

Senior Research Thesis:
**Estimating Carbon Storage in
Chesapeake Bay SAV
Ecosystems**

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Why SAV?

- Nature-based solution for climate change impacts
 - Atmospheric C sequestration through “**blue carbon**”: biomass and sediments
 - Less studied than other blue carbon ecosystems i.e. tidal marshes and mangroves

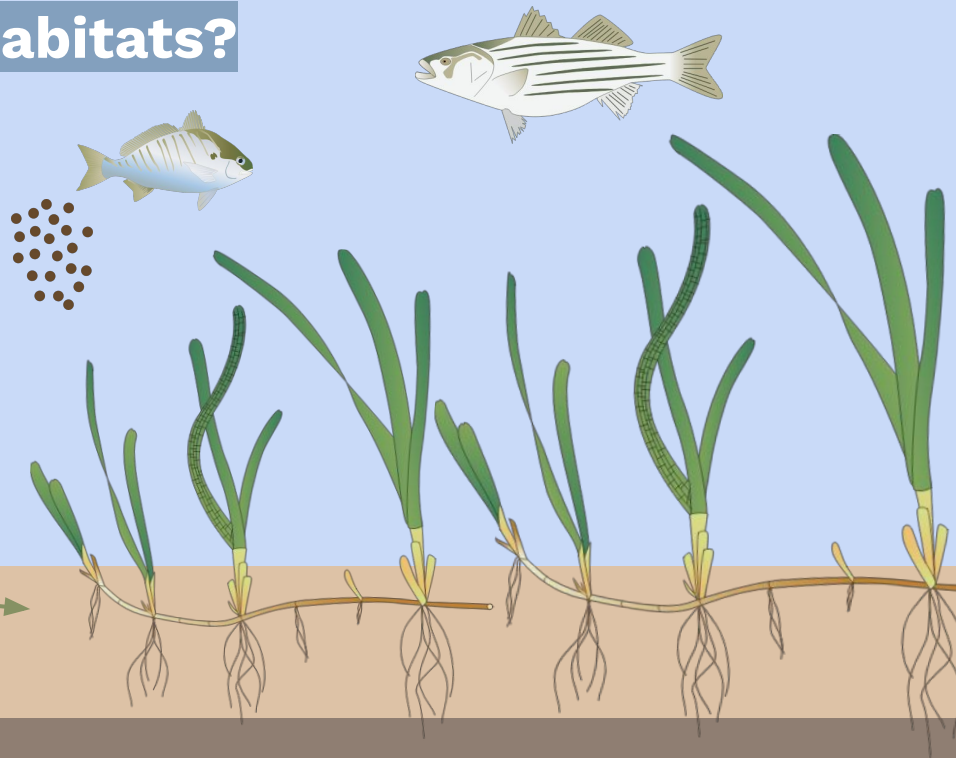
How is carbon stored in SAV habitats?

Sedimentation: plants restrict water movement

Diffusion: carbonate "rain" incorporated in sediments

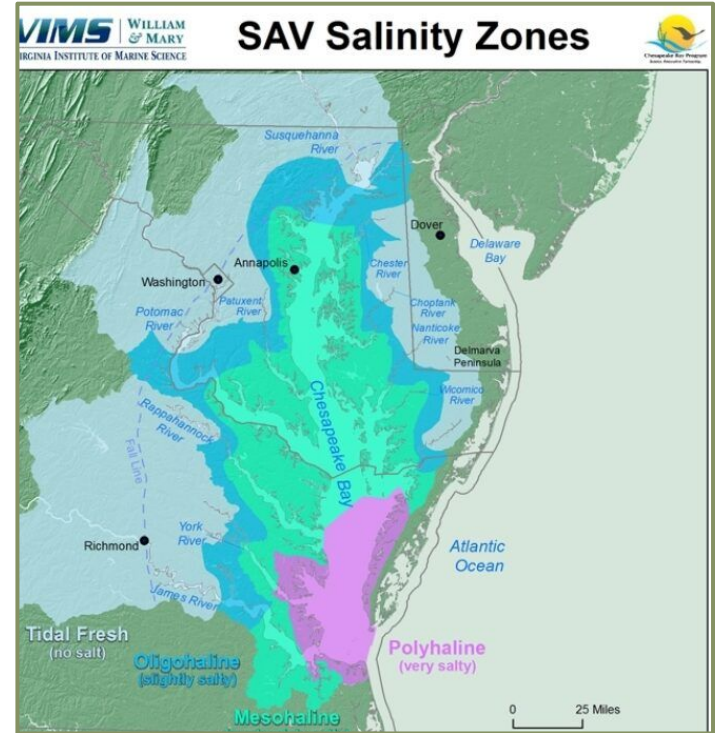
Biomass: carbon is incorporated via photosynthesis in leaves, tissues, stems and roots

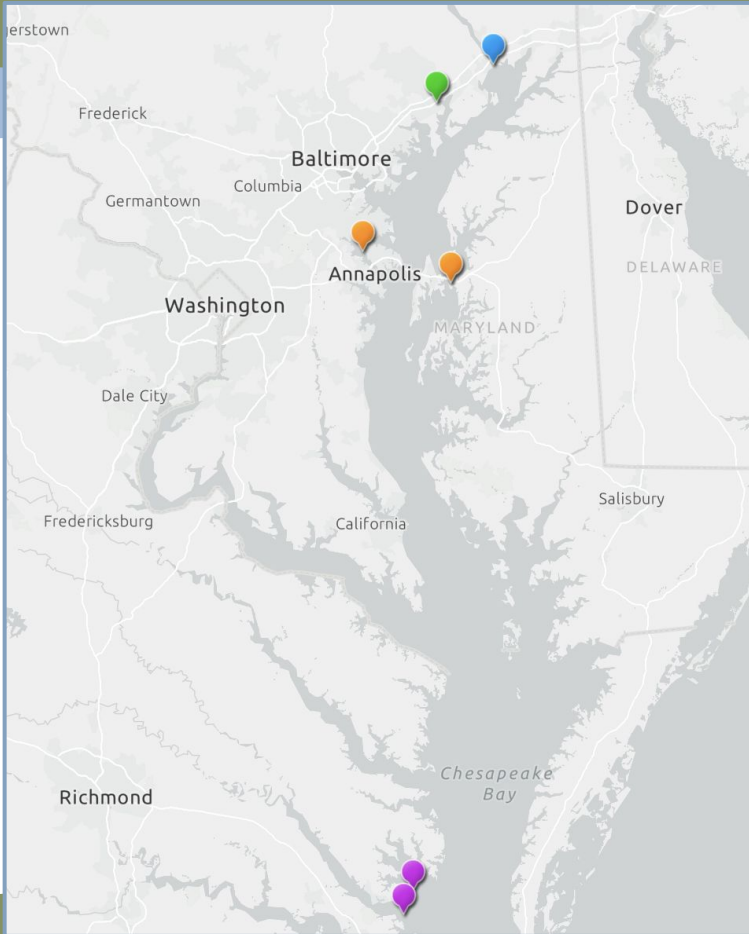
Burial: low rates of decomposition and high accumulation rates



Variability across salinity gradient:

- Hillman et al. 2020 (Louisiana)
- Distinct plant communities in each salinity zone
 - Different morphologies





Sampling Locations:

Blue: Susquehanna Flats -Tidal Fresh

Green: Otter Point Creek -Oligohaline

Orange: Severn River (West) and Marshy Creek
(East) - Mesohaline

Pink: Mobjack Bay (North) and Goodwin Islands
(South) -Polyhaline

Methods: Sediment

Methods from the Blue Carbon Initiative

- 3 cores taken at each site up to .5m (Russian Peat Borer)
 - Averaged 33cm
- Sliced into 5cm increments
- Dried, homogenized back at lab
- Sent out for elemental analysis to determine % C_{org}



Methods: Biomass

Field:

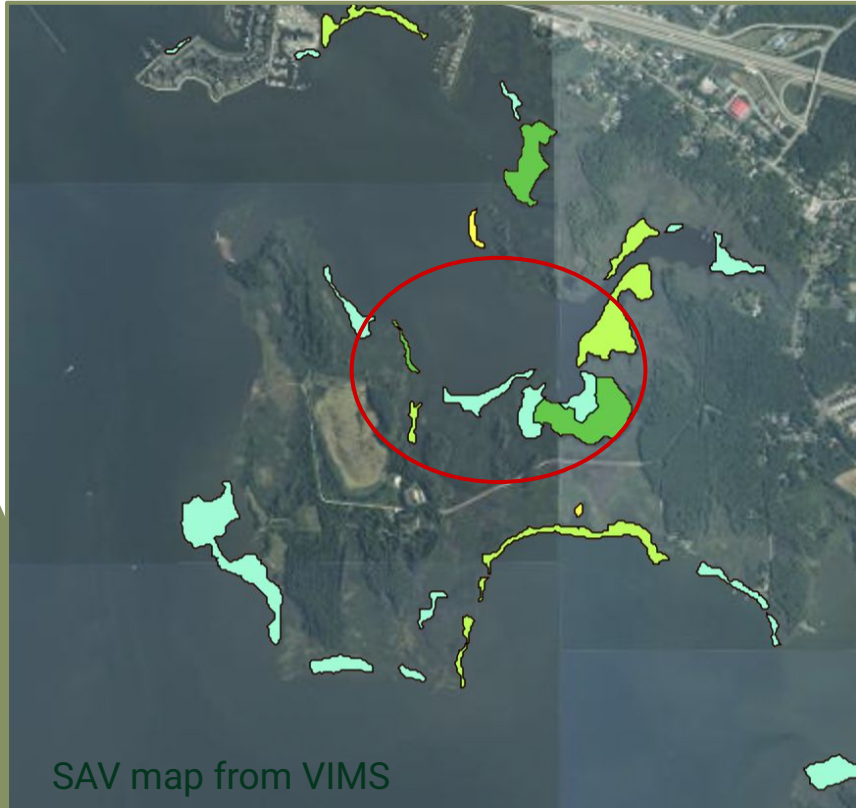
- 20 quarter meter quadrats per site
 - 1 biomass sample from each quadrat of the dominant species
- Shoot count, % cover and other characteristics

Lab:

- Separated AG and BG, dried and weighed
- .34 carbon conversion factor
- Determined the amount of biomass carbon in each quadrat



Preliminary Results: Marshy Creek Site



Sediment carbon stock:

$67.1 \pm 7.32 \text{ MgC/Ha}$

Biomass carbon stock:

$2.06 \pm .04 \text{ MgC/Ha}$

Next Steps



Evaluate C
stock at 5 other
sites



Create graphs/
graphics



Write full scientific
report



Present to JHU
Department (and
here again,
hopefully!)

Thanks!

Do you have any questions?
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