Exploring the role of stingrays as predators and habitat engineers in Virginia's seagrasses

April – August 2022 pilot experimental study and proposal draft, preliminary results

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Presented by Enie Hensel in October 2022 to update Chesapeake Bay's SAV Working Group on current and upcoming projects.

Photo by Desiree Groff

Seagrass ecosystems are important biogenic habitats that are shaped by local physical and biological processes

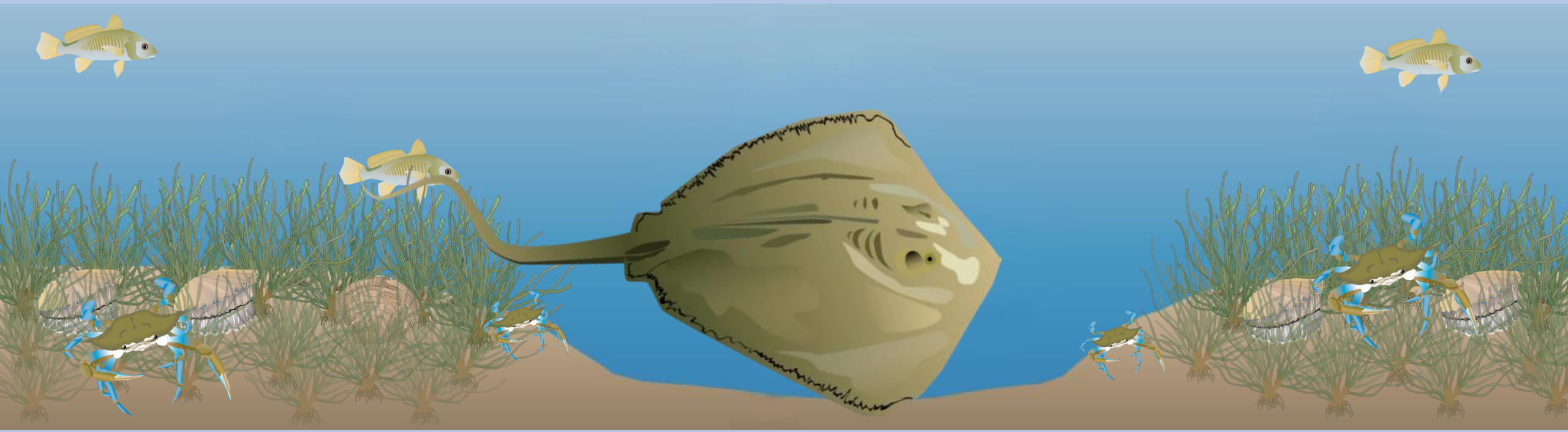
PILOT STUDY INSPIRED BY

- marine megafauna as ecosystem health indicator species (restored beds)
  - Multiple species observed in Coastal Va Bays
- Understand the ecological role of rays as they are ubiquitous mesopredators (few studies)
  - Unknown mechanistic effects, leading to varied directional ray effects
  - Largely thought of as pests or unknown

experimental pilot study and proposal concept draft, preliminary results

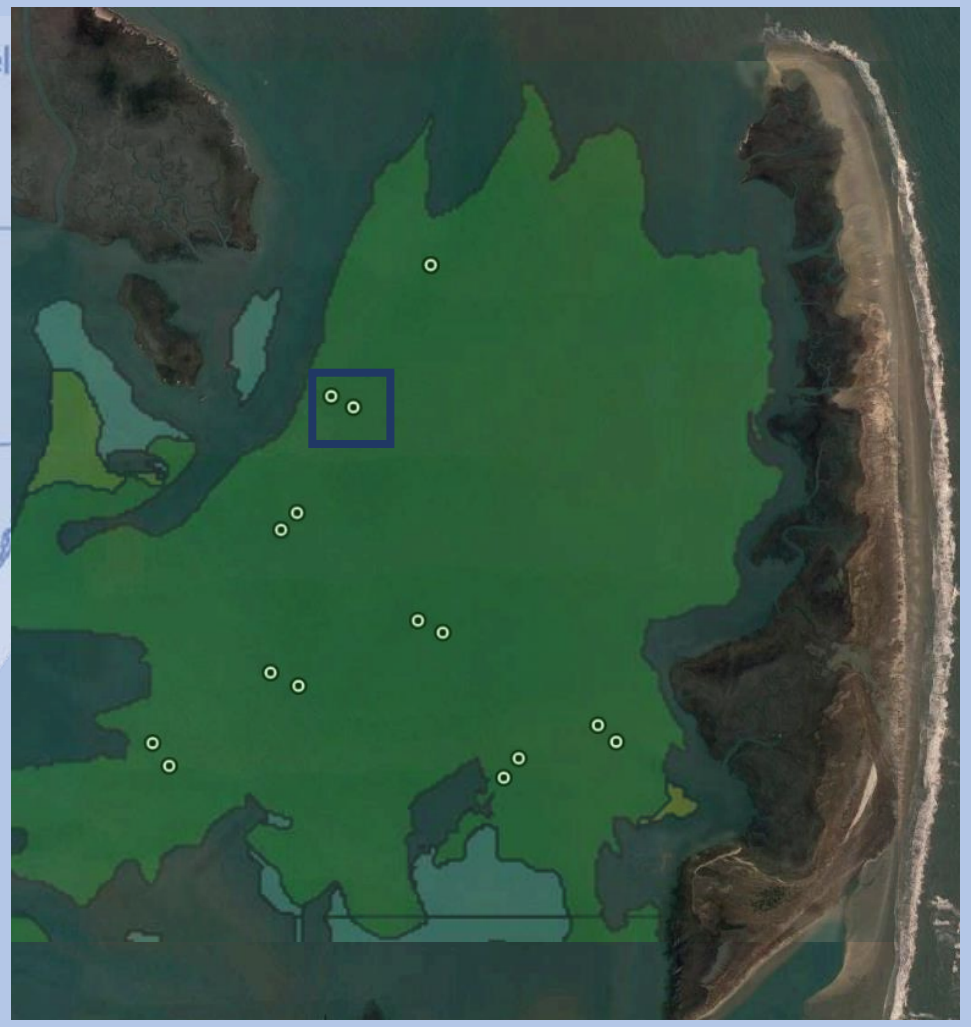
How does ray benthic foraging alter seagrass heterogeneity?

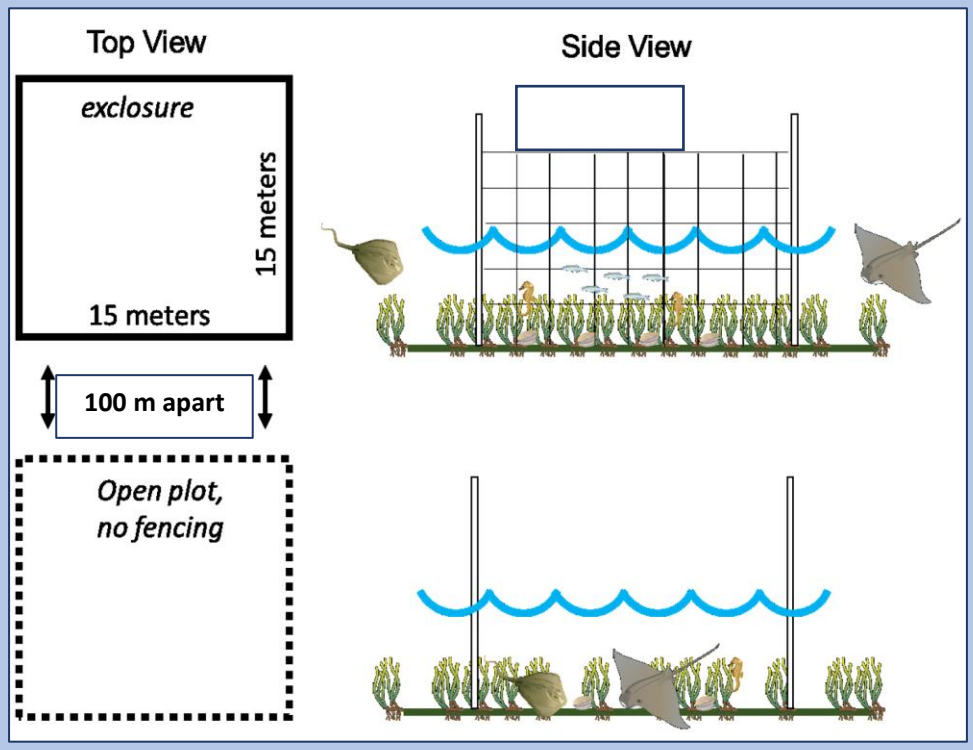
What are the cascading effects of ray foraging holes on predator-prey interactions?



Pilot Study conducted in South Bay, Va

paired-plot design along a continuous gradient of bivalve densities





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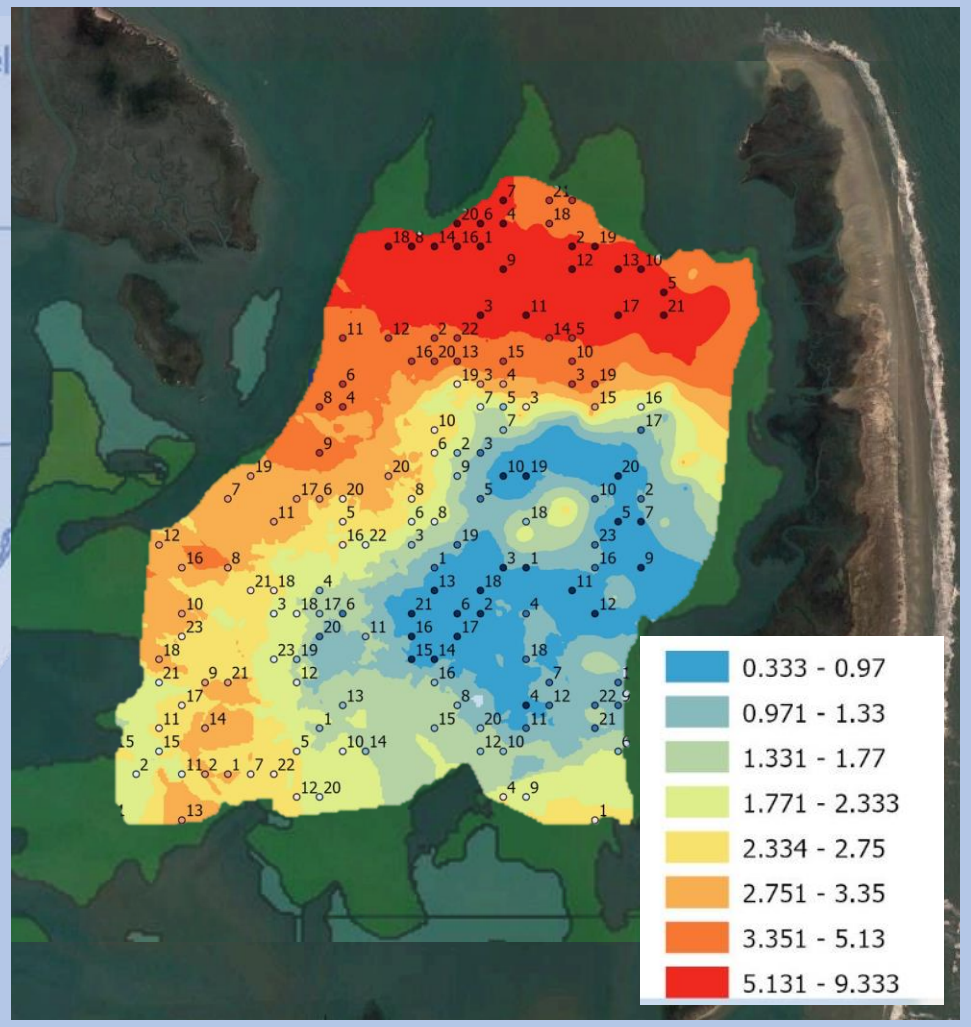
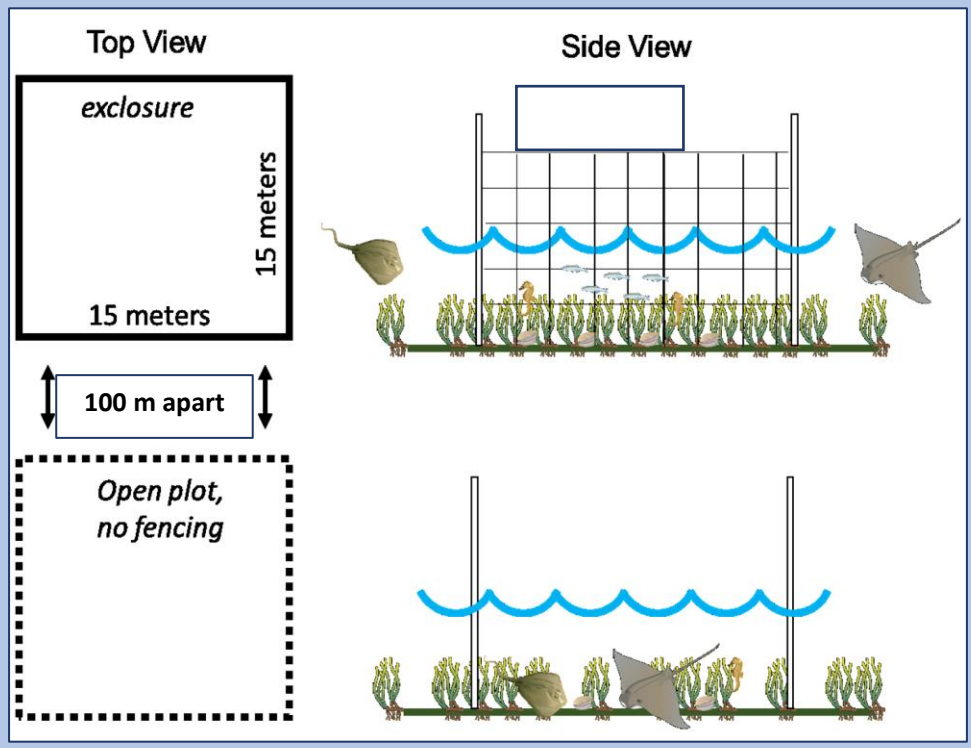


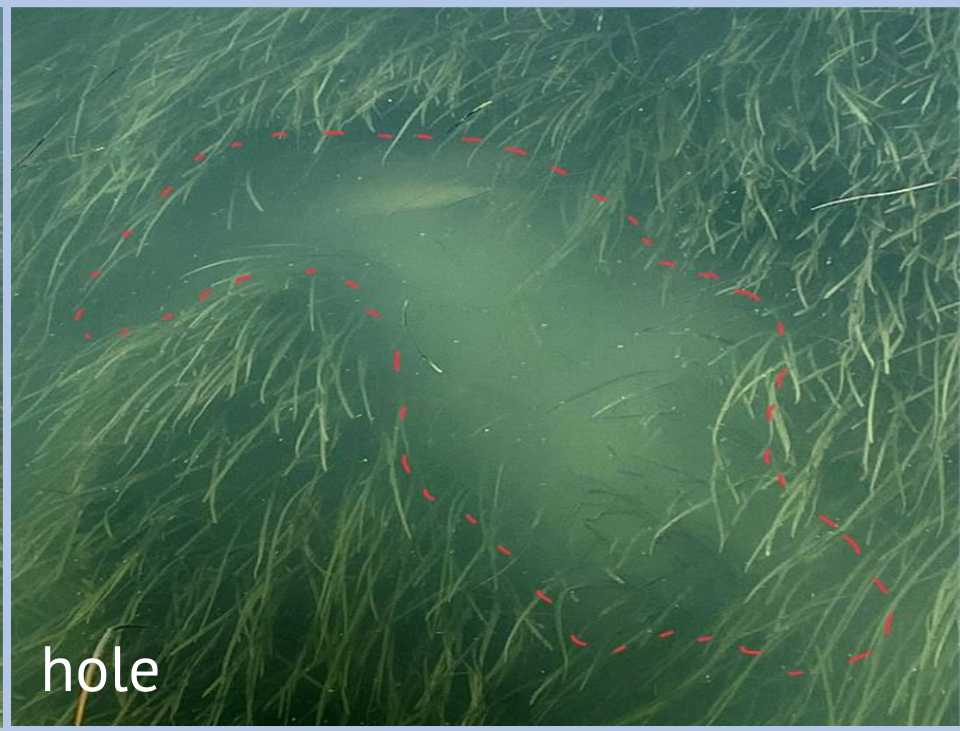


South Bay wide surveys also conducted

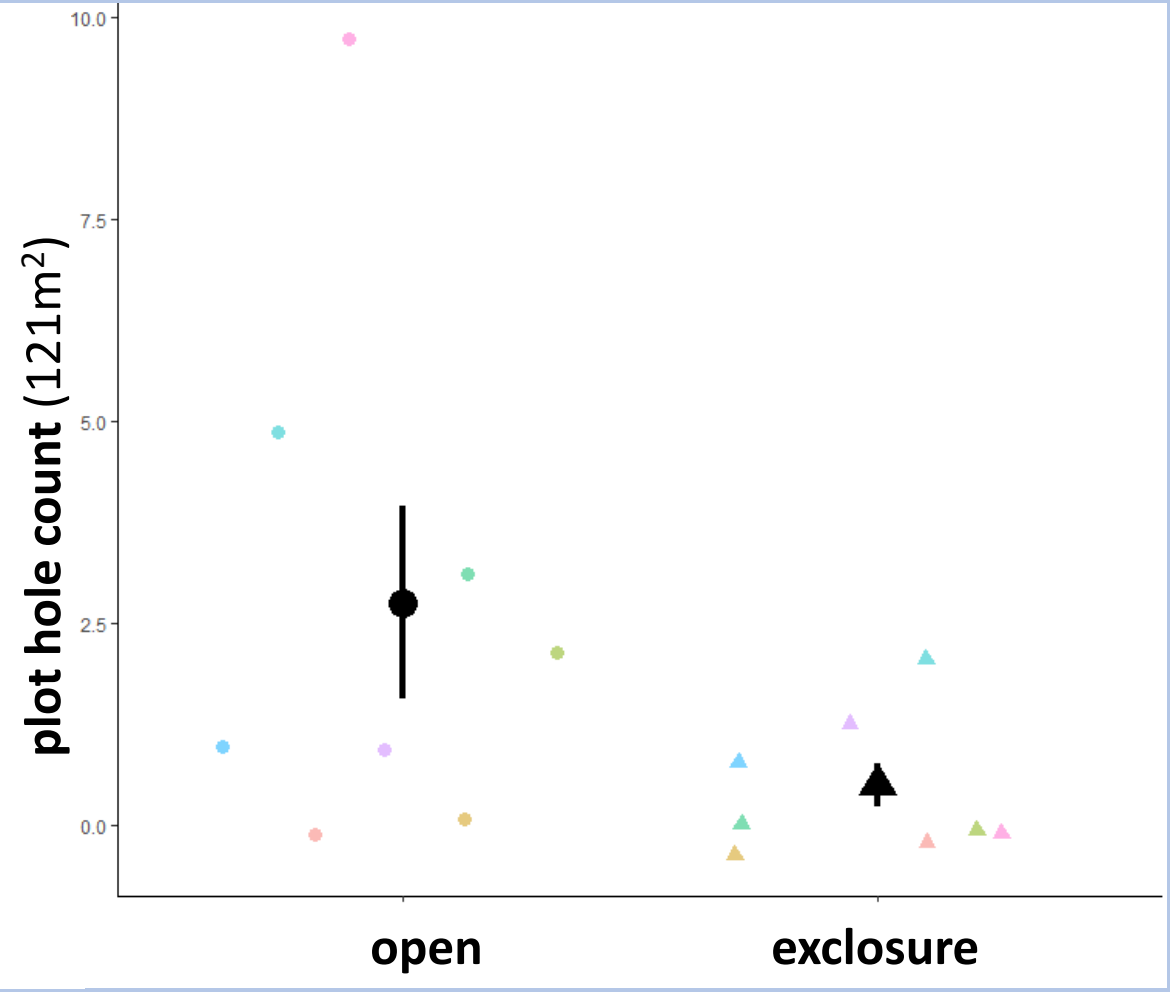
- ray hole definition was standardized in surveys and exclosures


exclosure


seagrass


hole

Exclosures had fewer large, bare depressions than open plots



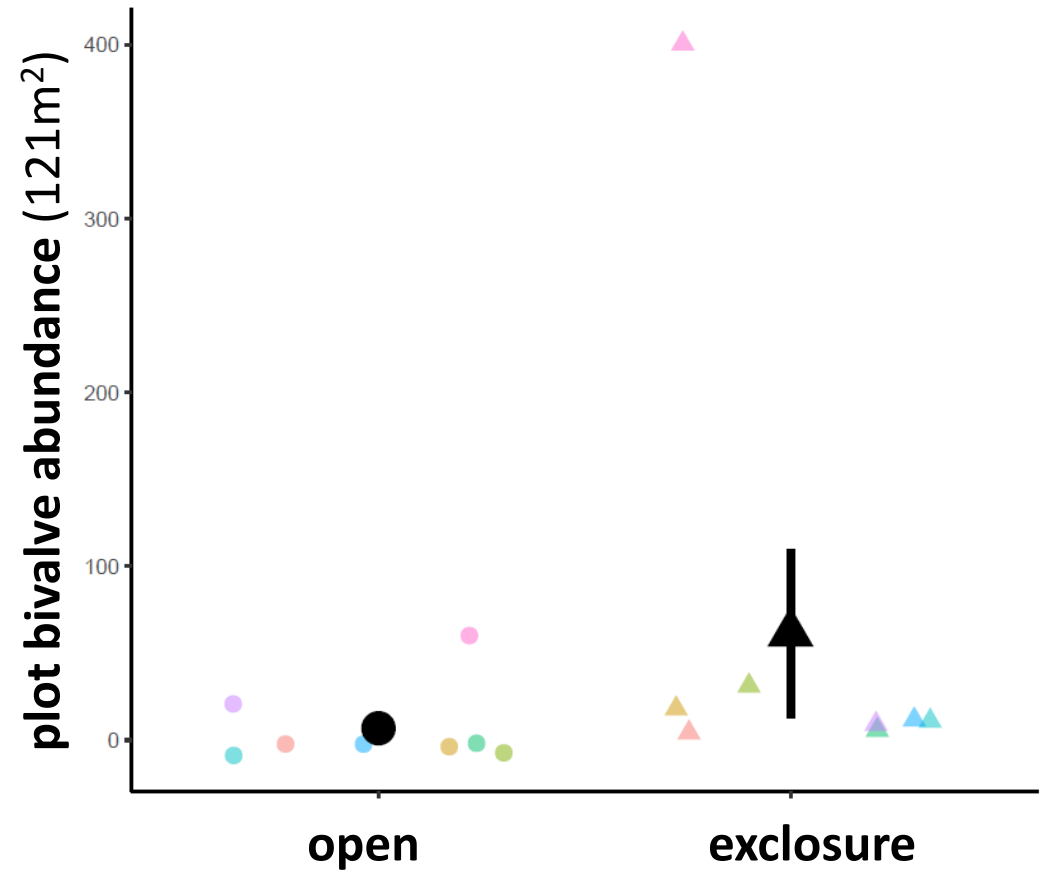
- Next steps – investigate how ray foraging holes may alter nearby seagrass structure complexity, i.e., shoot density and canopy height
- led by Hayden Acors, VIMS undergraduate honor's thesis

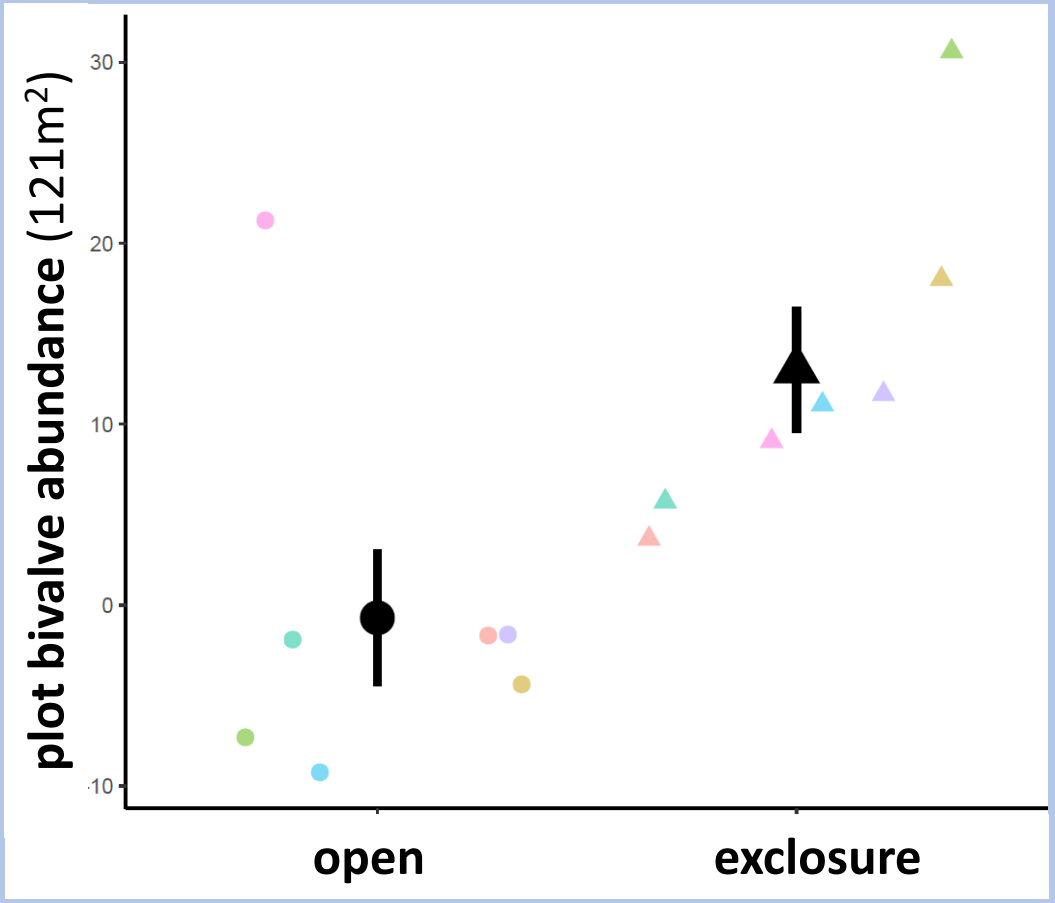
experimental pilot study and proposal concept

draft, preliminary results

Exclosures have more bivalves compared to oppose to open plots

- Next steps – observe how the abundance of different bivalve size classes differs between treatments





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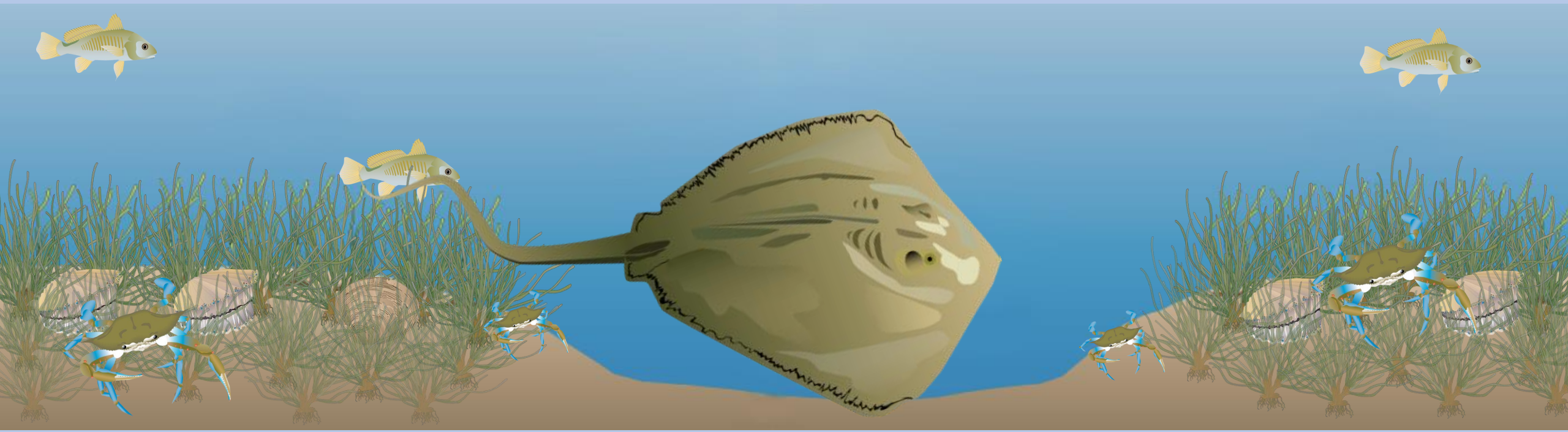

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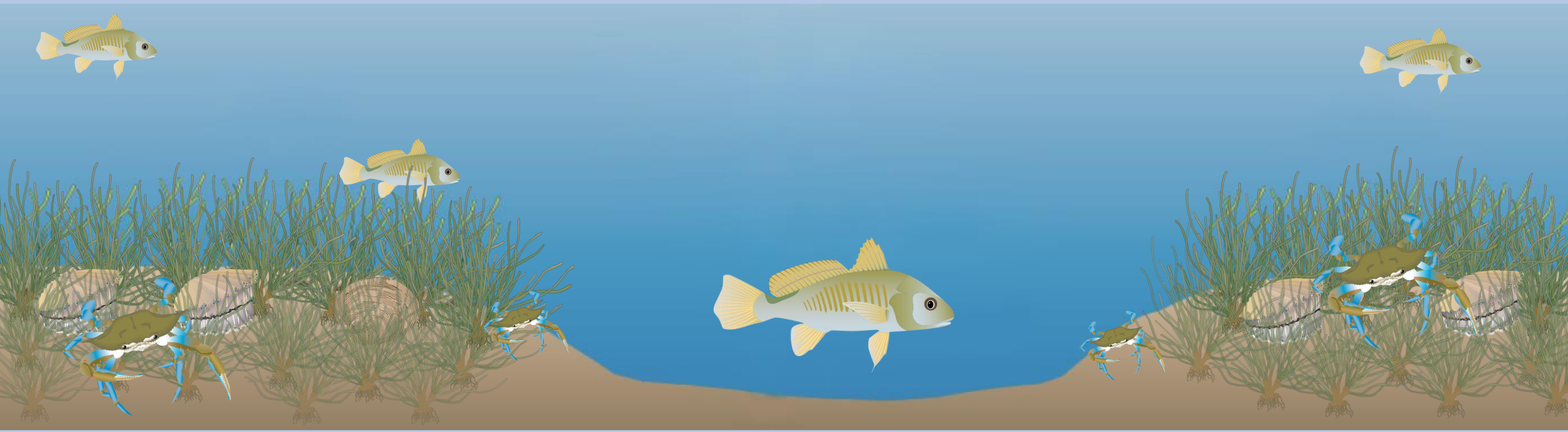


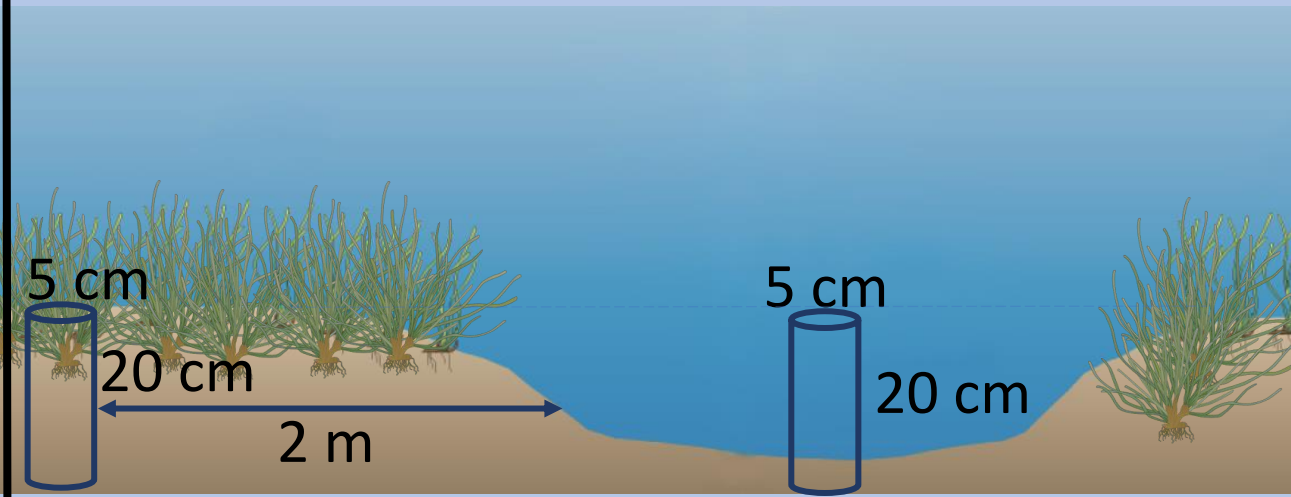
Using a paired design, we measured differences in predation and bulk carbon – Tiffany Hwang REU student

Tether experiment

- n = 10 paired holes, open seagrass
- 24-hr soak, repeated 3 days
- GoPro footage, repeated 2 days

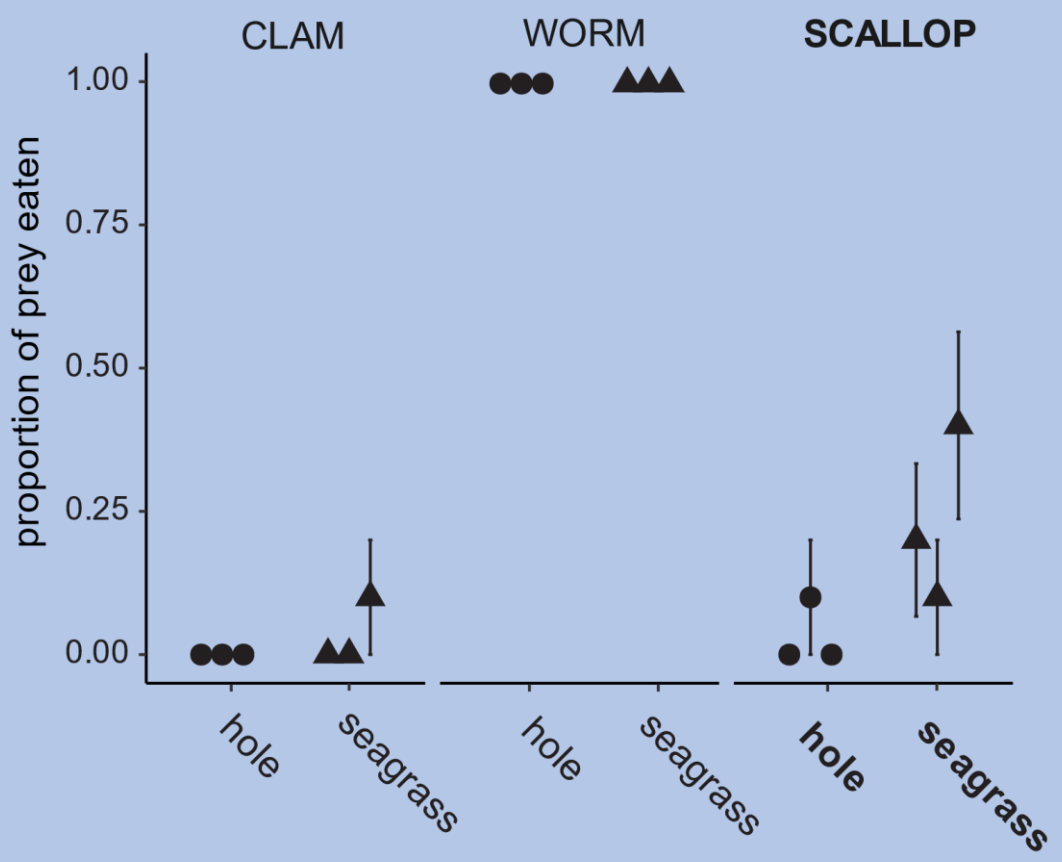
Bulk carbon storage

- n = 10 paired holes, open seagrass
- Benthic core 20 cm down from bed's surface
- Organic and inorganic material separated and processed



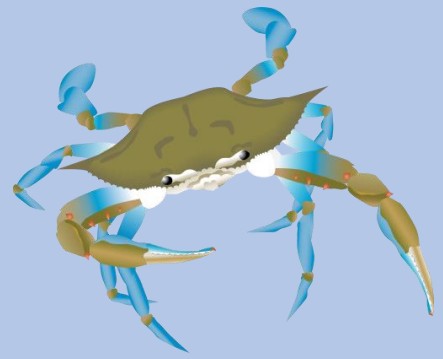
Tiffant Hwang, REU student results

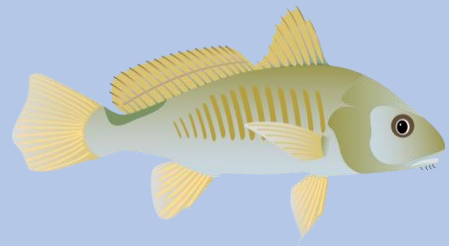
Ray holes altered what prey type was consumed in 24 hours



prey*plot F(2,163) = 4.3, p = 0.01

- Scallops were targeted ~25% more in seagrass than ray hole edges





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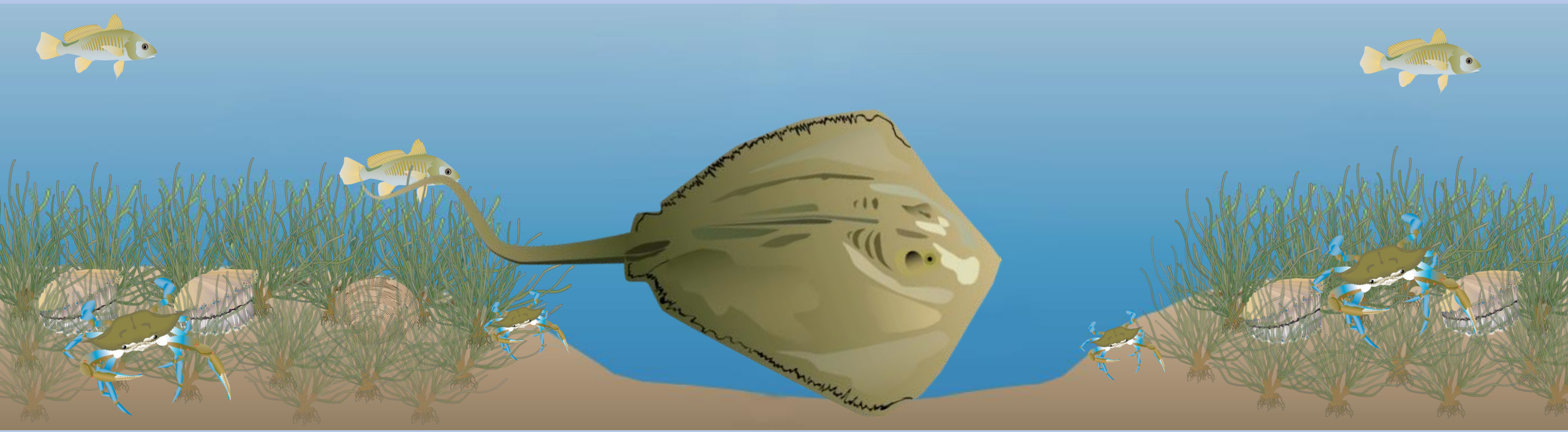
Preliminary observations

- Ray foraging appear to change local scale habitat heterogeneity, altering predator-prey interactions
- survey observation - ray foraging locations appears to be selective



Acknowledgements

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VIMS REU 2022 Program

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