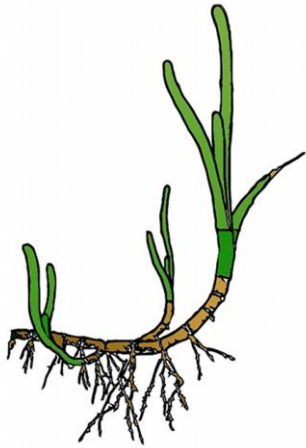


Macrophyte community and population dynamics in the GoM: implications for rapid ocean warming



Nicholas Yoong



Katie DuBois, Olivia Bronzo-Munich, Everett Horch, Tori Bacall, Bridget Patterson, Barry Logan, David Carlon

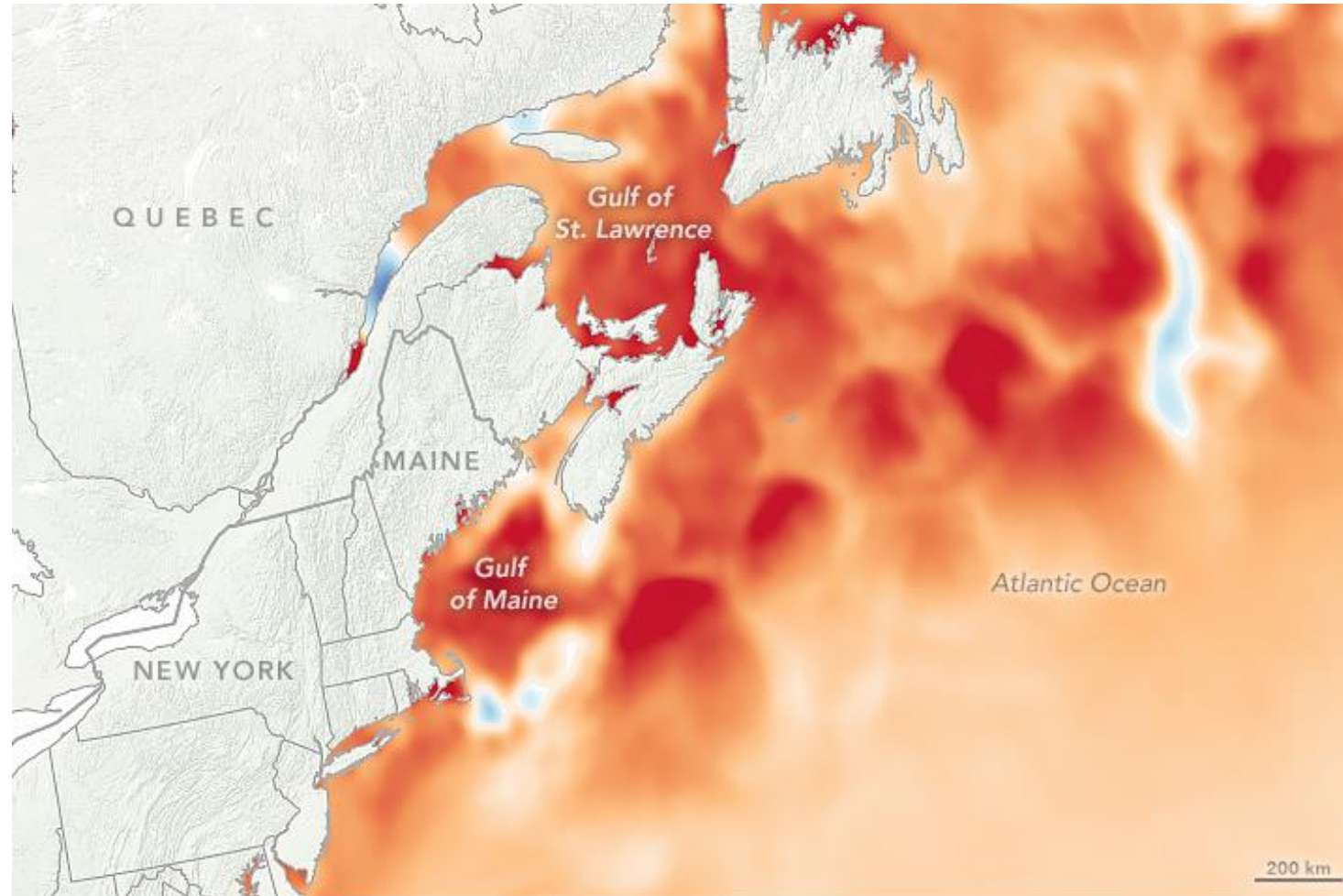
A wide-angle photograph of a coastal wetland. The foreground and middle ground are dominated by a dense field of eelgrass (Zostera marina) with long, narrow, green leaves. The plants are growing in shallow, muddy water. In the background, a calm body of water extends to a distant shoreline with a line of trees under a clear sky.

Eelgrass (*Zostera marina*)

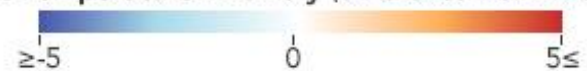
A close-up photograph of Knotted Wrack (Ascophyllum nodosum). The image shows a dense cluster of the seaweed's characteristic knotted, yellowish-brown, bulbous structures. The knotted structures are interconnected by thin, green, leaf-like blades, creating a complex, textured appearance.

Knotted Wrack
(*Ascophyllum nodosum*)

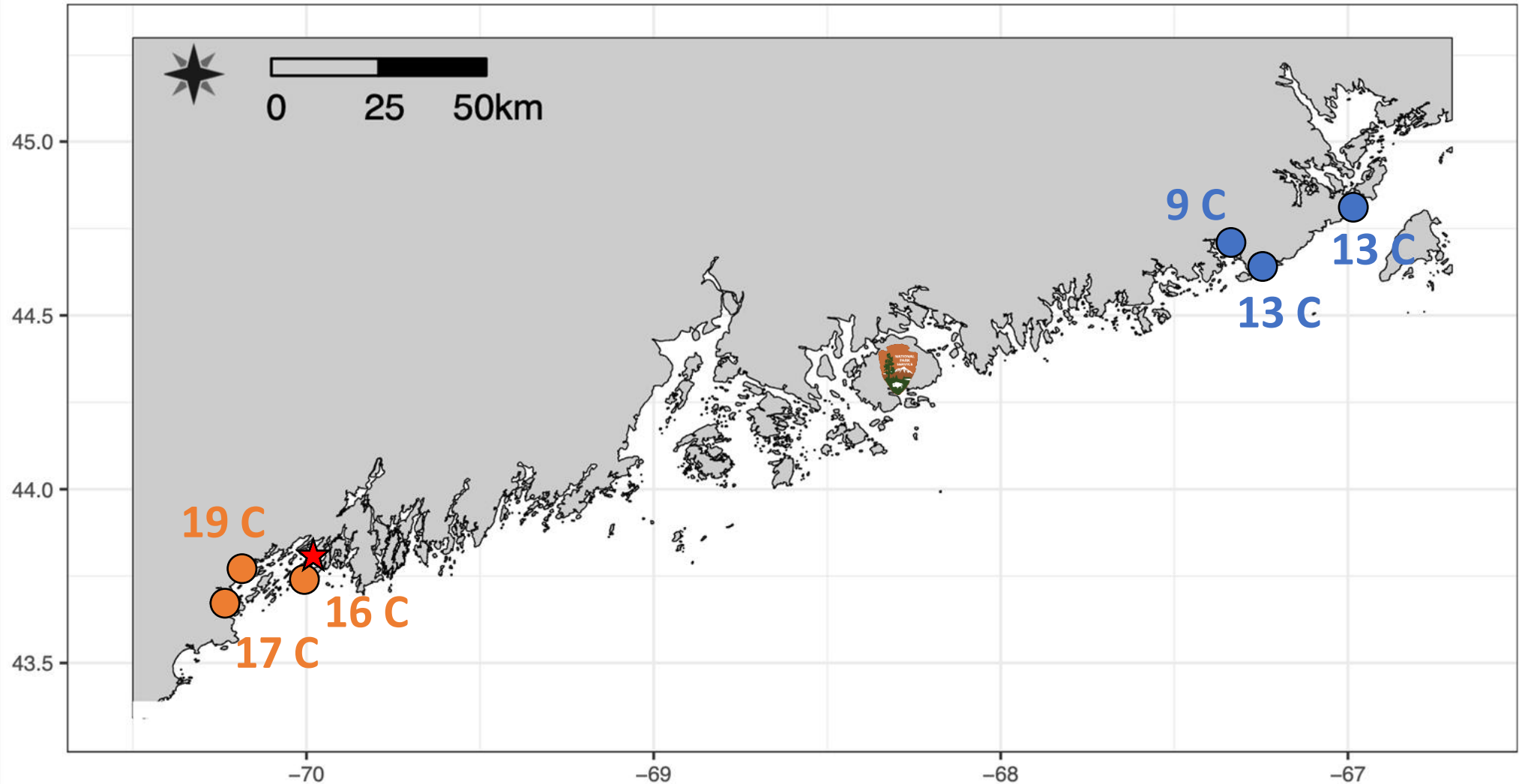
Gulf of Maine: Fastest rates of ocean warming across the globe



August Sea Surface Temperature Anomaly (difference from 1985-2012 average, °C)



Six field sites spanning regional differences in temperature

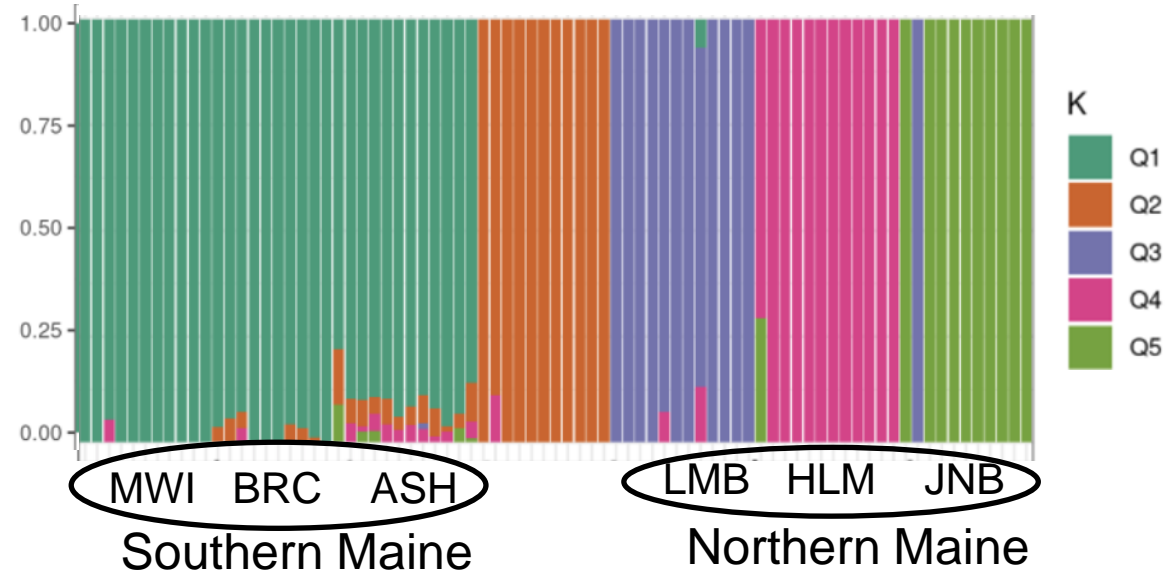
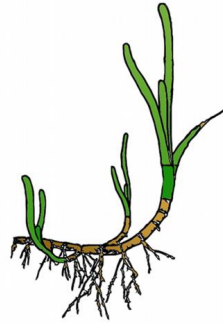


Field Surveys at six sites:

- Tissue for population genomics
- Individuals for eelgrass and knotted wrack warming experiments
- Multi-year surveys of eelgrass density and invertebrate communities

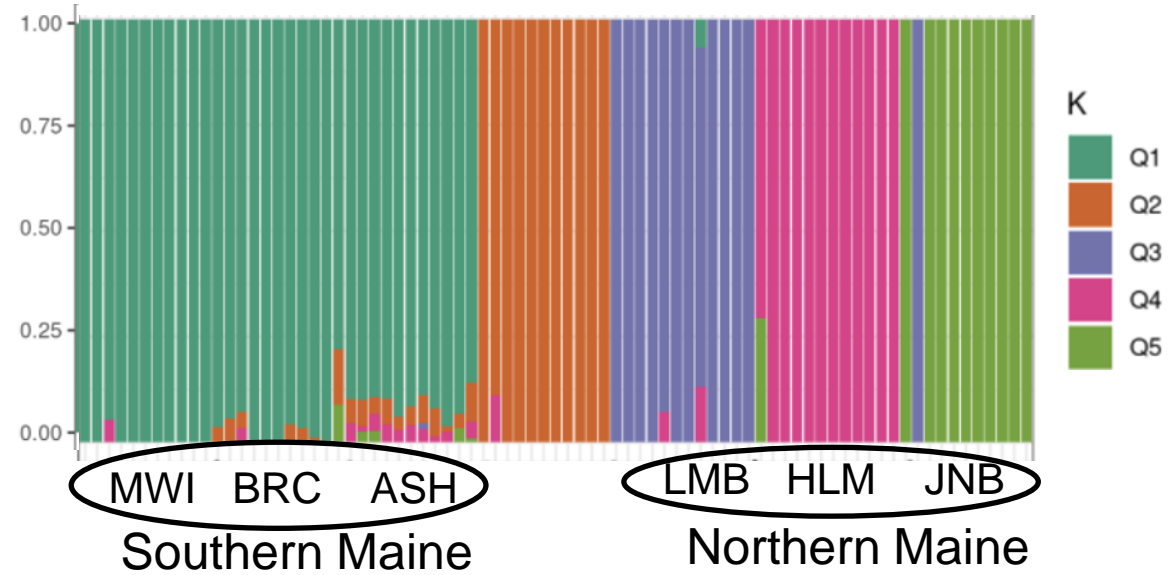
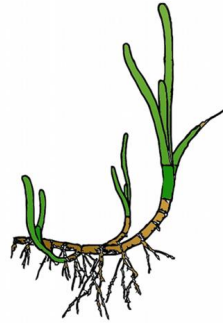


Preliminary population genomics results: Admixture

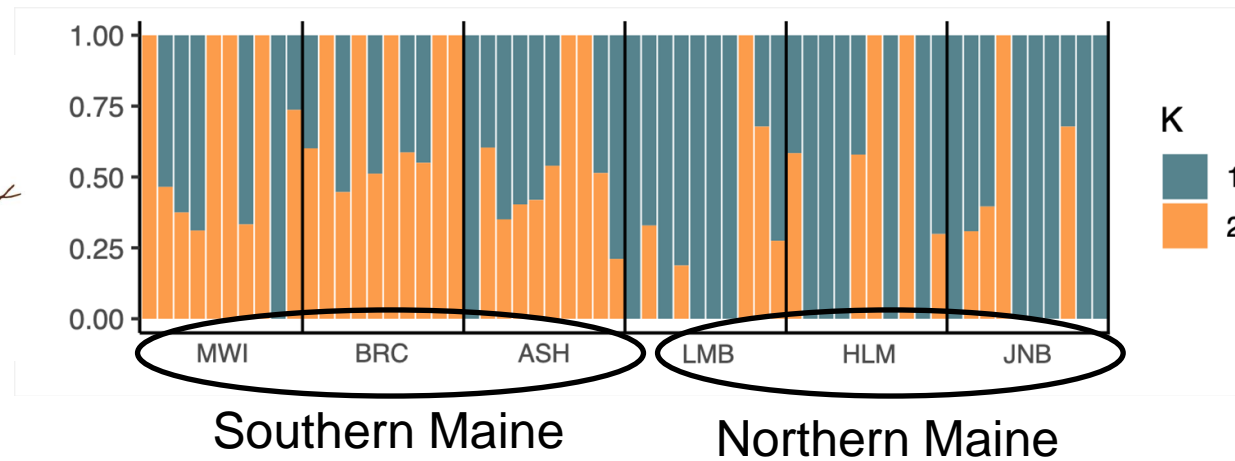


Nicky Yoong '24

Preliminary population genomics results: Admixture

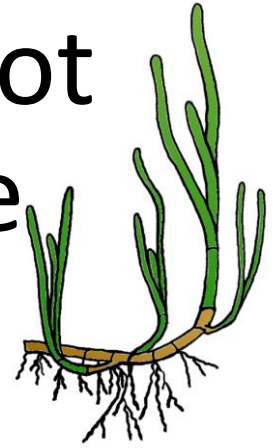


Nicky Yoong '24



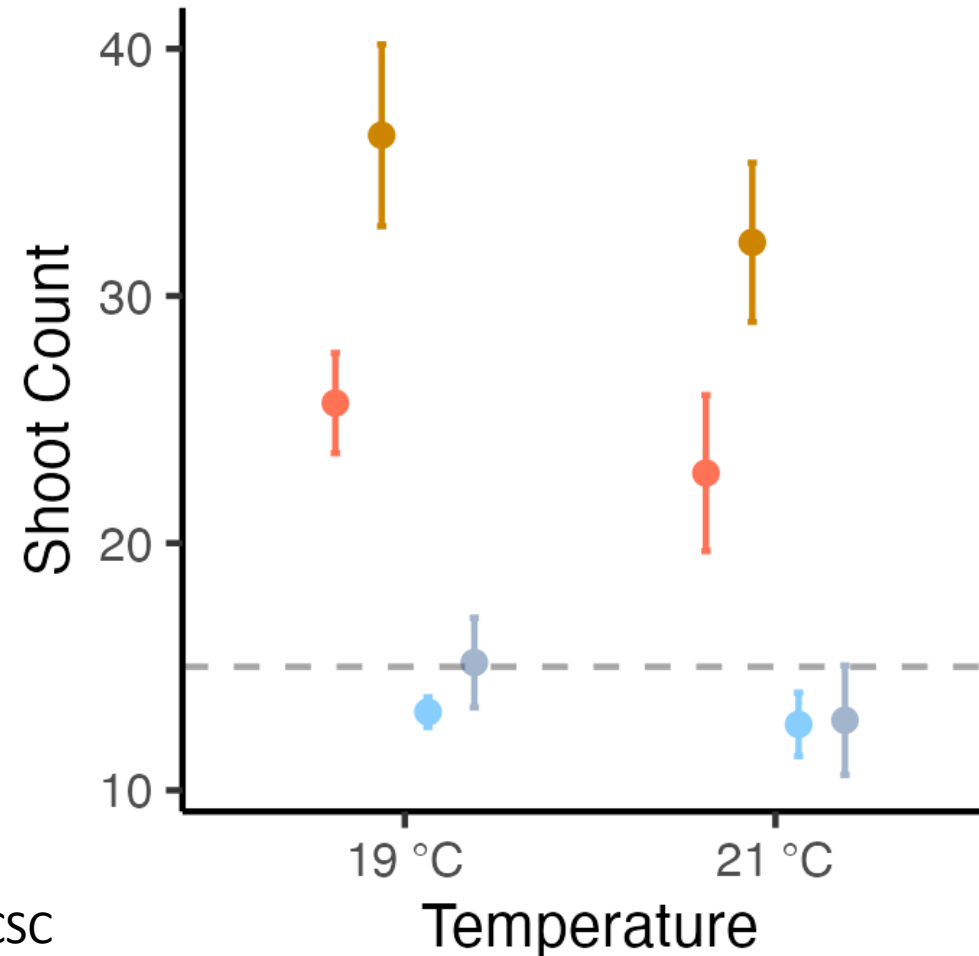
Olivia Bronzo-Munich '23

Regional differences in eelgrass clonal shoot reproduction in response to temperature



Average Summer Field Temperature

● South1	17 C
● South2	19 C
● North1	13 C
● North2	13 C



Eelgrass Population

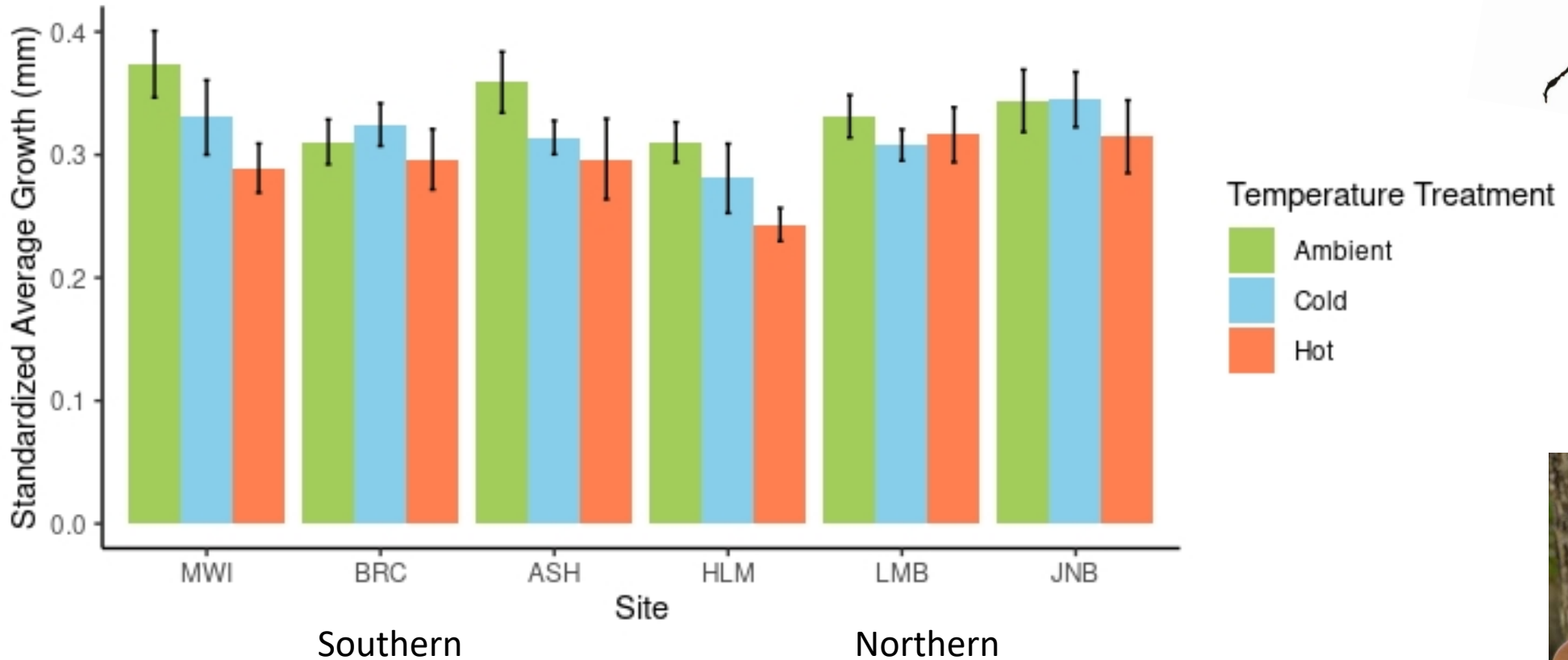
- South1
- South2
- North1
- North2



Everett Horch '24

1-Month Growth Experiment at SCSC

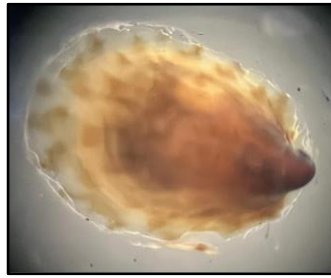
Little evidence of knotted wrack population differences in growth across temperature



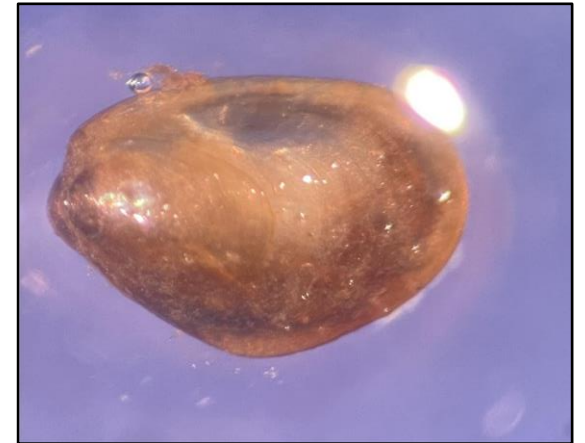
1-Month Growth Experiment at SCSC



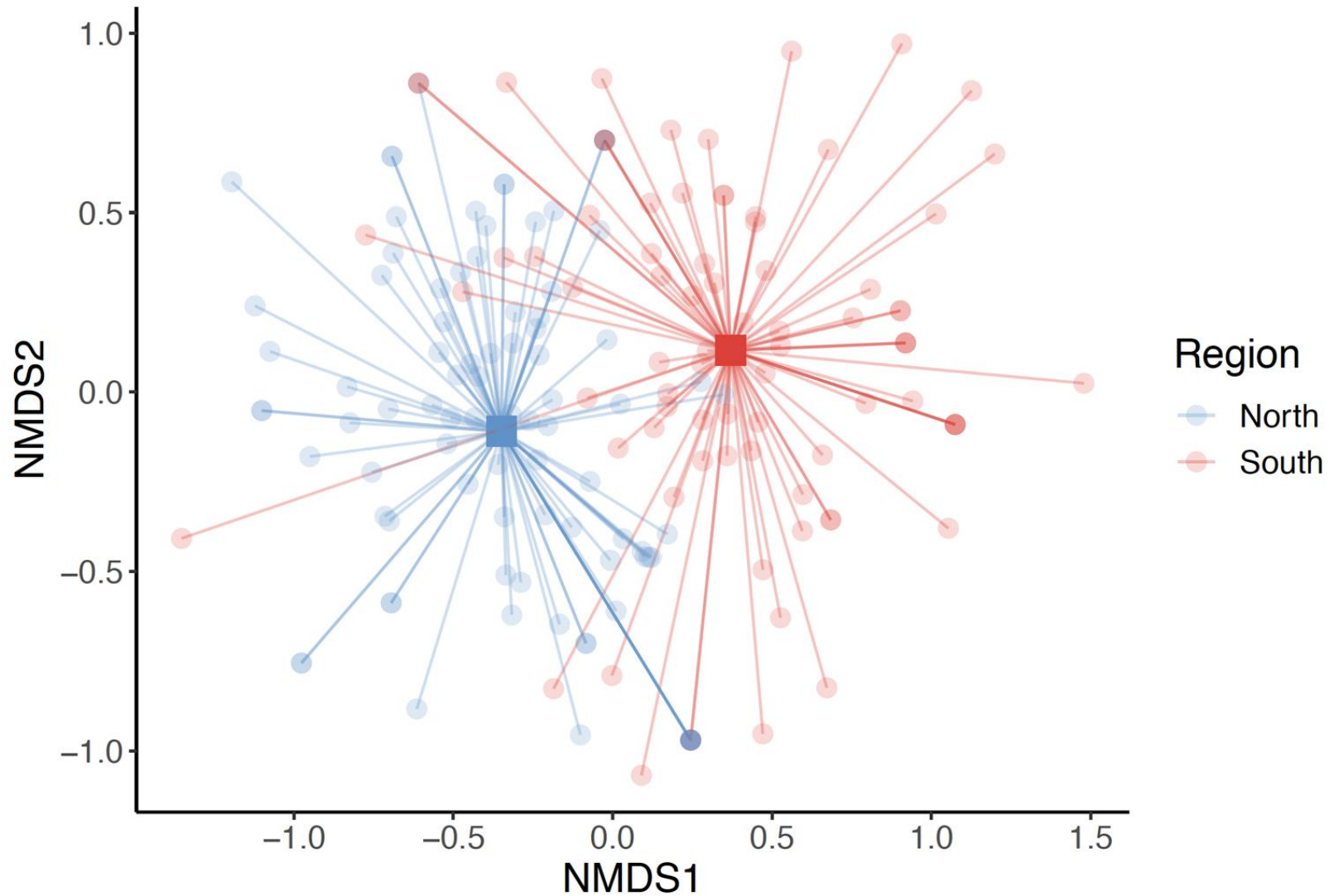
Tori Bacall '26



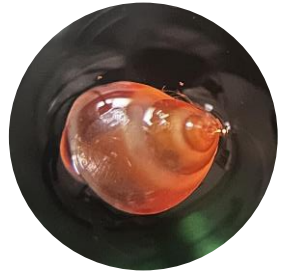
Epifauna!



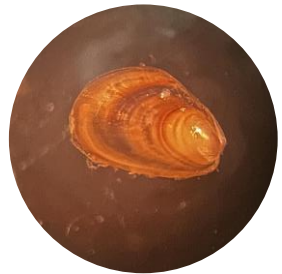
Regional Difference in Eelgrass Epifaunal Community!



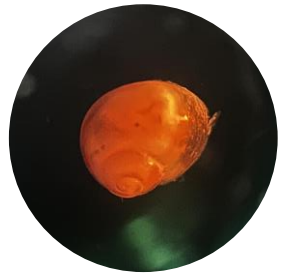
Regional Difference in Eelgrass Epifaunal Community!



Lacuna vincta

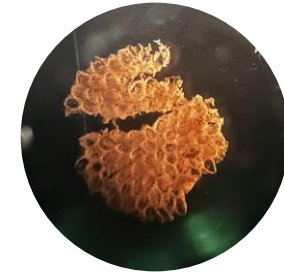


Mytilus edulis



Littorina obtusata

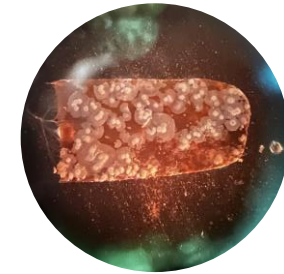
North



Cribrilina mutabilis

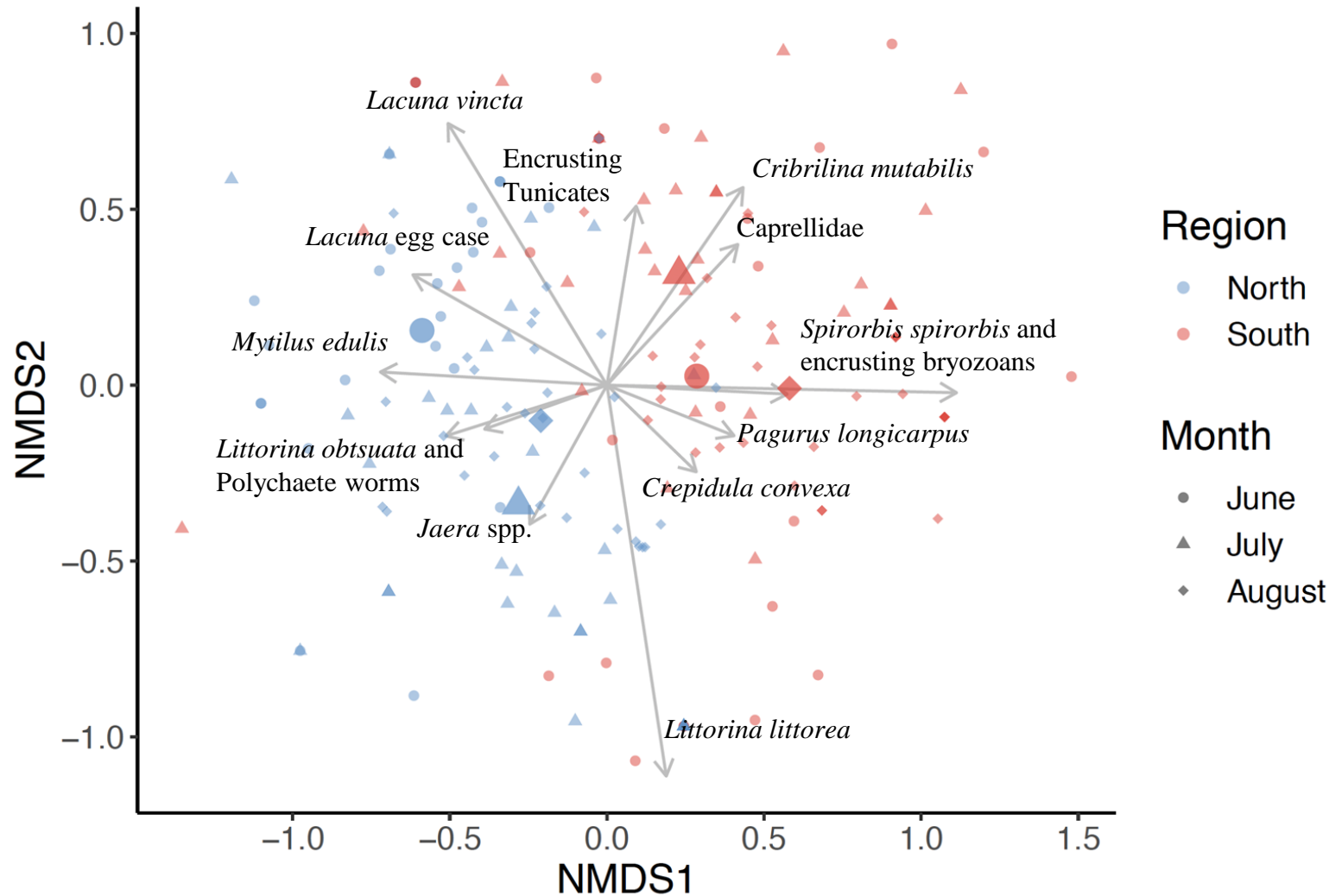


Caprellid amphipod



Encrusting bryozoan

South



Region

- North
- South

Month

- June
- ▲ July
- ◆ August



Climate Desk

Casco Bay eelgrass dropped by half in four years, report finds

Maine Public | By Murray Carpenter

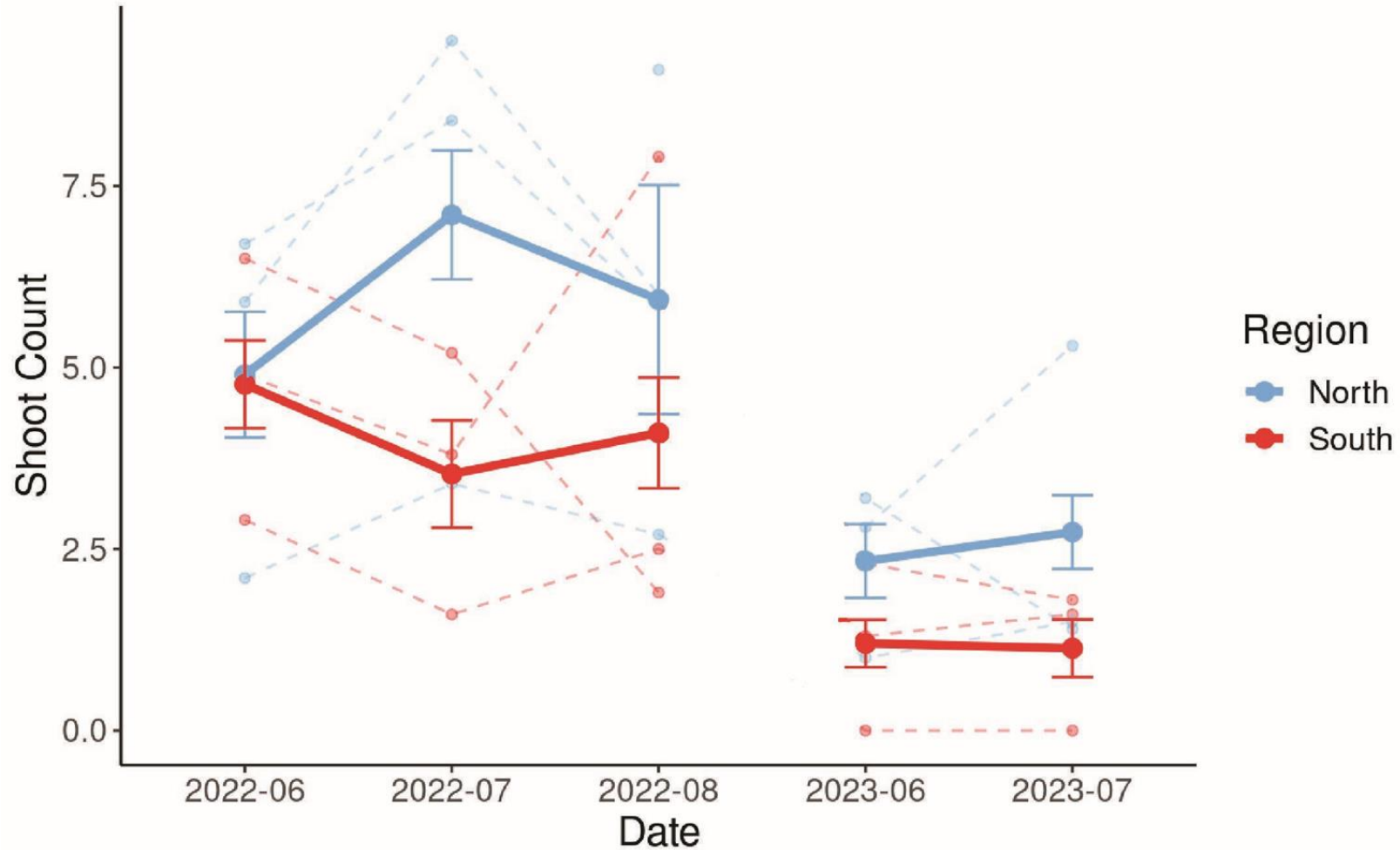
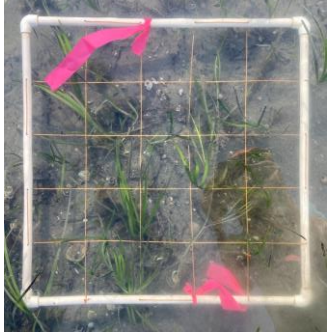
Published March 23, 2023 at 4:07 PM EDT



Stephen Karpiak / Via The Friends Of Casco Bay

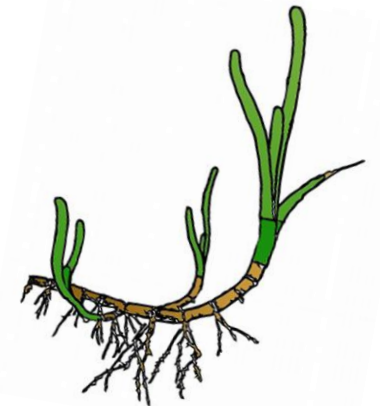
The report from the Department of Environmental Protection calls the loss of 54% of eelgrass abundance "staggering."

Evidence of impacts warming event across our six field...



How will GOM warming impact macrophyte populations and communities?

- Knotted wrack populations are highly mixed and have a broad thermal range
- Eelgrass populations show structure within regions and sensitivity to site-level temperature differences within regions, though we observed state-wide declines in eelgrass density after a marine heatwave
- Eelgrass epifaunal communities differ across regions





Questions?



kdubois@bowdoin.edu



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