



LIFE NEAR THE SEAFLOOR



Assessing Species/Seafloor and Species/Habitat Relationships using Remote Underwater Video Systems

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Seafloor Struggles

The Gulf of Maine, located in the northwest Atlantic Ocean, is biologically, ecologically, and socio-economically important. The Gulf of Maine supports over 3,300 species of flora and fauna.⁶ Humans have negatively impacted this region by overfishing cod,^{1,5} implementing bounties on harbor and gray seals,^{3,4} instigating warming through human induced climate change,⁵ and altering seafloor habitats through trawling and urchin collection.² Over the last several decades, benthic communities in the Gulf of Maine have experienced changes in relative abundance, distribution, and habitat occupation likely due to anthropogenic activities.⁶ Although changes in species-habitat relationships are known to have been occurring, they are not fully understood.²

Research Question

How are the abundances and distributions of marine species in the Gulf of Maine impacted by seafloor geomorphology and habitat variation?

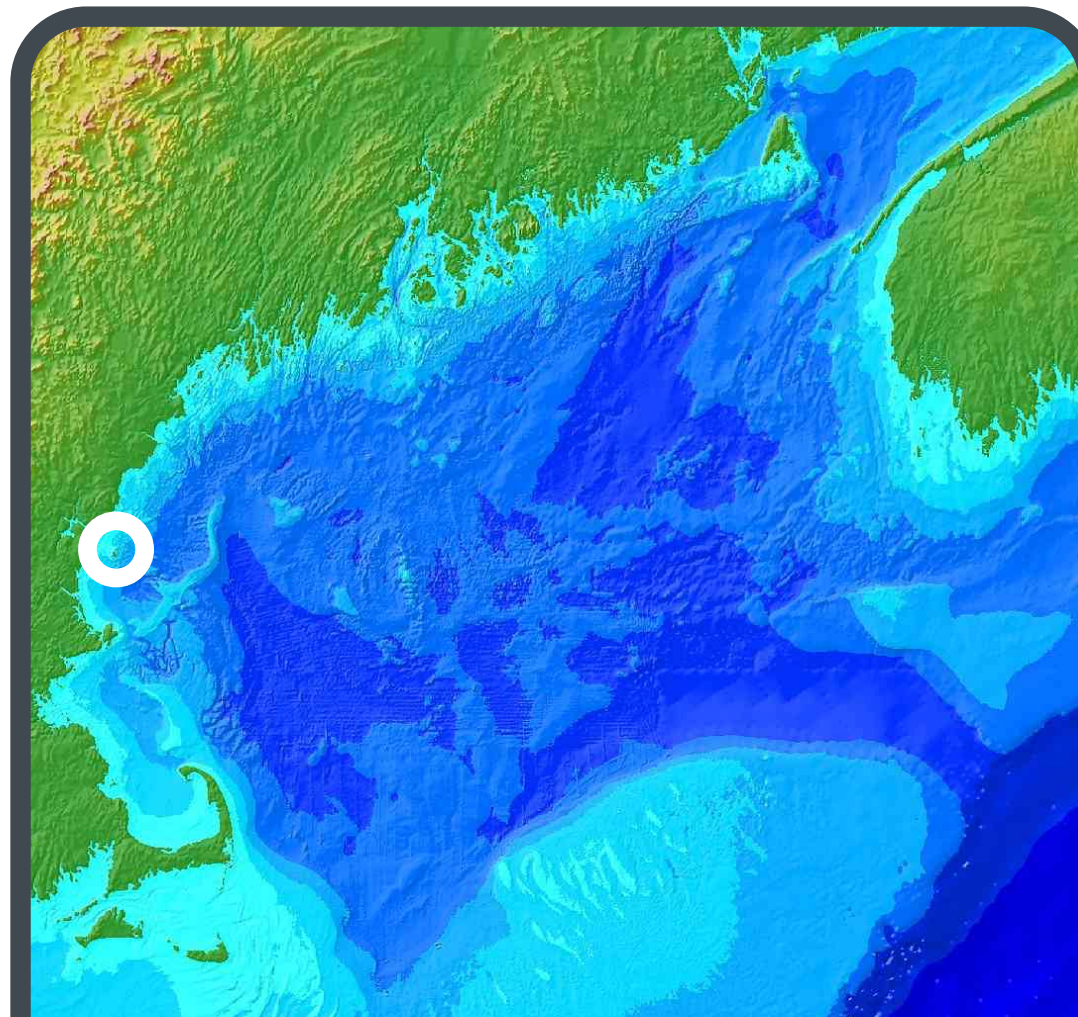


Figure 1: Gulf of Maine with Appledore Island circled. Image Credit: Ed Roworth & Rich Signell, U.S. Geological Survey.



Figure 2: One of three identical RUVS used in this study. They are PVC structures that hold an AKASO EK7000 camera about a foot above the seafloor.

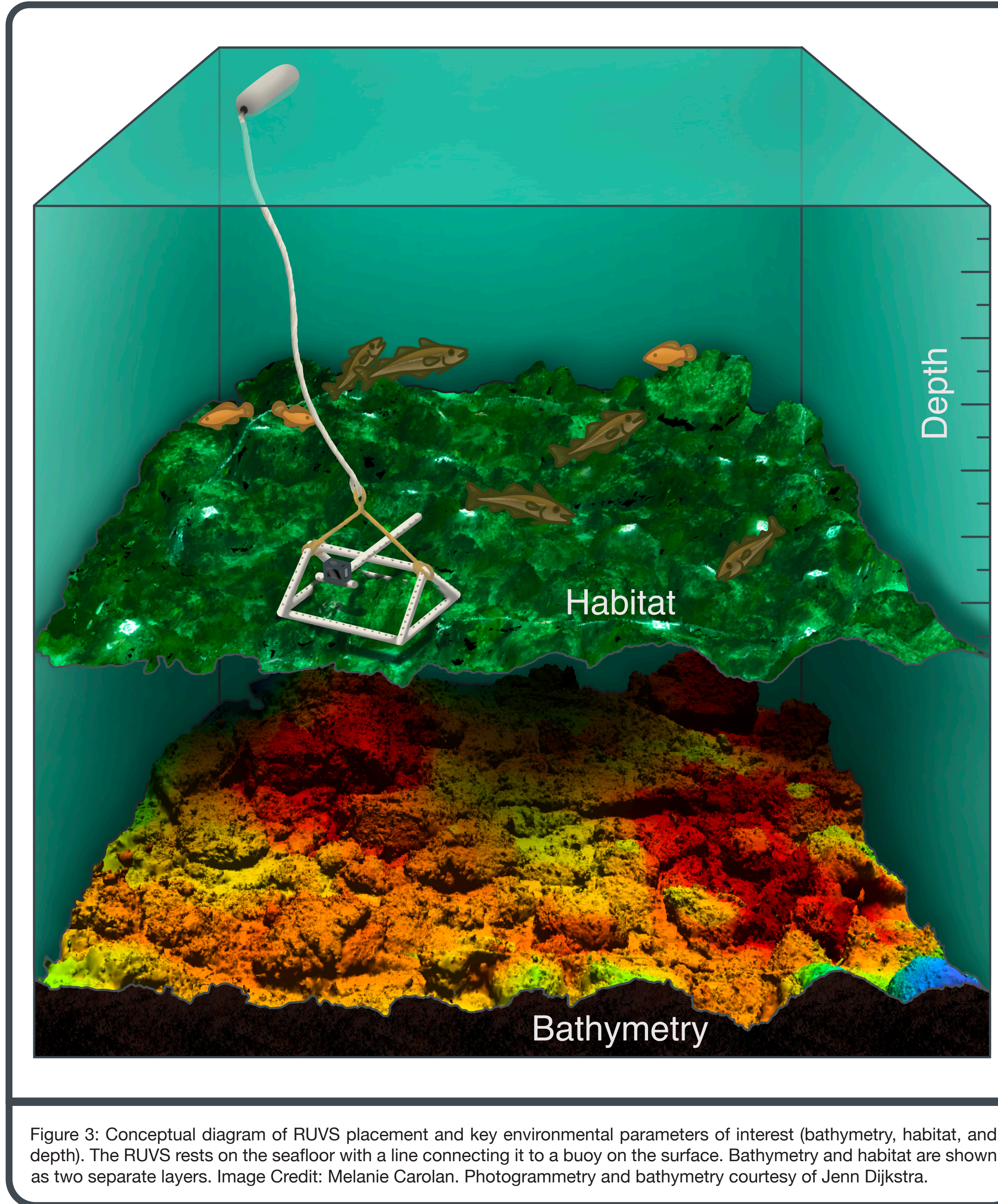


Figure 3: Conceptual diagram of RUVS placement and key environmental parameters of interest (bathymetry, habitat, and depth). The RUVS rests on the seafloor with a line connecting it to a buoy on the surface. Bathymetry and habitat are shown as two separate layers. Image Credit: Melanie Carolan. Photogrammetry and bathymetry courtesy of Jenn Dijkstra.



Significance and Impacts

Identifying the habitat characteristics that can be used to predict the locations and abundances of near shore fish is important for both wildlife protection and commercial fishing. This research is also important for determining the roles of foundation species in determining mobile species distributions.

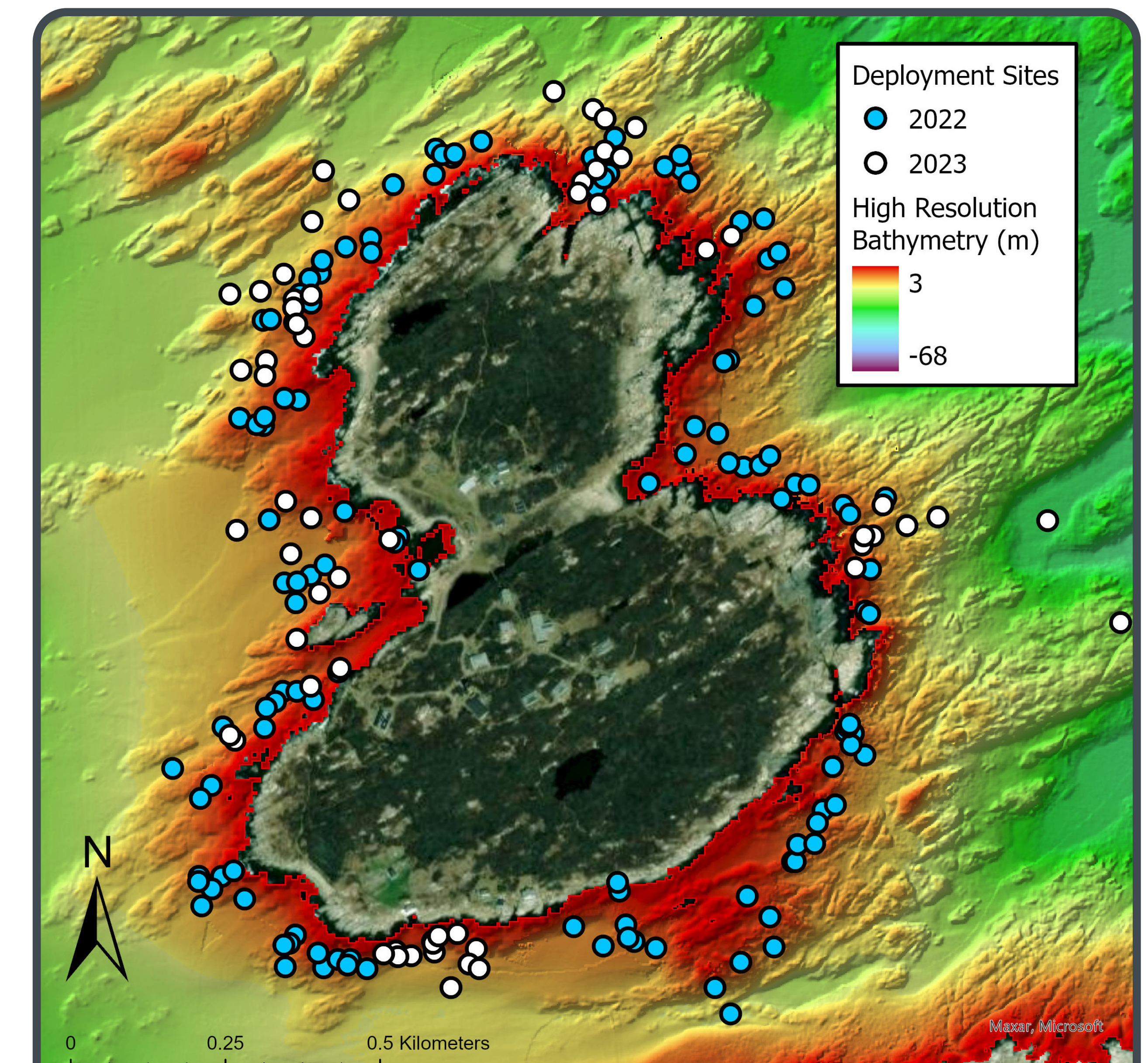


Figure 4: Map of sample sites around Appledore Island. Created in ArcGIS Pro. Bathymetry gridded at 4 meters. Bathymetry Data Layer Credit: UNH CCOM JHC.

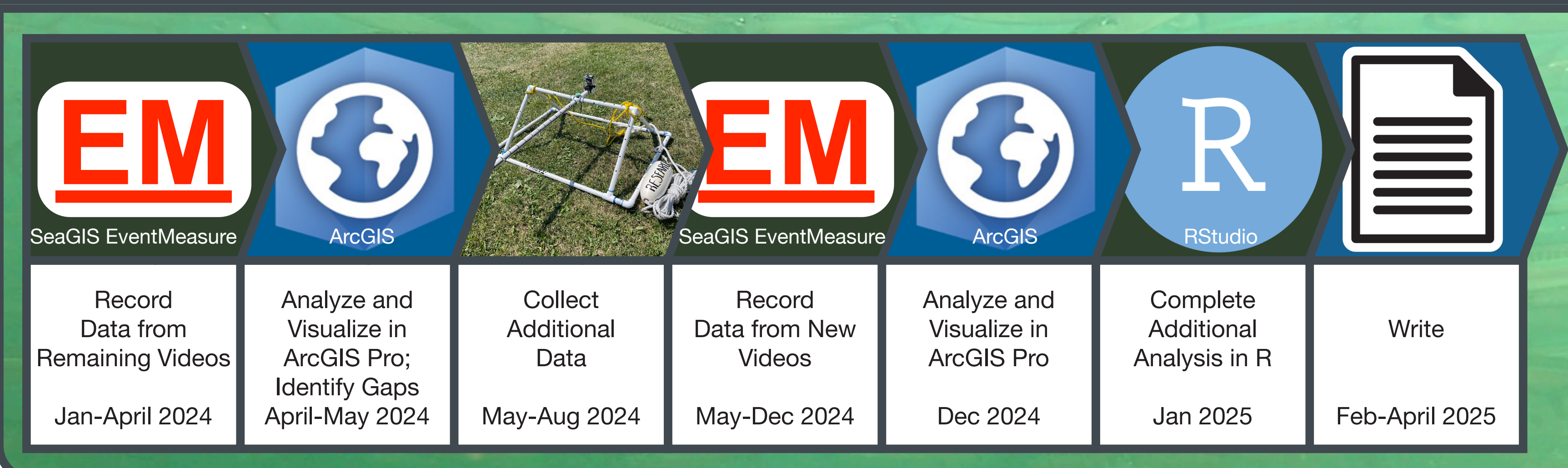
First Impressions

Atlantic pollock (*Pollachius virens*) and cunner (*Tautogolabrus adspersus*) are the most common fish species that have been observed in video analyses. Kelp beds, red turf algae, bare rock, mixed algae, and bare sediment habitats have been observed.

Looking Beneath the Surface

Most of the current data for this study was collected around Appledore Island (Fig. 1) during the summers of 2022 and 2023. Additional data will likely be collected in other areas of the Gulf of Maine in the summer of 2024 in order to obtain information for a wider variety of marine habitats. To collect the data, three identical remote underwater video systems, or RUVS, were used. RUVS are structures designed to hold a camera while resting on the seafloor (Fig. 2, Fig. 3). The camera recorded for about an hour and a half during each deployment. From the footage, the maximum number of individuals of each species that were visible within the view of the camera at the same time (MAXN) was recorded.

Planning Ahead



Acknowledgements

Jenn Dijkstra provided research advisement. Research assistantship funding was provided by the Joint Hydrographic Center award NA20NOS4000196 to UNH by the National Oceanic and Atmospheric Administration (NOAA). Data collection efforts were supported by Shoals Marine Laboratory staff and facilities, Easton White, Jenn Dijkstra, Mike Sigler, and Owen Nichols. Madeleine Wenger collected the 2023 data.

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