Structure in the Pelagic Ecosystem
Asher Brownstein, Riley Cannady, Tess Frazer, Antonia Gomez, Samuel Grysk, Kiele Mader, Charlie Mottur, Audrey Wallner
Advisors: Eric Schneider, Anita Wray, & Natasha Hinojos

Methods

Objective: create a catalog in which we can characterize the biodiversity of life within Sargassum.

- Two methods for collecting Sargassum:
  - Sargassum trays (a large net that is dragged behind a boat through the water)
  - Quadrat dip nets (square nets used to scop up sargassum by snorkelers)
- Our control is sampling biodiversity in the open water.
- After collected, the sargassum is placed into buckets and taken back to CE (Cape Eleuthera Institute).
- The sargassum is sorted through and organisms are found throughout the seaweed. Once an organism is found, it is placed in a petri dish filled with water and data is recorded on it. The organism is weighed, measured, and photographed. The abundance of each species found is also recorded.
- This data is being used to create a catalog of all the species that are found in Sargassum.

Preliminary Results

- Organisms collected from two quadrat dip nets
- Collected: two species of Sargassum and multiple species of epiphytic algae
- 122 individual organisms
- Organisms belonged to 4 different animal phyla: Arthropoda, Cnidaria, Mollusca, and Chordata

Discussion

The organisms collected from the Sargassum contribute to the ongoing catalog that characterizes the life living in Sargassum in order to observe the extent of biodiversity within the natural structure. The significance of this catalog is understanding what organisms are utilizing the Sargassum habitat. The protocol not only creates the catalog, it serves as a tool to help track the abundance of Sargassum as it proliferates across the Atlantic Ocean. This is relevant because people are unaware of what Sargassum is, and how it is affecting the pelagic ecosystem.

Future Studies

By developing new technology and methodology in the form of our acoustic array and sargassum catalog we are looking towards better understanding the pelagic ecosystem. FADS have become an essential part of modern fisheries, but there is still so little known about how these FADS are impacting the greater pelagic environment. Despite being so vast, pelagic ecosystem is a limited resource, and the biggest impact of our research lies in the potential that this data holds for creating more sustainable fisheries for bycatch management.

Sargassum:
- Use the protocol to observe the contents of microplastics in the Sargassum and see how they are affecting the biodiversity within the Sargassum
- Critical step because microplastics are increasing in abundance which then impact the ocean and biodiversity is not researched enough

FADS:
- Tap commercially relevant fish & sharks
- Next steps: implement the vertical array method elsewhere
- Aid fisheries in reducing their bycatch by determining where to position their nets to catch only targeted species
- Gain partnerships between scientists and fisheries

Acknowledgements

- Eric Schneider
- Anita Wray
- Natasha Hinojos

- Brendan Talwar
- Ellyna Laffrance
- Candice Fields

- Florida International University
- Moore Charitable Foundation
- University of Glasgow

Literature Cited

- Grysk, S. M., Frazer, T. J., Mader, K., Mottur, C., Wallner, A. (2017). Objective: study the fine scale movement of fish around a FAD

Acoustic Telemetry

- Acoustic telemetry: remotely tracking an object (i.e. fish) using sound pings
- Project goal: develop a system where we can study the movement of fish around a FAD using transmitters and receivers
- Typically used to track fish in shallow water habitats
- First vertical array implemented in the open ocean
- Project goal: develop a new system to study the fine scale movement of fish around a FAD

Trilateration

- Now that the method has been successful, we can now study the different movement patterns of species around the FADS. This information can then aid fisheries in reducing their bycatch by determining where to position their nets to only catch targeted species. This method could also provide partnerships between scientists and fisheries because it saves resources for both parties because the anchor lines are deployed on the existing FADS. With observation and studies we can understand more about the pelagic ecosystem, which will help us know how to conserve and protect this ecosystem.