

## Fishing opportunities associated with the pelagic sargassum ecosystem in Barbados

## Oportunidades de pesca asociadas con el ecosistema de sargazo pelágico en Barbados

## Opportunités de pêche associées à l'écosystème pélagique de sargasses à la Barbade

KRISTIE ALLEYNE<sup>1</sup>, MICAELA SMALL<sup>2</sup>, MAKEDA CORBIN<sup>2</sup>, HENRI VALLES<sup>3</sup> and HAZEL OXENFORD<sup>2</sup>

<sup>1</sup>The World Maritime University- Sasakawa Global Ocean Institute

<sup>2</sup>Centre for Resource Management and Environmental Studies (CERMES), Faculty of Science and Technology, The University of the West Indies, Cave Hill Campus, Barbados

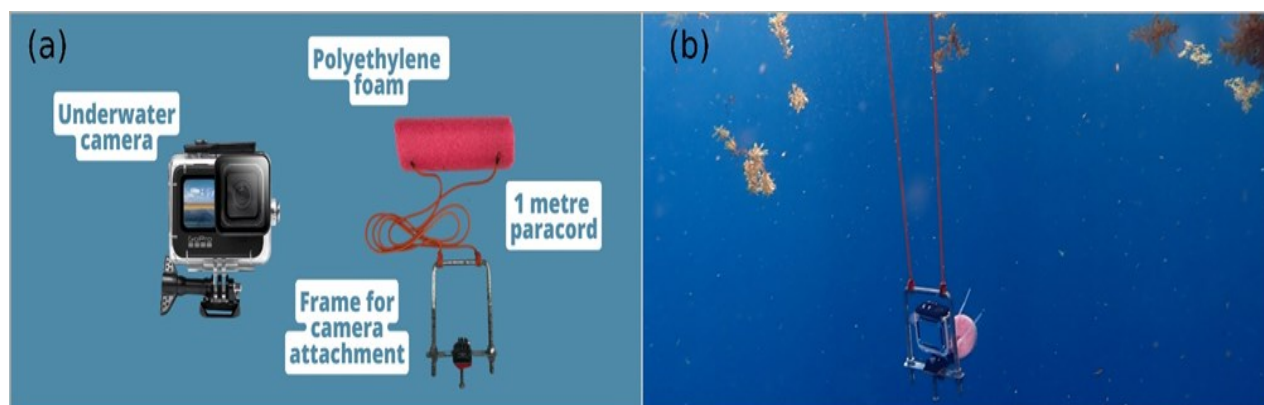
<sup>3</sup>Department of Biological and Chemical Sciences, The University of the West Indies, Cave Hill Campus, Bridgetown, Barbados

### EXTENDED ABSTRACT

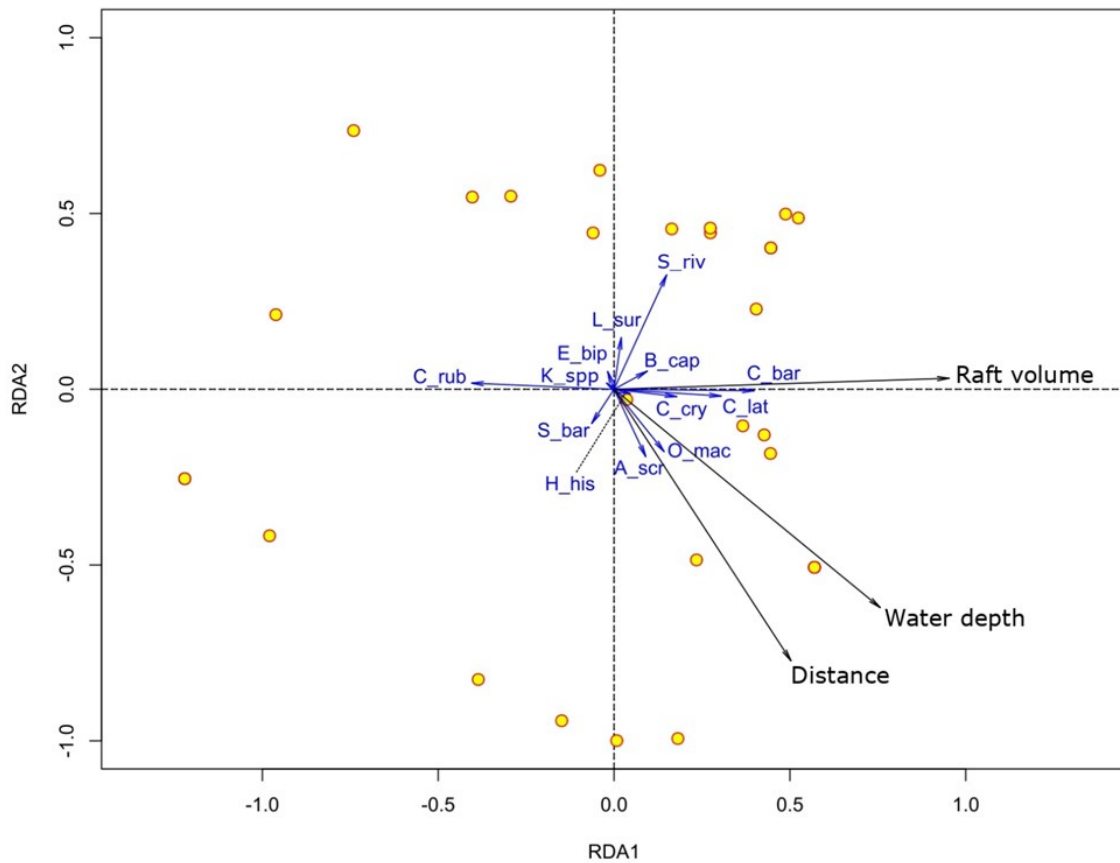
The fisheries sector of Barbados, like much of the Eastern Caribbean, is an integral component of the culture, economy and food security. Mass accumulations of pelagic sargassum (*Sargassum natans* and *S. fluitans*) in the Tropical Atlantic, across the Caribbean and off the coast of West Africa, threaten the state of fisheries in Caribbean SIDS (Speede et al., 2018; Oxenford et al., 2019). However, while it is true that mass proliferations and subsequent influx events of pelagic sargassum brought new navigation and harvesting challenges to fishery sectors, there are recent reports of fishers utilizing this floating ecosystem to target various fish species. Over the last two years, Barbadian fishers have been using satellite images, to target large sargassum rafts in pursuit of almaco jacks (*Seriola rivoliana*) (Dr. Shelly-Ann Cox, pers. comm., Barbados).

In light of the decade long mass sargassum proliferations across the Wider Caribbean Region, this study sought to understand: (1) the composition of fish species associated with sargassum; and (2) factors that drive changes in community composition. Over a three-month period, a total of 35 underwater surveys were conducted off the eastern and southern coastline of Barbados. Cameras were deployed under two types of pelagic sargassum aggregation states: mats and windrows (Figure 1). To assess the relationship between raft characteristics and community structure, several raft dimensions were recorded subsequent to camera deployment. Recorded dimensions include, the length of the sargassum raft; the diameter of the sargassum raft; the thickness of the sargassum raft; the depth of the water; and the distance from shore. During video analysis, the maximum number of individuals sighted in any one field of view (i.e., frame) (hereafter referred to as MaxN) was recorded for each species within each survey.

Underwater surveys reveal that pelagic sargassum arriving in Barbados consist of a relatively low (12 fish species) species diversity. Application of the MaxN metric revealed significant correlations with raft characteristics notably raft volume, raft distance from shore and water depth (Figure 2). The three environmental variables accounted for 9% of the variation (adjusted R<sup>2</sup>) in the free-swimming community composition with raft volume being the major driver of species richness. The results demonstrate a strong affiliation between pelagic sargassum rafts and species biodiversity and abundance that will need to be considered by managers when seeking a best compromise between protecting beaches from inundation by sargassum and protecting biodiversity and fishing opportunities.



**Figure 1.** Materials used to construct underwater recording device (A) and (B) a still image of the device deployed underwater.



**Figure 2.** Redundancy analysis (RDA) ordination plot showing the effect of distance, water depth and raft volume on species composition of the free-swimming fauna associated with pelagic sargassum. *S. rivoliiana* (*S\_riv*), *B. capriscus* (*B\_cap*), *C. bartholomaei* (*C\_bar*), *L. surinamensis* (*L\_sur*), *C. latus* (*C\_lat*), *C. crysos*

**KEYWORDS:** sargassum morphotypes, morphotype composition, backtracking, sub-origins

#### LITERATURE CITED

- Oxenford, H. A., Johnson, D., Cox, S.-A., and Franks, J. (2019). Report on the Relationships between Sargassum Events. Oceanic variables and Dolphinfish and Flyingfish Fisheries. Centre for Resource Management and Environmental Studies, University of the West Indies Cave Hill Campus Bridgetown: Barbados. 32.
- Speede, R. F., Cox, A. L., and Oxenford, H. A. (2018). "Best practices for Caribbean fishers coping with sargassum influx events," in 71st Gulf and Caribbean fisheries institute, vol. 71. (San Andrés, Colombia: GCFI), 315–316.