INTRODUCTION

Fish aggregation devices, or FADs, are used to attract fish and enhance fisheries catch rates (Castro et al. 2002). Around the world, FADs are becoming increasingly popular with 100,000 estimated to be deployed annually (Momen et al. 2013). Unfortunately, FAD-associated fishing leads to overfishing and high rates of bycatch due to its non-selective nature (Trygonis et al. 2016). Research has been focused on the impact of FADs on commercially important species (Castro et al. 2002). Little research has been done to understand the wider impacts of these FADs on marine ecosystems in the western Atlantic. Species that have little research consist of invertebrates and lower trophic level organisms.

OBJECTIVES

- Collect data on the colonization and succession of migrating pelagic species around FADs in the Exuma Sound
- Determine species abundance, individual fish counts, and behavior of migrating pelagic species around FADs in the Exuma Sound

METHODS

Camera Surveys

Camera surveys were performed once a week. Each survey had four cameras: one pointing into the current (upstream), out of the current (downstream), towards the surface (up) and down the FAD rope (down). The cameras recorded for 1½ hours. The footage was analyzed to determine how long species were present and their behavior around the FAD.

Sonar Surveys

The sonar survey consisted of deploying the sonar 10 meters behind us and driving the boat in a radial star pattern with the FAD in the center. The sonar works by sending out a ping of sound energy at 96 kilohertz into the water column every second. Objects reflect sound energy back towards the sonar which calculates the density and distance of objects in the water column. Using these metrics the sonar can recognize the amount of biomass around the FAD.

Light Trapping

Light traps act as a beacon in the dark attracting organisms during the night. Using light traps, we are able to supplement what we’ve learned from our sonar surveys and see the specific species aggregating around our FADs. The light traps are made up of a quatrofoil and a PVC tube trap. There are three locations that the light traps are placed: on the FAD, 500m away from the FAD, and 1000m away. The light traps are placed at a depth of 10m, 200m, 400m, and 600m. They are collected after 3 hours and the organisms caught are recorded and photographed.

RESULTS AND DISCUSSION

We analyzed video survey data to collect information on fish abundance and grouping as well as their distance from the FAD. In the past, videos from our cameras have shown that bait fish aggregate (~10m) around the FAD rope which most likely means that they are feeding off the algae and that larger predatory fish associate around the FAD (~10m) and occasionally will feed on the bait fish.

Figure 4: The figure above demonstrates where around the FAD organisms tend to aggregate. Abundance is highest beneath the FAD because it provides the most shelter.

From the sonar we discovered that there is not a significant difference in biomass accumulation around the FADs depending on location of the FAD or time of day. However, we did discover that there is an increase in accumulation depth dependent on time: during the day most biomass accumulates deeper than at night, this is due to the diel vertical migration. Additionally, the location in which fish accumulate around the FAD is varied. The abundance of organisms aggregating around the FAD decreases with distance and depth from the FAD buoys. This may mean that the effect of the FAD is more localized than previously thought.

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