

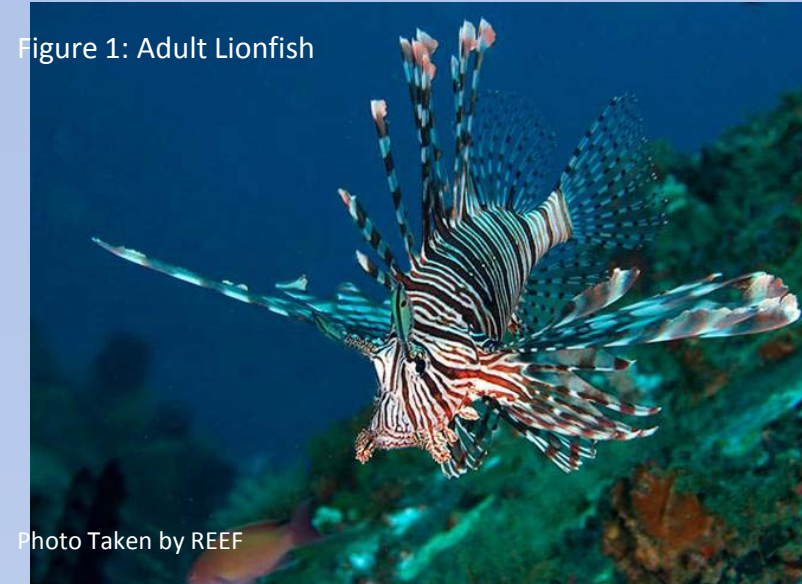
The Extent of Invasive Species in Little Cayman Island

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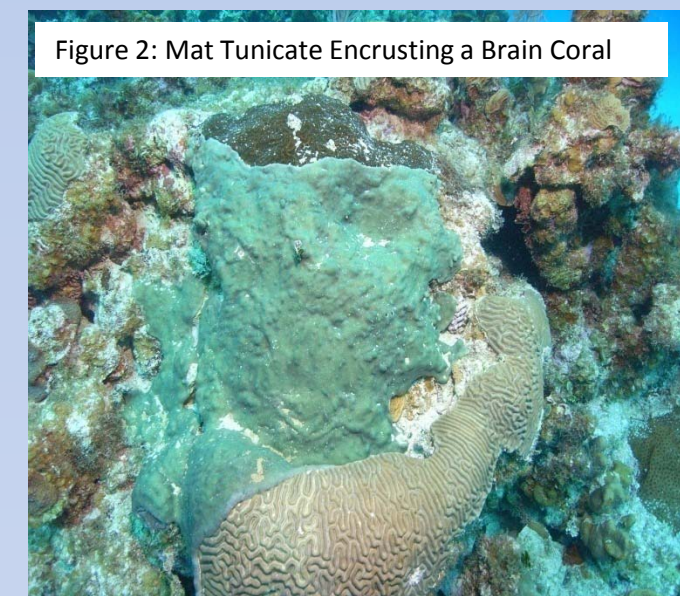
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Introduction

The health of coral reefs in the Caribbean is becoming threatened as a result of coastal development, overfishing, global warming and the introduction of non-native species. The invasion of non-native species such as the Indo-Pacific Lionfish (*Pterois volitans*) (Figure 1) along with the increasing threat from the mat tunicate (*Trididemum solidum*) (Figure 2) are high threats to biodiversity of the reefs. Lionfish are capable of decimating indigenous reef fish populations due to their apparent lack of natural predators in the Caribbean and voracious appetite. In



Since February 2008, more than 20 lionfish have been captured with more reports of sightings every week. This research will show the distribution of the extent of the Mat Tunicate and Lionfish in shallow lagoon and coral reef environments around Little Cayman in order to assess the level of disturbance, if any, so far.



Methods

Researchers collected data on the occurrence of these species in:

- back reefs
- shallow reefs
- deep reefs
- mangroves

Surveys were conducted by swimming a minimum of 200 meters parallel to the reef within 30 meters of the reef crest.

Mangroves were surveyed by swimming 30 meters perpendicular to the prop roots along the shoreline.

A snorkel survey of the shallow reef habitats conducted in Bloody Bay by swimming parallel to the first reef crest closest to shore in about 5 meters of water for 500 meters.

Deep water reef habitats greater than 15 meters were surveyed by scuba diving following the Roving Diver survey method.

Data from Lionfish captures on Little Cayman Island between February 2008 and March 2009 are also included in this study.

Results

Tunicates were observed in both the marine protected areas and outside the MPA's (Figure 3). Tunicates were not observed in the mangroves, or in the MPA's of South Hole Sound and Grape Tree Bay (Figure 3). All the tunicates observed were encrusting over live coral, both massive and branching varieties. The only lionfish observed in this study was found in the Mangroves of South Hole Sound (Figure 3). Between February 2008 and March 2009 a total of 22 lionfish have been collected by scuba divers and researchers (Figure 4). The size range is from 2cm to 14cm. Other lionfish have been observed but not collected.

Figure 3: Numbers of Tunicates and Lionfish Observed

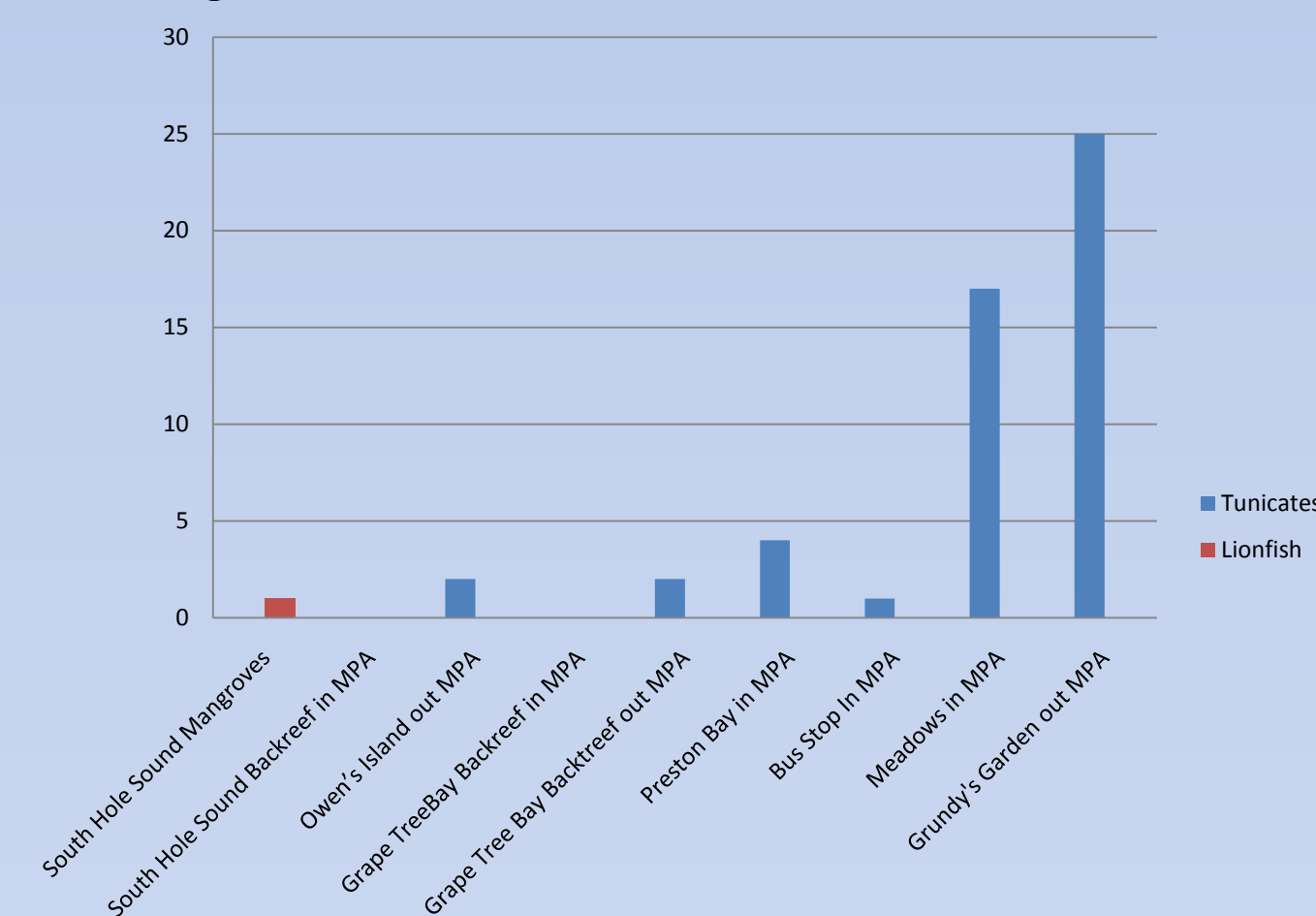
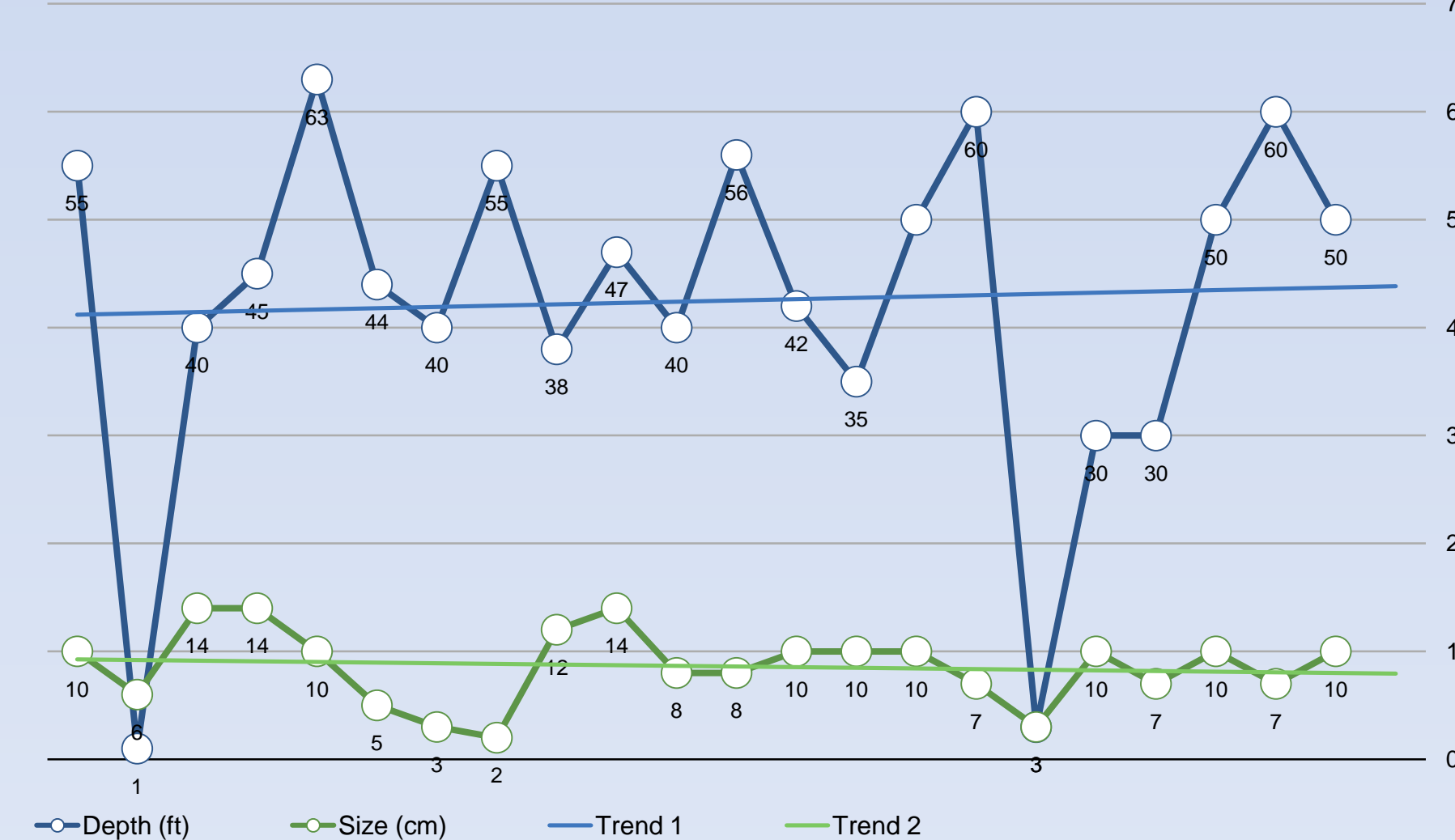


Figure 4: February 2008 - March 2009 Lionfish Captured



Discussion

The Mat Tunicate is found in both the marine protected areas and non-protected areas throughout Little Cayman Island suggesting that there is no initial effect of the Marine Protected Area on this species. The highest abundance of the tunicate occurs at greater depths (>15 meters). It was also noted in field studies that the tunicate was found encrusting live corals only. In shallower depths, it was found to grow over branching corals at shallower depths (<2meters) and more over massive such a boulder corals or brain corals as depth increased (>15 meters).

Based on the locations of captured lionfish, there does not seem to be a direct relationship between depth and fish size, although there is a very slight trend showing as depth increases, size decreases (Figure 4). Of the fish collected, the average length is 8.64cm, indicating these individuals are sexually immature juveniles. These data suggest that the lionfish are reproducing since the smallest at 2cm is well below reproductive age.

Conclusion

According to the data collected on the Mat Tunicates, it is possible that reef biodiversity is potentially threatened at greater depths. This species affect coral recruitment by reducing the amount of available space for juvenile corals to settle. This Mat Tunicate may be more of a threat to species inside the marine protected areas as well since they are also found inside the MPA's

The juvenile lionfish presence over the island suggests that it is possible that this species may be transported by a number of vectors, including currents affected by the direction of wind along with deeper subsurface currents. The data collected does not suggest there is a directional pattern of the invasion due to the presence of the lionfish on the deep reefs as well as along the shoreline and in the mangroves. However, the lionfish populations seem to be more established on deeper reefs (> 15m) than in back reefs around Little Cayman Island.

Acknowledgements

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