A Preliminary Investigation into the Spatial Abundance, Diversity and Habitat Use of Deep Water Sharks in the Exuma Sound

Taylor Schendel, Liam Donovan, Aubrey Faggan, Clay Bales, Dorothy Long, Aly Boyce

Advisors: Annabelle Oronti and Sean Williams

Introduction

Overfishing

Over the past 50 years, global fisheries have been overfished to the extent of massive decline in resources (Moriato et al. 2006). Since the 1970’s, shallow water resources have been declining, causing fisheries to move further offshore, in search of more available fish stocks (Morato et al. 2006). 70% of the world’s fish are caught in waters deeper than 200 meters or in the open ocean. This makes it the largest ecosystem in the world, but one that little is known about. This movement into deeper waters is detrimental because S. cubensis is a predator with a slow digestion rate, and S. rhizodon only has a 45% life in deep water, making them extremely difficult to study.

Objectives

1. Assess the relative abundance of deep-water sharks in the North Eastern Gulf of Mexico to determine fishing effort in the region.
2. Analyze their movement patterns using pop-up acoustic satellite tags.
3. Assess the post-capture stress on deep-water sharks.

Methods

Sharks & The Marine Ecosystem

As K-selected fish, sharks display many characteristics such as slow growth, late maturity, and low fecundity (McLaughlin et al. 2004). Sharks hold the lowest intrinsic rebound potential among fish, at 2.2%, which leaves them highly vulnerable to overfishing (Fig. 1). Sharks have an important role in their ecosystems as apex predators. If they are removed, a trophic cascade may occur such as the collapse of the New England with hammerhead sharks, coonass rays and scallops (Myers et al. 2007).

Capture Stress

Studies have shown that there are sub-lethal effects on sharks caused by post-capture stress. Even if they are returned live to the ocean, the trauma that they go through could be harmful. Handling from hooks, predation on the line, and exhaustion from capture are some examples of these stress factors. Further research assessing these factors will lead to better management policies for global deep-water fisheries.

Conclusions

The post-release survival of the deep-water sharks was assessed by analyzing blood parameters, pressure data, and recapture movements. Movement patterns of the sharks such as the Bluntnose sixgill were recorded over a minimal time period but this data indicates that some species follow a diel movement pattern. Although there is still a great lack of knowledge on deep-water sharks, this data can help towards a future goal of providing fisheries with information to create better management plans.

Future Directions for Research

- Test Baited Remote Underwater Video Surveys as a method to assess the behavior of deep-water sharks
- Continue to survey throughout the year to compare species abundance and identify possible seasonality in behavior and distribution.
- Investigate interspecies trophic-dynamics in the deep-water ecosystem.

Literature Cited