Fish Community Changes in Marine Reserves

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2/7/2020

Research Statement

I am a MSc student in the Department of Biological Sciences at Florida International University. My project proposal is looking at the annual fish data by NOAA's Southeast Fisheries Science Center that was collected in the Florida Keys National Marine Sanctuary to compare Sanctuary Preservation Areas (SPAs), patch coral reefs designated as "no-take" zones, to nearby nonprotected reef sites to analyze and compare if removing fishing pressure has positive effects on the fish community. This data is publicly available and includes scuba visual surveys done by two divers (buddy pair) who conduct a 7.5m radius survey circle and record all fish species and length that they see. Divers also collect coral cover and rugosity measurements of reefs sites at the end of their surveys.

Objectives

This project will investigate the changes in fish communities within no-take, patch coral reefs by determining the changes in fish density and biomass over time as the number of years of protection increases. By analyzing "no-take" zones, we can quantify the changes that human-exclusion zoning has on the ecosystem.

Hypothesis

H1: Removing fishing pressure increases fish species richness, density and biomass throughout multiple trophic levels.

Statistical Analysis

From NOAA's visual fish surveys biomass can be calculated using fish length-weight relationships which will be referenced from previous literature. This data will then be tested for assumptions and if it fails, will be transformed with a log or square function. Biomass results can then be plotted against reserve age using time series analysis to show trends of the data and predict future data as number of years of closure increases within a reserve.