

1046-92-614

Howard Weiss* (weiss@math.gatech.edu), School of Mathematics, Georgia Tech, Atlanta, GA 30334. *Fish Biomass Structure at Pristine Coral Reefs and Degradation by Fishing*. Preliminary report.

Apex predators constitute 85% of the total biomass at the pristine Kingman coral reef. This is in sharp contrast to most reefs where the prey biomass substantially dominates the total biomass. As pristine reefs like Kingman are thought to provide an important baseline for the natural state of coral reefs, an understanding of the biomass structure at pristine reefs is vital to reef restoration and conservation efforts.

Based on recent field observations, we model the biomass structure within the framework of an extended consumer-resource theory and provide a mechanistic explanation for the inverted biomass pyramid. As corals play a vital role in the ecology at reefs by providing a refuge for small prey from apex predators [14], the prey death rate and predator growth rate in our model are strongly dependent on the 'refuge size'.

Coral reef ecosystems around the world are under threat from overfishing. We show that sufficiently high fishing pressure will destroy the inverted biomass pyramid found at pristine coral reefs.

This is joint work with Georgia Tech colleagues Wendy Morrison (Biology), Abhinav Singh (Physics), and Hao Wang (Math). (Received September 09, 2008)