



In Partial Fulfillment of the Requirements for the Degree of

**Master of Science**  
**Zachary D. Hughes**

Will defend his thesis

**Modeling Marine Conservation Strategies in a Coupled Coastal  
Economic-Ecological System**

**Abstract**

The conservation of marine resources is critical to the well being of a large portion of the world's population. Coastal artisanal fishing communities are particularly reliant on marine resources for food and for their livelihoods. In order to preserve these resources, conservation actions are often needed. But conservation actions can often cause unexpected changes in human behavior and for the environment. We design a model that explores how the human communities and the marine ecosystem are coupled, and how marine conservation strategies may impact both the ecosystem and the livelihoods of the human population. We consider two conservation strategies in the model for conserving the marine environment; fisheries enforcement and land conservation. We then examine how implementing these strategies affects the human community and the marine environment. Our results indicate that both strategies can increase the abundance of fish, and thus help preserve the marine ecosystem. However, the results also show that marine fisheries enforcement negatively impacts the livelihoods of the human population. Land conservation, on the other hand, increases the livelihoods of the human population. These results indicate that, depending on management objectives, land conservation or a combination of strategies may be a better choice for conservation managers. We also show that accounting for changes in behavior is important to help prevent surprise outcomes from marine conservation actions.

Friday, November 6, 2009

3:00 PM

GIOS 481

Faculty, students, and the general public are invited.

Supervisory Committee:  
Dr. Leah Gerber  
Dr. Eli Fenichel  
Dr. Caterina D'Agrosa