

Addressing Predictive Modeling Knowledge Gaps to Improve Information Used in Decision-Making

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Rapid changes in the climate threaten the future of marine coastal ecosystems as warming temperatures and ocean acidification strongly influence marine communities. However, much of our understanding of how communities respond to change have been extrapolated from predictive computer models built primarily upon data available from published literature. Such an approach is risky, particularly when attempting to enhance decision-making at the regional, community or species level. Models are only as good as the quality of the data that is being entered and when parameterizing models, there is a need to ensure that the best available data, which considers key species, particularly those from the regional species pool.

The goal of this seed grant is to address these gaps by contributing new information that will enhance models developed to predict changes in New England's coastal ecosystem. There is strong evidence to show that coastal shellfish (e.g. mussels) are vulnerable to the effects of climate change, but there is little consideration on how their predator's feeding behavior and physiology will be impacted since this will influence shellfish communities. The few studies that do take this focus fail to address the metabolic status of the predator and whether food intake can satisfy their energetic requirements. In this context, it is not known whether predators select larger and higher value prey with greater return for effort or opt for smaller and lower value prey with less return for effort. Any changes in predatory metabolic status under a future climate will strongly influence their predatory pressure on shellfish coastal communities, how they are structured and decision-making processes associated with their management.

Although we do not have the data from this project yet, we will present some information about how we are simulating climate change conditions in the laboratory and how we collect information to address this information gap. Additionally, we will provide information about how the seed grant has provided some opportunities for students to develop their skill sets and experience.