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ESM 260: Homework 3

2/26/2020

Tests of Hypotheses and Management Actions

1. Fine Branching Corals and Coarse Branching Corals in Rarotonga
2. Fine Branching Corals  
   **Hypothesis 1**: Fine-Branching Coral might decrease due to an increase in algae in Rarotonga

**Observations**: Observations on fine branching corals could be conducted through transects and counting experiments in the water.

**Experiment**: A manipulative experiment would include removal of algae where fine branching corals are present or might be present to see if growth would increase with the absence of algae. Samples of fine branching coral should be planted in areas with no algae and algae to see confirm if algae effect the growth of fine branching coral. Some of the planted coral should have a cage around it to ensure protection and some of the planted coral should brave the elements of the ocean.

**Hypothesis 2**: A steady population of Surgeon recruitment might increase the amount of Fine-Branching Corals in Rarotonga

**Observations:** The per capita and total production of babies by adult Surgeonfish vary positively with the amount of the fine branching coral. Get in the water and observe where the Surgeonfish are recruiting.

**Experiment:** Collect Surgeonfish from other healthy populations of fine branching coral populations (from Aitutaki) and bring them to Rarotonga. This way they will recruit on the fine branching coral that is there and develop a healthier fine branching coral population.

1. Coarse Branching Corals   
   **Hypothesis 1**: Coarse-Branching Corals might decrease due to the presence of algae. Algae tends to be a big competitor when space previously used by Coarse-Branching corals is open. Once algae is stable, it is hard for corals to make a comeback.   
   **Observations**: Observations of coarse branching coral would be conducted with getting in the water and using quadrats. Randomly assign plots to place the quadrats over along a transect. Count how many coarse branching corals fall within each quadrat as well as algae or other species.  
   **Experiment**: Actively pull out algae from area that have resemblance of coarse branching corals and plant new corals that would otherwise grow there.

**Hypothesis 2**: Coarse-Branching Corals might decrease due to a decrease in young Coral Trout recruitment. Recruitment of young fish is vital to the growth of corals. They excrete ammonia that the corals use as a fertilizer.

**Observations**: Observe the number of adult Coral Trout that are in the area with coarse branching corals.

**Experiment**: Collect Coral Trout from an outside lagoon and place them in areas where coarse branching corals are diminishing.

1. Spotted Damselfish: Manipulative Field Experiment. limitation of recruits from the supply of larvae and limitation of recruits from the amount of settlement habitat available.