**BIOL 301, Spring 2019** **Final Exam: Tuesday May 7, 9:45 am**
**Marine Ecology and Evolution** **WAT 420**
**Final Exam Questions**

For the final exam, I will ask you to answer 3 of the 8 questions below. **They will not be bonus questions and you will not have a choice, so be prepared to answer all 8.** The remainder of the final will be a multiple-choice "quiz" on Lectures 21-26 plus one additional question on hypothesis testing (focusing on the differences between an observation, a hypothesis, and a prediction).

1. What is a foundation species? Using one type of ecosystem discussed in class, explain how observations and/or experiments discussed in class reveal how top-down and bottom up factors regulate the abundance of a foundation species.

2. Compare and contrast the goals of and methods used by traditional fisheries management versus management based on the use of marine reserves. Do both approaches work as advertised? Use at least two examples from class for full credit.

3. Palumbi and Baker studied the population structure of humpback whales in the north Pacific, but also gathered data from the North Atlantic. Use their data below from the actin locus (a cytoskeletal protein) to calculate $F_{ST}$ between California and the North Atlantic. You must show all your work for full credit.

| | AA | AB | BB |
|---|---|---|---|
| California (n=30) | 5 | 10 | 15 |
| North Atlantic (n=42) | 2 | 15 | 25 |

4. What are demographically-independent populations? Using the answer from question 3, explain why or why not populations in California and the North Atlantic are demographically independent? What caveats must you consider when interpreting genetic data like these?

5. Compare the nature and role of the thermocline in temperate and tropical oceans and the impact it ultimately has on the basic aspects of the structure and function of these open ocean ecosystems.

6. What is the center of origin hypothesis and what are the likely environmental drivers involved with respect to the coral triangle? Describe one study that provides evidence that species likely arise within the coral triangle. Be sure to explain why the evidence suggests that the coral triangle is a center of origin.

7. Describe how and why rates and amounts of primary production and fish biomass vary among different parts of the world's oceans.

8. Why is top-down control of rocky shore communities stronger at Strawberry Hill than at Boiler Bay in coastal Oregon? Describe the physical and biological processes that create these differences in community structure and function.