Mock Exam #2: NOTE – like the midterm, some of the “mock” questions will actually be on the exam, but (unlike the midterm) there will also be questions on the final that are not listed here…

Questions from Readings:
Expect one question from each assigned reading and from Jared Figurski’s guest lecture.

Compare and Contrast (should be able to define each term; this can be graphical):

1. Settlement vs. recruitment
2. Density independent vs. density dependent vital rates (mortality, or birth rate)
3. Deterministic processes vs. stochastic processes affecting population and community regulation
4. protandry vs. protogyny
5. closed vs. open population structure
6. resistance vs. resilience
7. amplitude vs. elasticity
8. stable equilibrium vs. unstable equilibrium

True or False
1. Increasing the spatial scale of a study increases the “openness” of the population.
2. Post-settlement processes are typically thought to be stochastic.
3. Density-dependence in either birth or death rates can act to regulate population size.

Essays/short answer:

1. Describe ONE of the two experiments we discussed in lecture that used fouling communities to test theories about the stability of marine communities, and whether deterministic processes or stochastic processes dominate. What conclusion did the researcher draw from the experiment?

2. Individual-level responses to post-settlement processes can influence both population and community dynamics.
   a. Give an example of a MORPHOLOGICAL response that might have cascading effects.
   b. Give an example of a BEHAVIORAL response that might have cascading effects.
   c. Give an example of a SHIFT IN RESOURCE ALLOCATION that might have cascading effects.

3. Curt Lively’s research on Chthamalus barnacles in the Gulf of California provides a great example of morphological response to predators.
   a. Draw a graph that depicts the initial pattern he saw in the intertidal.
   b. List one of his hypotheses (specific or general) about what might be driving this pattern, and
   c. briefly describe how he tested this hypothesis.
d. What did he ultimately conclude about both morphs? (why are both maintained?)

4. Explain how (1) sampling frequency and (2) different patterns of early post-settlement mortality can influence your estimate of recruitment.

5. If openness of a population acts to destabilize population dynamics, then populations with shorter larval durations should be less variable than open ones. Russell Schmitt tested this hypothesis using fish species from the Southern California Bight. Use a graph to show (1) the original prediction, and (2) what he actually found. Bonus: Explain why he might have found what he did.

6. Define recruitment limitation.

7. List 4 factors that can influence the NUMBER or QUALITY OF PROPAGULES produced by a population.

8. Describe 3 oceanographic features that have been shown to influence larval supply. Give an example of species whose larvae have been influenced by each feature.

9. Describe two indirect methods for figuring out how far larvae disperse. Describe one direct method for figuring out how far fish larvae disperse.

10. Gaines and Roughgarden noticed that the number of barnacle recruits in the intertidal each year was negatively correlated to how much kelp was growing offshore.
   a. Draw a graph that depicts their original observation.
   b. List their two general hypotheses for this pattern, and
   c. Briefly, how did they test these two hypotheses, and
   d. What did they find/conclude?

11. What conditions make it most likely for larval behavioral cues to evolve?

12. Describe the experiment and the reasoning used by Grosberg to conclude that stratification of larvae in the water column determined the spatial distribution of _Balanus glandula_ and _Balanus crenatus_ on pier pilings in Santa Cruz harbor.

13. Describe the hypothetical general relationship between settlement and subsequent adult density. Indicate on your graph the regions that are dominated by density-dependent and density-independent processes.

14. List one physical process and one biological characteristic or process that is important in the following life-history phases of marine organisms: number of propagules produced; transport/dispersal; settlement; and recruitment.