Dr. Reichler's Bio 301M class time:_____ Print Name:_____KEY_____
Exam #2 March 5, 2010

Read each question carefully and don't hesitate to ask if a question seems unclear. If possible, answer each question in the space provided, but if needed, continue on the back. If you use a drawing as part of your answer, be sure to also include a written explanation. These questions have specific answers, although for some, more than one answer is possible. To receive full credit you must clearly and fully answer the question being asked. The points for each question are noted in parentheses totaling 100 points.

1. Mountain lions and wolves are both secondary consumers. Would the number of wolves in an area increase or decrease after the introduction of mountain lions? Why? (10 pts)
Decrease, the mountain lions and wolves would compete for the same resources, prey, and so there would be less food for the wolves. OR Stay the same, the wolves and mountain lions would be in competition, but since competition does not last long between two species, they would each find their own niche, so the wolves would still be able to find plenty of food.

2. You are raising two sheep, which are herbivores, for food. Your sheep are both the same size and age. George the sheep is very active and is constantly moving while Fred the sheep is lazy and does not move much. If you feed these sheep the same amount of food each day, which will provide more energy when eaten? Why? (12 pts)
Fred is using less of the food he eats and so would provide more food to whatever eats him.

3. Under what condition would the carrying capacity of a single species be very high while the biodiversity where this species lives be very low? (12 pts)
If the species has a specific niche with plentiful resources in that niche, but lives where there are not many overall resources and therefore not many niches.

4. One hypothesis about the disappearance of *H. floresiensis* is that a volcanic eruption caused their extinction. Even if a few *H. floresiensis* individuals survived the eruption, why might they have gone extinct? (10 pts)
They may have entered an extinction vortex. The few remaining individuals had too little genetic diversity, and reproduction decreased until they went extinct. OR Their niche has disappeared, and they cannot get the resources they need, because the island is undergoing secondary succession.

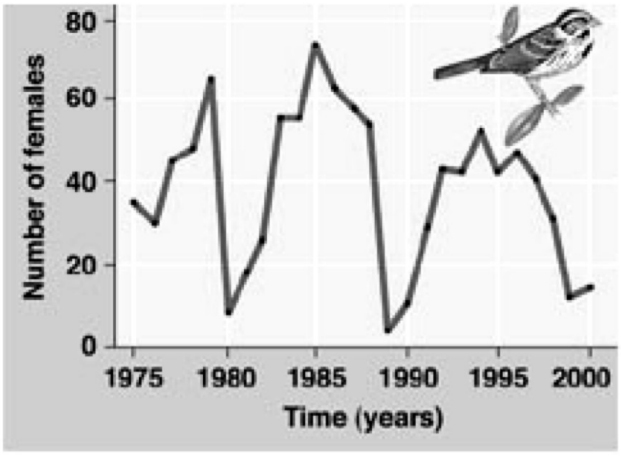
5. The numbers of individuals in a species of birds <u>that eats insects</u> has decreased since the Chernobyl accident, but these birds do not have any mutations in their DNA. Why have the number of these birds decreased? (10 pts)
Insect numbers have decreased in the areas with the highest radioactive contamination. So these birds are suffering from a lack of food.

6. There are two islands in a similar climate. Island R was produced 20 years ago as the results of a volcanic eruption. Island G has existed for thousands of years, but 20 years ago there was a flood that killed all of the organisms. Which island would have **greater** biodiversity today? Why? (12 pts)
G, the flood did not destroy all of the resources, so secondary succession needs to reconnect species, but not reform resources. Island R will take much longer because of the initial lack of resources that will take a long time to increase.

7. If besides eating herbivores, wolves could also do photosynthesis, would this increase, decrease, or not change the number of wolves in an area? Why? (12 pts)
Increase. They will have more energy available because they can produce some of their own energy and not need to rely on what plants produce.

8. Where would you expect to find more levels of consumers (trophic levels), in a desert or in a rainforest? Why? (12 pts)
All of the energy in a food chain comes from the primary producers, plants. So since rainforests have more plants which means more primary production that can support more trophic levels. While deserts have very few plants which means little primary production and few trophic levels.

9. The line on this graph represents the number of female song sparrows (assume that there are an equal number of males). Give one possible explanation for the fluctuations in song sparrow numbers **by adding a line to this graph**, describe what the line you have drawn represents, and how that would account for the fluctuation in song sparrow numbers. (10 pts)
Many possible answers: Changes in rainfall. Changes in food availability. Changes in predation. Changes in a disease. Changes in genetic diversity leading to changes in reproductive rates; after a decrease in genetic diversity there needs to be migration of birds to increase genetic diversity again.



(c) A song sparrow population in its natural habitat