EEB 2208 (Introduction to Conservation Biology)

Homework 1: Lectures 1-3

A few people did not follow the instructions on how to submit the answers. As described in the "Exam Format Information" document, each numbered item is a separate question and will be worth 1 point on the final exam (this is why a group of questions is worth 5 points). If you did not follow this format, and instead treated the set of five as a traditional multiple choice question, then you will not have answered every question, which was a requirement to get a point for the homework. A correct set of answers for the first 10 questions would look like this (the "Q" is optional):

Q1 -A
Q2 - A
Q3 - A
Q4 - A
Q5 - A
Q6 - B
Q7 - A
Q8 - B
Q9 - B
Q10 - A
Etc.

Some people also submitted answers in which it was not possible tell whether they were indicating that a given question was true or false. These homeworks were also considered incomplete and no point awarded. Note that there are only two possible responses to each questions (true = A, false = B). If you gave C, D, or E as an answer, you were not answering the question properly.

Note that you only have to complete 10 of the 13 homework assignments, so even if you made one of these mistakes you can still get the full 10 points.

Homework 1

For the following sets of questions identify all answers that are correct. Each numbered item is worth 1 point.

Which of the following things have been suggested as reasons why conservation is important? (5 points)

1. People like nature. **A**
2. Biodiversity is a source of building materials. **A**
3. Human health can benefit from biological diversity. **A**
4. Ecosystems provide important services to humans. **A**
5. If too many species go extinct there might be an ecological catastrophe. **A**

All these examples were discussed in the first lecture. This question tests whether you understand the wide range of arguments that have been put forth in support of biodiversity protection. Note that it is possible for all answers in a set of five to be correct (or incorrect).

Using data collected from vets, researchers have studied the mortality rate of cats that have fallen from buildings to see whether the height of the fall influences the chance that the cat will die. Surprisingly, they found that cats that fall from floors 1-5 were more likely to die than those that fell from higher up (floors 6-32). Why was this? (5 points)

6. Falling from high up gives the cats time to position themselves so that they land safely. **B**
7. The data are biased. **A**
8. A mean is being compared to a median. **B**
9. Fewer cats fall from high floors than low floors. **B**
10. Vets don't see most of the cats that fall from higher floors. **A**

Note that the correct answers here are two ways of saying the same thing – the first a general statement, the second a specific one. The point of this question is to test whether you can remember both the specific issue that relates to this data set and recognize the more general point. Note too, that it is possible that 9 could be correct (as, I guess, could 6), but we have no evidence to support that conclusion, so you would not get points.

Which of the following disciplines play an important role in conservation biology? (5 points)

11. Genetics. **A**
12. Political science. **A**
13. Geography. **A**
14. Economics. **A**
15. Environmental activism. **B**

This question tests two things. First, that you recognize that conservation biology is a multidisciplinary subject drawing on a wide range of fields: 11-14 are all things I mentioned explicitly in the first lecture so their inclusion here should be straightforward. The second thing I wanted to test is that you know that conservation biology is very distinct from activism of any kind. The science conducted in conservation biology can certainly be used in activism, but the reasons for doing it are different, and it can also be misused by activists.

Which of the following could be considered keystone species? (5 points)

16. Wolves. **A**
17. Beavers. **A**
18. Oak trees. **B**
19. Humans. **A**
20. Krill. **A**

This set focused on whether you know what a keystone species is. 16, 17, and 20 are all examples given in class and/or the textbook. The first two should have been straightforward. Krill is more difficult because I did not mention it in the context of keystone species – but I showed it in the center of a food web, so you should have been able to infer its importance. 19 also tests whether you can apply your understanding of the concept to a new situation. Even at this early stage you should have the idea that the entire course is about the ways in which humans have had dramatic impacts on a wide range of organisms – this tells you that they play a keystone role. Finally, oak trees were not mentioned at all in class. I included them in this list because someone with a superficial understanding of the concept might think they are a keystone because they are very abundant and have a big influence in forest systems. But,

someone who really understands the concept would know that they do not necessarily have a disproportionately large influence.

Which of the following is a component of biological diversity? (5 points)

21. Interactions among species. **A**
22. Abiotic factors, such as temperature. **B**
23. Species richness. **A**
24. DNA differences among humans. **A**
25. Species evenness. **A**

Here I am testing whether you understand the full range of things that constitute biological diversity. All of these items are things I discussed in lecture. I did not specifically mention human diversity, but 24 was included to ensure that you understand that humans are also a part of biodiversity. 22 was included to test whether you understand that, although abiotic factors influence biodiversity, they are not actually a part of it (the clue is in the name: a-biotic, implies not biological).

The following statement compares dolphin survival in captivity versus the wild: "Calculations taken from the study showed that on average the expected life span of a bottle-nosed dolphin in captivity could be as little as 14 years, while in the wild the dolphin could live twenty to twenty-nine years." What can you accurately conclude from this statement?

26. Keeping dolphins in captivity harms them. **B**
27. Dolphins live longer in the wild than in captivity. **B**
28. Captive breeding is unlikely to be a good strategy for dolphin conservation. **B**
29. The mean life span of a captive dolphin is 14 years. **B**
30. The median life span of a wild dolphin is 20-29 years. **B**

This statement provides relatively little useful information. 26-28 cannot be concluded because the measures given for dolphins in captivity and the wild are different and cannot be meaningfully compared. 29 and 30 simply misuse the terms mean and median – the former number is a minimum (of sorts, though the wording is so vague it's hard to be sure), while the latter is a maximum.

Which of the following statements is true about this course? (5 points)

31. Extra credit assignments are available upon request. **B**
32. There are no office hours. **B**
33. Responses to the discussion papers can be submitted via email. **B**
34. You can miss up to three discussion papers without providing a reason. **B**
35. During exams I will happily answer any questions you have about how to interpret questions. **B**

This set of questions was included to determine whether you have read the material in "Important Course documents" part of the web site. If you got any of the questions wrong, you should go read the documents to find out why.

PART 2:

36. Define the following terms, and give an example of each (6 points).

a) Ecosystem engineers See notes to Lecture 3 and text book. Note that an ecosystem engineer can also be considered a keystone species, but the reverse is not necessarily true. Examples include beavers and earthworms.

b) Spurious correlation See notes to Lecture 2. An example is the apparent relationship between the number of storks in Germany and the number of human births.

c) Beta-diversity See notes to Lecture 3 and text book. An example would be the change in species composition as you move from a woodland into an adjacent field. Note too that this is something I will talk about more when discussing how range size affects estimates of extinction rates in tropical rainforest (see Lecture 8 notes when they are posted).

37. Describe three ways in which conservation biology is similar to medicine (3 points).

See notes to Lecture 1. 1 point for each distinct similarity.

38. Define the word "average" as completely as possible (3 points).

Here I would be looking for definitions of mean, mode and median. See notes to Lecture 2. 1 point for getting each correct.

39. What is Paul Ehrlich's "rivet-popping" analogy and how does it relate to conservation biology? (3 points)

See notes to Lecture 1. 1 point for equating rivets in a place with species in an ecosystem. 2 points for connecting the sequential loss of rivets/species with an unknown point at which the plane/ecosystem falls apart.