

**EEB 2208 (Introduction to Conservation Biology)
Homework 8: Lectures 1-15**

Homework checklist

- Answer every question or you will get no points
- Submit your responses before midnight on the day they are due or you will get no points
- Submit your answers via huskyct, following the instructions in the “Homework overview” document. Do not put your answers in the “Comments” box, or you will get no points.
- If you write your homework in Word and then copy & paste into HuskyCT, make sure you are not using Word’s auto-numbering, otherwise all the question numbers will disappear when the homework is submitted (and you will get no points).
- Be sure to use the format explained in class and for Homework 1. Each numbered item is a separate question and would be worth 1 point on an exam.
- A = true, B = false

Conservation biologists frequently make inferences based on imperfect knowledge and extrapolation. Which of the following statements, based on extrapolation, are reasonable?

1. Identifying biodiversity hotspots based on well-studied groups of organisms will ensure the protection of all groups.
2. Data deficient species are so numerous that it is impossible to compare modern extinction rates to those in the past.
3. If a data deficient species is declining, habitat loss is probably a contributing factor.
4. Protecting habitat in the lowland tropics is likely to benefit more species than protecting habitat in the montane boreal zone.
5. If a terrestrial species has declined due to habitat loss, it is likely that agriculture is the cause.

Which of these statements about the role of stochasticity in population models are correct?

6. Catastrophic events are a type of demographic stochasticity.
7. Random variation in the number of offspring produced by each individual in a population is type of stochasticity.
8. Adding stochasticity to a model makes the resulting conclusions more useful.
9. Adding stochasticity to a model makes the resulting conclusions less certain.
10. Genetic drift is a stochastic process.

A group of researchers has created a demographic model to estimate the extinction risk for Sumatran rhinos. The model is designed to determine the probability that the current population of 275 animals will go extinct within the next 100 years. All of the data for the model come from a detailed, long term study of birth and death rates from the wild population. The researchers conducted 10,000 simulations, and found that the population went extinct in 150 of them. Which of the following statements are true?

11. The model is deterministic.
12. The model includes uncertainty in the population’s trajectory.
13. According to the model, the population has at least a 90% chance of persisting for 100 years.
14. According to the model, environmental stochasticity is a major threat to the persistence of this population.
15. The species is completely safe from extinction.

Which of these conservation actions would be considered representative of the declining population paradigm?

16. Translocating northern quolls to an island where they will be safe from invasive species that threaten them.
17. Reducing the spread of invasive species.
18. Developing a land protection strategy that helps to keep common species common.
19. Captive breeding for the critically endangered California condor population.
20. Implementing sustainable harvest management for waterfowl.

Why is it difficult to use observational field studies to determine the MVP for a species?

21. Because it is impossible to estimate the amount of environmental stochasticity.
22. Because it typically takes a long time.
23. Because estimating MVP requires that you track multiple populations.
24. Because the data are difficult, or impossible, to gather.
25. Because many people view it as unethical to let a population decline without doing something.

Which statements correctly connect the named species to a cause of their endangerment?

26. The Puritan tiger beetle is a narrow range species at risk of catastrophe.
27. The rainbow trout is at risk from hybridization.
28. The large blue butterfly is at risk from co-extinction.
29. The heath hen is at risk from recent climate change.
30. Cone shells are at risk because of their use in biomedical research.

Which of the following statements about the equation, $H_{t+1} = (1 - 1/2N_e)H_t$, are true? (3 points)

31. N_e is the total number of individuals in the population.
32. H_t is a measure of the amount of genetic variation in the population.
33. If you do these calculations, H_{t+1} will always be smaller than H_t .
34. The equation describes the effect of genetic drift on a population.
35. The equation describes changes in genetic diversity in a population.

36. Give two reasons why conservation biologists consider genetic diversity to be important. (2 points)

37. Describe the advantages and disadvantages of using computer simulations to estimate the chance that a population will go extinct under different scenarios? (5 points)

38. In what ways do the small and declining population paradigms differ? (5 points)

39. Define the following terms. (3 points)

a) Point endemic:

b) Census population size:

c) Sensitivity analysis: