EEB 2208 (Introduction to Conservation Biology)

Homework 11: Lectures 1-21

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 = demonstrably true, B = not demonstrably true (i.e., false)

The CT DEEP plans to restore an area of grassland on an old landfill in Hartford. The goal is to restore all of the ecological functions of the historic grasslands, but only some of the species that occurred there historically because the site is too small to support area-sensitive species. Which of the following statements about the project apply?

1. This project is an example of site rehabilitation.
2. This project meets the Society of Ecological Restoration's definition of ecological restoration.
3. Doing nothing more than putting topsoil on the landfill is one option for restoration.
4. A good reference site for this project would be a natural grassland with the full complement of functions and species that the DEEP hopes to see at the restored site.
5. Controls should be set up to determine whether active restoration was necessary.

Which of the following statements about habitat corridors are true?

6. Corridors facilitate gene flow.
7. Corridors help to prevent population fragmentation.
8. Corridors can act as sink habitat.
9. Corridors can help invasive species to spread.
10. Corridors can help endangered species to persist.

Which of the following statements about the design of reserve networks are true?

11. Large reserves are generally better than small reserves.
12. All other things being equal, the best shape for a reserve is generally a circle.
13. Several small reserves can sometimes be better than one large reserve of equal area.
14. Small reserves are always more effective when they are widely spaced.
15. Maximizing the amount of edge habitat in a reserve network is important.

These two figures come from the paper by Fuller et al. (2010) that we read as a discussion paper. The figure on the left plots the "contribution of Australian protected areas to conserving vegetation types relative to their rarity (B_j)" versus the "estimated cost of acquisition and management of the sites (C_j)" for nearly 7000 protected areas. The figure on the right plots the "change in total area under protection … as existing protected areas are progressively replaced with more efficient sites." Which of the following statements do the figures suggest are accurate?
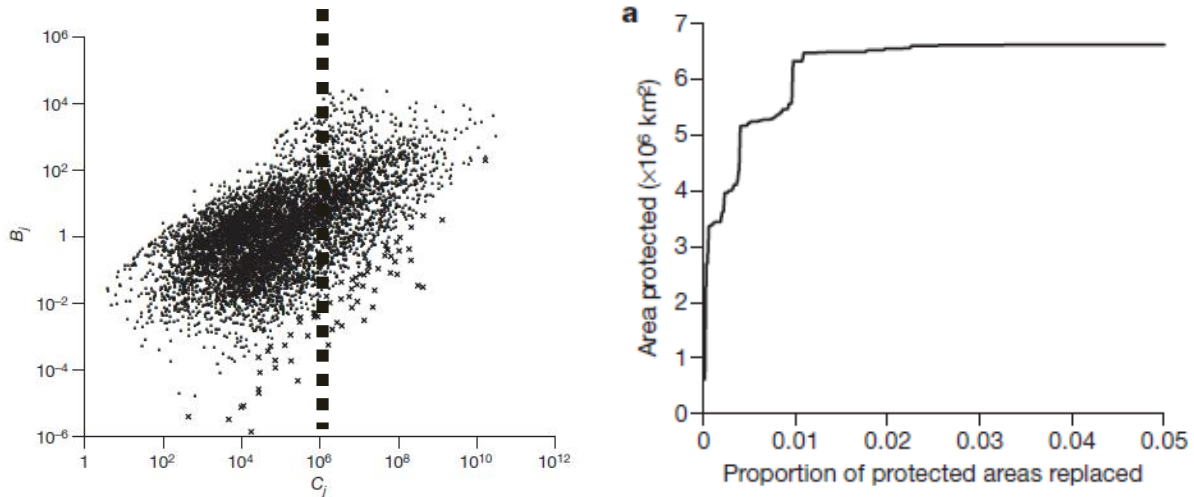
16. Sites that provide greater conservation value tend to be more expensive
17. For a given cost, variation in conservation value varies across several orders of magnitude.
18. The dashed line in the figure on the left represents the division between sites that contribute the most conservation value for money spent and sites that should be prioritized for sale in order to generate new funds for conservation.
19. Replacing 2% of the currently protected areas can result in >200% increase in the protected area.
20. Replacing more than 2% of the currently protected areas is probably not worthwhile.

The town of Mansfield is conducting a study of the effects of clearing invasive plants in town parks. They want to know whether using pesticides is more effective than removing plants by mechanical means. To study this question, they plan to use pesticides throughout one of their parks and mechanical methods at another. They will then measure the number of invasive plants in fifty 1-m^2 plots at each park and compare the two sets of numbers. Which of the following statements are accurate?

21. The management treatments in this study are well replicated.
22. Ideally the investigators would determine which park gets which type of management, randomly.
23. A strength of this study is the use of controls.
24. A strength of this study is the absence of confounding factors.
25. With this study design the investigators cannot answer their question very well.

Large nest boxes are commonly used to help manage for wood ducks. Which of the following recommendations would reduce the effectiveness of using nest boxes to manage this species?

26. Clumping boxes in groups of ten.
27. Hiding boxes deep in the woods.
28. Building boxes with two compartments.
29. Placing boxes in a dense tangle of vegetation.
30. Placing boxes on tall poles in the middle of a pond.

The figure below comes from the paper about the changes in abundance of various marine species (mostly sharks and rays). The three rows correspond to three levels in a food chain, with top predators in the top row. Each individual graph show population estimates in different years. The acronyms (NMFS, VIMS, etc.) all refer to the organizations that produced the data. Which of the statements that follow are correct?
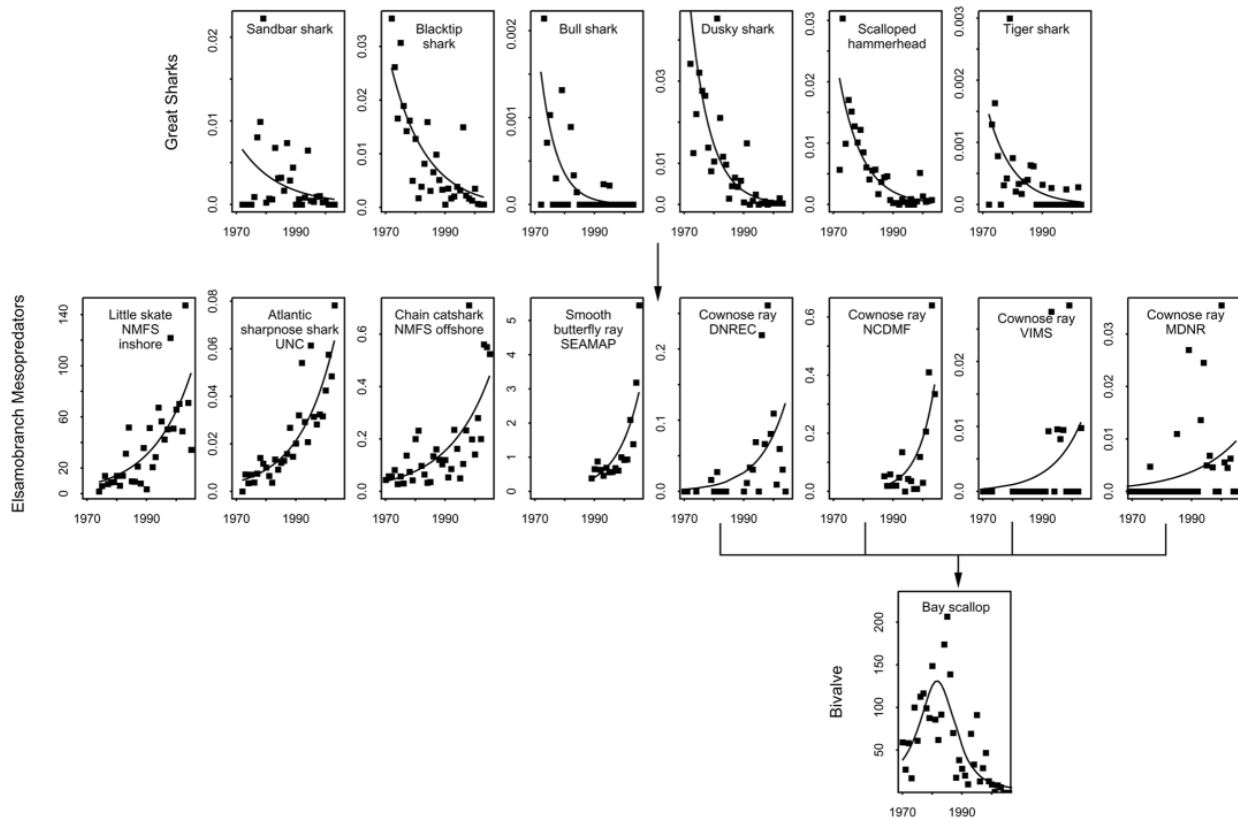
31. The figure shows population change in twelve different species.
32. The figure appears to illustrate a trophic cascade.
33. A likely explanation for the patterns shown in the figure is overharvest.
34. The figure illustrates the keystone species concept.
35. One way to increase the number of great sharks would be reverse the decline in bay scallops.

36. In recent years, Starbucks has started selling "shade-coffee" and claiming that this decision has environmental benefits. What is shade-coffee and what benefits does it provide? (3 points)

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

a) Ecological mitigation:
b) Mesopredator:
c) Adaptive management:

38. For each of the following pairs of reserve design, explain which option is best and why. In each case you can assume that the total area of protected land is the same for both choices. For each example also give a reason why the option that you selected as best might not be the better choice. (6 points)

a)

OR

b)

OR

c)

OR