

BIOL 521 Fall 2007  
Study guide for final exam

*Harvest*

Explain additive and compensatory offtake by harvesting or predation. For each, include a graphical analysis of the relationship between overall survival and the kill rate. Provide an example of demographic compensation and of compensation via the 'competing risks' mechanism. What is the distinction between these two types of compensation? In what circumstance is there a lot/little scope for a harvest to be compensatory in the sense of competing risks?

Draw and explain the recruitment curve for a population with density dependent growth. Identify the MSY and the population size that yields this MSY. State any assumptions you've made in drawing the recruitment curve as you did.

Draw offtake curves for fixed quota and fixed effort harvests and relate them to the recruitment curve above. Explain the differences between the two strategies, including a discussion of the stability of equilibrium points, and the effects of variation in recruitment on the two strategies.

Ideally, what information is needed to regulate a harvest? How can a fixed effort harvest be regulated with information only on effort and harvest?

*Diversity/Stability*

Define and briefly explain two measures of stability and two measures of diversity.

What were Elton & MacArthur's arguments for the hypothesis that community diversity promotes stability?

What was May's theoretical argument to the contrary?

How did subsequent empirical research by McNaughton, Tilman and others resolve this debate? In your answer, consider species vs community-level stability, and stability of ecological function vs. stability of community composition.

Explain Tilman's study of diversity and stability of grassland communities. Include methods, major results, his conclusions, and your evaluation.

### *Climate Change*

What is the greenhouse effect? What are the major greenhouse gasses? How has the concentration of CO<sub>2</sub> changed since the beginning of the industrial revolution? How have ecological responses to climate change been examined? Do these analyses suggest cause for concern about extinction rates?

### *Island Biogeography*

Explain species-area relationships, algebraically, graphically, and verbally. Explain the predictions of the equilibrium theory of island biogeography. Define and discuss edge effects. What do these relationships suggest about the design of reserves for conservation?

### *Landscape Approaches to Conservation*

Explain the basic steps of the landscape approach to conservation, and gap analysis in particular, perhaps by explaining the methods of used in papers you read.

What limitations of other approaches to conservation does the landscape approach address?

What are the basic steps of a gap analysis? What are some of the typical limitations in gap analyses? What concerns are raised or addressed by analyses of 'complementarity' and 'sweeping'?

Describe the major conclusions of Kiestler et al's gap analysis for Idaho, or Dobson's gap analysis for threatened and endangered species in the US. What are the strengths and weaknesses of the paper?