

Study Questions and Reading Guide: Kareiva & Marvier, Chapter 8
Conservation Biology
Spring 2011

Reading: Once again, this chapter is all about small populations except this time the focus is on stochasticity and the growth and decline of populations. There are a number of very important mathematical concepts in the chapter and it is important that you explore these topics early and thoroughly (don't wait for the exam). Also please take advantage of the materials on line having from intro courses on basic population ecology, if you are not already familiar with it.

I. Terms to know (there are others that I expect you already know (e.g., "heterozygote")):

Life history data	Age, stage and size based life history.
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II. Questions:

1. Know what **sampling by quadrats** is. How does the accuracy of population estimation using quadrat sampling resemble what we already learned about sampling error with regards to species presence (ch.1)?
2. The simplest forms of mark-recapture are very easy to understand. Concentrate on the basic theory of mark recapture population estimates and especially on a critique of what can make samples of real populations inaccurate and think about some of the things that can be done to reduce inaccuracy.
3. Why is estimating population trend so important in conservation and why is it so difficult – and what are the consequences of error in trend estimates? Box 8.2 is especially useful.
4. An important feature of this chapter is that it drives home the importance of understanding how assumptions affect and can bias estimates or mislead investigators. Probably everyone in the class has been exposed to the simple population growth model given in eqs 8.2 and 8.3. What are the assumptions behind this model and how realistic are they in most cases?
5. Note that since populations grow and decline, the overall growth rate is the geometric, not arithmetic mean. Know how to calculate geometric mean and understand why arithmetic means are not accurate predictions of average growth.
6. The "distinguishing trend from noise" section is very important and is a fundamental problem in all areas of science. Study it carefully.
7. Why are matrices important in creating more accurate population growth models? Be sure you understand the demographic model given at some length in the text on orangutans. We will go over this model in the text and you should be able to do the related problem (#3) at the end of

the chapter (a solution will be posted after population models are covered in class). Please apply yourself on this one and don't just read it without making a truly serious effort to understand the model.

8. Population viability analysis (PVA) is an important tool in conservation that is fraught with many dangers in terms of misleading results.

Understand the nature of a PVA, why it is a stochastic type of model, some of the features of PVA in terms of how they are constructed, what the outputs look like, and finally, be able to defend their use and be able to thoroughly critique them – in other words, please gain a balanced understanding of these tools. We will cover them in some detail in class.

Be able to answer all of the discussion questions at the end of the chapter. I will post a solution to #s 2& 3 and a partial answer to #4; we will have additional problems relating to Lincoln-Peterson indices.