Hunter & Gibbs Ch. 7 – Extinction Processes – Study Questions and Guide
Conservation Biology
Spring 2009

Much of the material in this chapter is an application or restatement of what we have learned earlier. You should be able to answer most of the questions below simply from the reading without us having to go over them in class (but if you have specific questions, please do ask). What will be new and what is very important is the tool called a population viability analysis (PVA). We will spend most of class on this, as it is the most difficult topic in this chapter (besides being very important). So, please be sure that you can answer the questions below (i.e., that you have learned and thought about the answers).

1. Rarity is a factor that predisposes species to extinction. What factors predispose a species to being rare and what does being a "specialist species" have to do with these factors? What does body size have to do with rarity? How about resource dispersion?
2. What are the relationships between a species range, dispersal ability and extinction likelihood? Explain.
3. Know the four factors that make species sensitive to extinction or substantial population reduction due to the action of humans. Be able to discuss each.
4. In the section about populations, notice in part why we discussed species definitions and genetic diversity. Careful studies of the biota have uncovered far more variation and far more species than the casual observer would ever believe exists. Much of this very important to the function of ecosystems. Furthermore, species go extinct population by population – not usually all at once. And as each population is lost, some of the species diversity is likely lost.
    (a) What are the two ways that biologists like to define populations?
    (b) Why is genetic interchange so important (we have talked about this many times in different ways – but be sure you understand the importance of gene flow in conservation.
5. What is a metapopulation and what does the concept of patchiness have to do with it? Does the metapopulation concept apply to all species? What are source and sink populations and ecological traps? Again, note the importance of the ideas of different spatial scales relative to the ability of genetic information to move around between populations of a species.
6. Relate the ideas of population turnover and local extinction and population re-establishment to earlier concepts of r- and K- selected species to what we learned about the deme structure of species.
7. What are the characteristics of a core and satellite populatiosn and why are these populations important in conservation? How do core and satellite relate to the idea of metapopulations?
8. Looking ahead, what do you predict the effect of habitat or ecosystem fragmentation to be on population extinction rates? Why?
9. What is a minimum viable population? Is there certainty or viability in its definition or is it a probabilistic concept? What is stochastic?
10. Read the box on PVA carefully as it will help you understand what we go over in class.

11. What are Shaffer's four interacting factors (pp144-46) that contribute to population extinctions? Be able to briefly discuss each and when possible, integrate these ideas wit the basic biology we learned earlier in the course.
12. Note that in PVA, as with all models, their accuracy is determined not only by their construction but also by the data that are used! The Soule quote "models are tools for thinkers, not crutches for the thoughtless" is a significant one and be sure that you understand what it means.
13. The bandicoot case study is excellent and provides an excellent example of how fieldwork and models can be used to identify populations at risk and evaluate different conservation strategies. Please study this one carefully.

Terms: patch, patchy, metapopulation, genetic sources and sinks, ecological traps, satellite populations, colonization event, local extinction, core satellite population, minimum viable population, stochastic