Review Sheet for Final Exam, Ecology Spring 2009 (Tues. May 5, 12-1:55)
Bring a # 2 lead pencil, calculator optional.

You are responsible for ALL material covered in Lecture.
You are also responsible for the readings in the syllabus, outlined below.
A portion of this exam (~40%) will be cumulative.

For your convenience, I have summarized the revised reading assignments below. In making up questions I will be using my lecture notes and the list below as guides to the important principles we've covered, so you should study accordingly. Since some of the exam is *cumulative*, all previous study sheets may also be used to prepare. The cumulative portion of the exam will take two main forms: repeats/modifications of questions on the previous exams, and questions that require you to bring together concepts from more than one section of the course.
The exam will be about as long as the others, and will have a greater emphasis on multiple-choice questions. Do not bother memorizing equations - they will be provided. Instead you should be sure you know which equation to use when, and what the equations mean. You should know by now that I won't focus on the details in the text, but on the general principles.

One of the following questions will be on the exam:

Your book discusses the interaction between honeyguide birds and honey-gathering humans. During a discussion, one of your study partners says "that's clearly a competitive interaction, since both species depend on honey." Your other study partner says "that's clearly an exploitative interaction, since the humans use the birds to find the honey". Yet the book calls this a mutualistic interaction. Reconcile these different viewpoints using the information available to you in your text.

In the chapter on global ecology we learned that humans have more than doubled the quantity of fixed nitrogen cycling through the biosphere. Discuss some of the consequences of this for the nitrogen cycle, and how such changes might affect natural communities and ecosystems.

Choose an environmental/ecological topic that's been in the news recently. Briefly describe the key features of the topic (1-2 sentences), and then explain how some of the things we covered in this course relate to or help in understanding the issue. Try to bring together the different subjects covered in this course as they relate to the whole problem – don't just focus on only one aspect of the issue. Use this as an opportunity to demonstrate your mastery of the course material.

Assigned Reading And Concepts To Know (skip those that are crossed out)

Chapter 15. Mutualism

- Plants benefit from mutualistic partnerships with a wide variety of bacteria, animals, and fungi
- Reef-building corals depend upon mutualistic relationships with algae and animals
- Theory predicts that mutualism will evolve where the benefits of mutualism exceed the costs

Chapter 16. Species abundance and diversity.

- Most species are moderately abundant; few are very abundant or extremely rare.
- A combination of the number of species and their relative abundance defines species diversity
- Species diversity is higher in complex environments
- Intermediate levels of disturbance promote higher diversity

Chapter 17. Food Webs

- A food web summarizes the feeding relations in a community
- The feeding activities of a few keystone species may control the structure of communities
- Exotic predators can collapse and simplify the structure of food webs

Chapter 18. Primary production and energy flow

- Terrestrial primary production is generally limited by temperature and moisture
- Aquatic primary production is generally limited by nutrient availability
- Consumers can influence rates of primary production in aquatic and terrestrial ecosystems
- Energy losses limit the number of trophic levels in ecosystems

Chapter 19 Nutrient cycling and retention--- focus on the cycles as covered in lecture.

- Decomposition rate is influenced by temperature, moisture, and chemical composition of litter and the environment
- Plants and animals can modify the distribution and cycling of nutrients in ecosystems
- Disturbance increases nutrient loss from ecosystems

Chapter 20. Succession and stability.

- Community changes during succession include increases in species diversity and changes in species composition
- ~~Ecosystem changes during succession include increases in biomass, production, respiration, and nutrient retention~~
- ~~Mechanisms that drive ecological succession include facilitation, tolerance, and inhibition~~
- ~~Community stability may be due to lack of disturbance or community resistance or resilience in the face of disturbance~~

Chapter 22. Geographic Ecology.

- ~~On islands and habitat patches on continents, species richness increases with area and decreases with isolation~~
- ~~Species richness on islands can be modeled as a dynamic balance between immigration and extinction of species~~
- Species richness generally increases from middle and high latitudes to the equator
- ~~Long-term historical and regional processes significantly influence the structure of biotas and ecosystems~~

Chapter 23. Global Ecology - know CO_2 well (as it was also covered in lecture).

- ~~The El Niño Southern Oscillation is a large-scale atmospheric and oceanic phenomenon that influences ecological systems on a global scale~~
- Human activity has greatly increased the quantity of fixed nitrogen cycling through the biosphere
- ~~Rapid changes in global patterns of land use threaten biological diversity~~
- Human activity is increasing the atmospheric concentration of CO_2, which may be increasing global temperatures