Course Goals

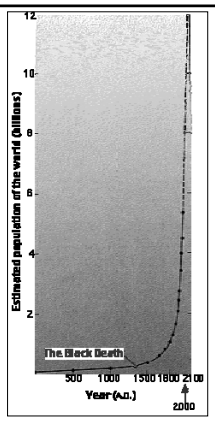
1. Develop an understanding of how organisms interact with their environment and the consequences of those interactions across ecological scales.
2. Develop an understanding of pattern, mechanism and scales in ecology.
3. Develop an understanding of how the scientific process is employed in ecology.
4. Develop an understanding of how ecology can be applied to environmental problem-solving.
5. Develop skills in
   - synthesizing ideas
   - critical thinking
   - applying knowledge to novel situations

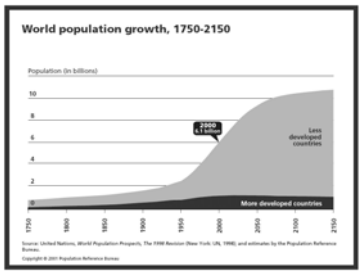
Bloom's taxonomy of learning

1. Basic knowledge → memorizing facts, processes
2. Secondary comprehension → understanding & illustrating facts
3. Application → generalizing to other situations
4. Analysis → understanding why, breaking the problem down
5. Synthesis → making connections
6. Evaluation → use knowledge critically to assess information

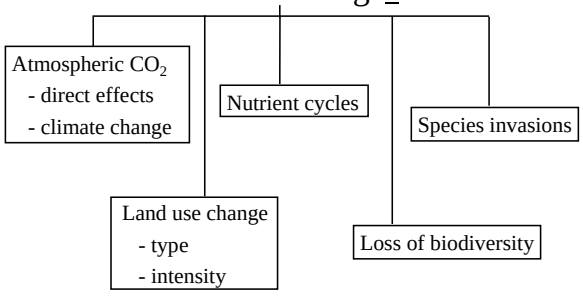
Who cares?

This is your world





Global changes



Content structure

(See syllabus)

1. 3 Issues
   1. Elevated CO_2 and climate change
   2. Loss of biodiversity
   3. Human population growth
2. Start with pattern
   1. How measured?
   2. How general?
3. Question driven investigation of mechanisms
   1. Progressively deeper levels
   2. Integration across levels of ecology
   3. How to test scientifically?

Homework Goals

- experience reading scientific literature
- practice synthesizing and applying ideas you've learned in lecture and textbook reading to novel situations
- learn how to approach test questions and real life problems
- encourage direct participation in learning.

What is ecology?

Is this ecology?

Or this?

Ecology: a hierarchy of complexity

Physiological ecology

adaptations for resource acquisition and dealing with environmental stresses

Physiological ecology: temperature

Physiological ecology:
water availability

Physiological ecology: light availability

Physiological ecology: the integrated organism

Ecology: a hierarchy of complexity

Population ecology -

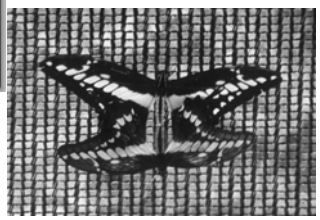
population growth, distribution, and regulation for a certain species

Physiological ecology

But no cactus is an island…

Population ecology:
abundance and
distribution

Population ecology: population growth and regulation



Population ecology: life histories

Ecology: a hierarchy of complexity

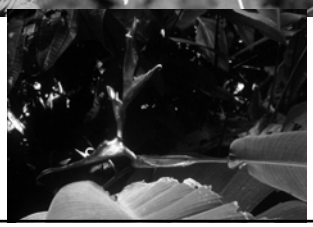
Community ecology -

interactions among multiple species

Population ecology

Physiological ecology

Community ecology: mutualism



Interactions among species: predation, herbivory, parasitism

Community ecology: competition

Community ecology: diversity

Community ecology:
disturbance and succession

Ecology: a hierarchy of complexity

Ecosystem ecology -

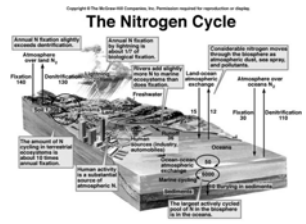
fluxes of energy and matter through the biotic and abiotic environment

Community ecology

Population ecology

Physiological ecology

Ecosystem ecology:
energy flux and production



Ecosystem ecology:
element cycles

Global change

Interactions among the levels

Ecosystem ecology

Community ecology

Population ecology

Physiological ecology