

Welcome to *Ecology 101*

Fall 2004

Premise of course:

Ecosystems approach

- a. Physical attributes
- b. Energy flow
- c. Productivity

Readings:

Required:

The Diversity of Life, Edward O. Wilson

Sand County Almanac, Aldo Leopold

Ecology: A Bridge Between Science and Society,
Eugene P. Odum

Highly Recommended:

Science Times

Science

Nature

Grading

1. Midterm: 50%

2. Final: 50%

Examination format:

Multiple choice, true/false, short answer, essay

Schedule and Lecture Topics:

September

Introduction:

Basic Principles I – Origin and Evolution of Ecosystems
Basic Principles II – Species and the Concept of Niche
Energy Flow and Trophic Levels
Biogeochemical Cycles I

October

Biogeochemical Cycles II

Ecosystems:

Lotic Ecosystems (Rivers)

MIDTERM EXAM

Lentic Ecosystems (Lakes)
Ecotones: Estuaries and Wetlands

November

The Oceans
Coral Reefs
Rainforests

December

Hardwood and Boreal Forest

FINAL EXAM

Websites:

Required:

[www.http://ci.columbia.edu/ci/eseminars/1111s_detail.html](http://ci.columbia.edu/ci/eseminars/1111s_detail.html)

[www.http://streamecology.org](http://streamecology.org)

[www.http://IES.org](http://IES.org) (Institute for Ecosystems Study)

Recommended:

www.medicalecology.org

[www.http://NASA.gov](http://NASA.gov)

, then go to Earthwatch

[www.http://NOAA.gov](http://NOAA.gov)

Learning objectives:

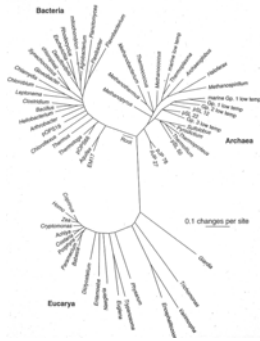
1. Students completing this course will acquire an over-view of the general principles that govern global processes resulting in sustainable ecological functions and services.
2. An ecosystems approach will enable students to envision most of the earth's terrestrial and aquatic biomes from the perspective of energy flow and bio-productivity.
3. Students will learn how all life forms in a given ecozone integrate forming ecological associations resulting in complex food webs.
4. Major impacts that human activities have had on ecological process (e.g., de-forestation, urbanization, mining, etc.) will be presented, contrasted with examples of how these ecosystems function in the absence of those activities.
5. Public health concepts of what constitutes "good health" will be integrated with concepts of ecological health as applied to the rest of the plants and animals on earth.
The adage that: "A health ecosystem fosters good health among all its inhabitants, including humans" will be amply illustrated throughout the course.

Is That All There Is?

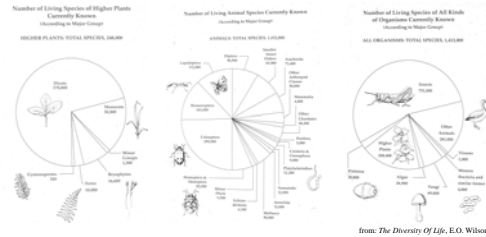


Right now we can only guess that the correct answer for the total number of species worldwide lies between 2 and 100 million

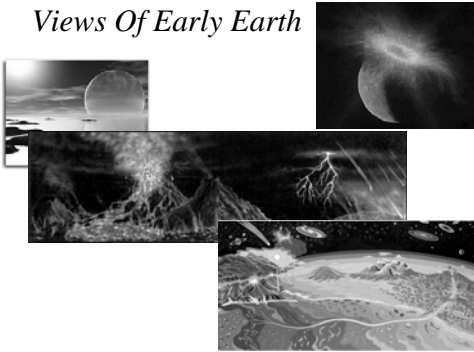
Life on Earth



The Diversity Of Life

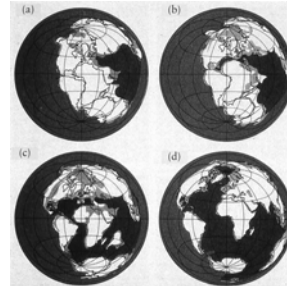


Views Of Early Earth



"Drifting Apart"

225 MYA



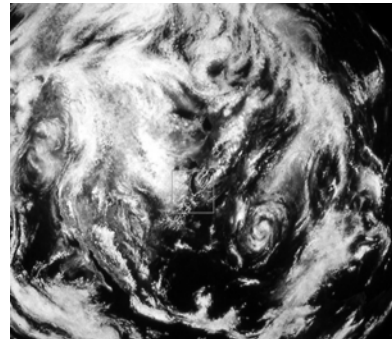
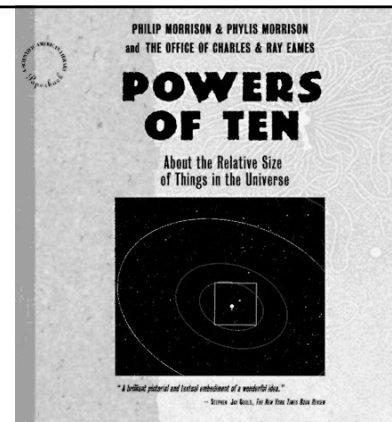
Now

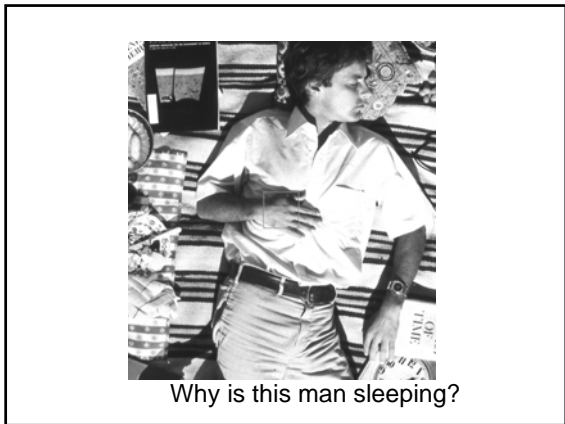
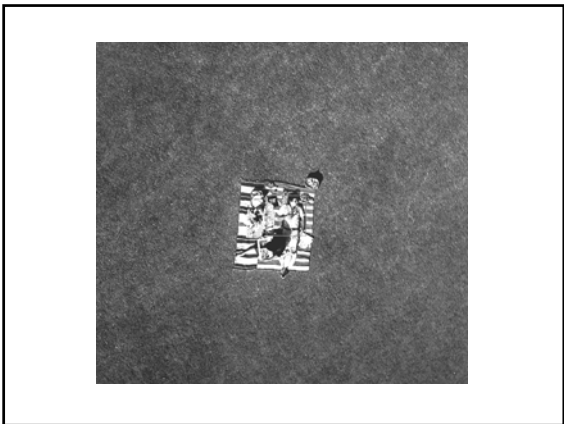
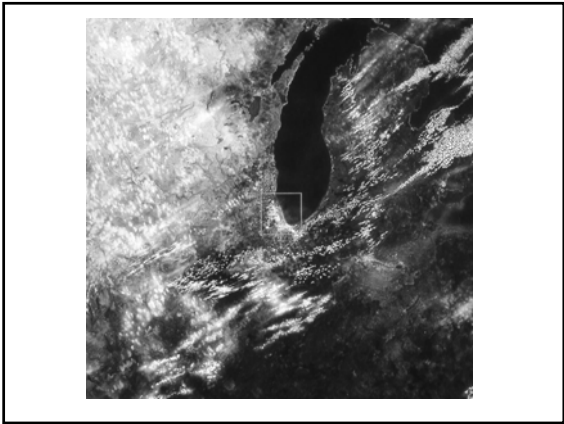
Ecosystem Ecology

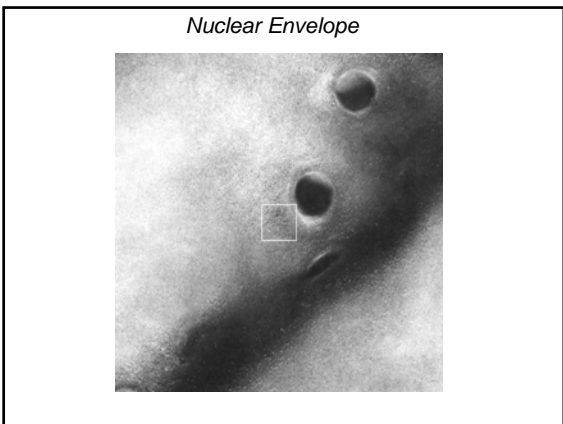
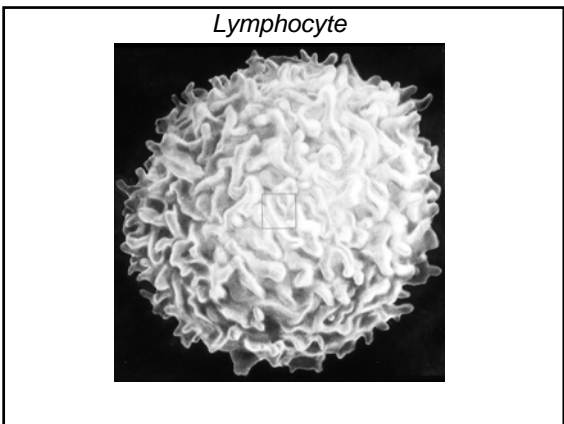
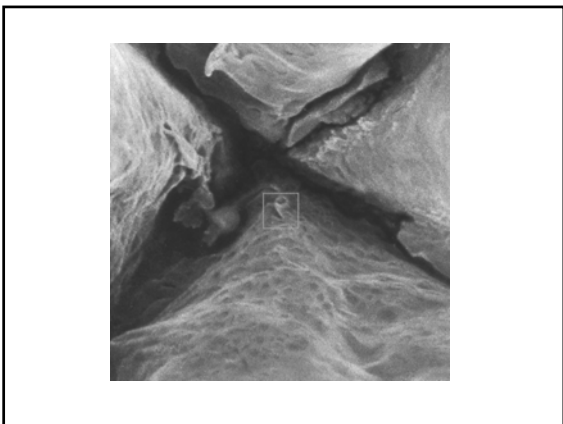
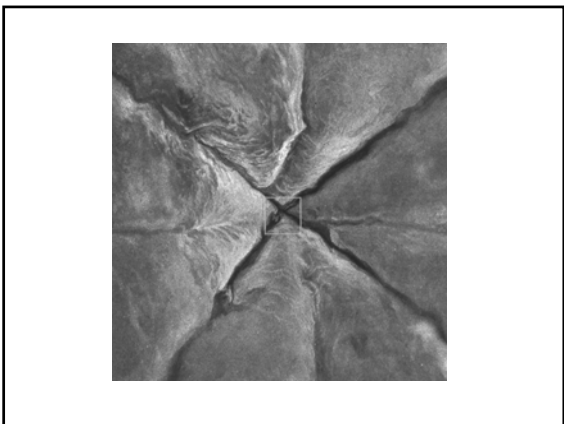
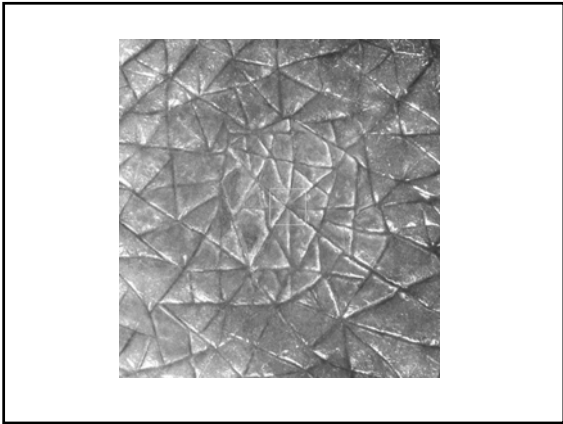
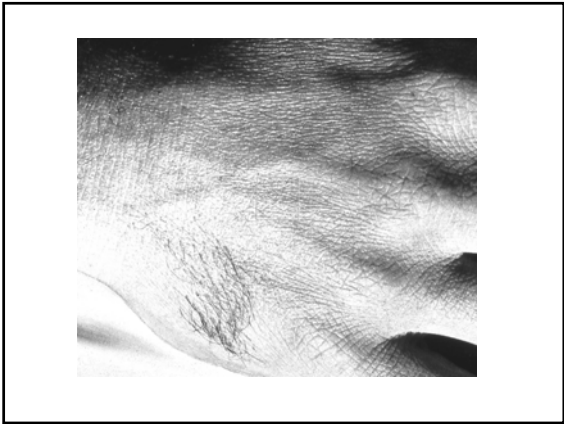
Describing Ecosystems

1. Identify a definable geographic region (e.g. grassland prairie)
2. Identify all plants and animals within that region (i.e., the biodiversity index)
3. Study how these disparate groups form associations of food chains and food webs (i.e. form ecosystems).
4. Study the flow of energy through these associations (i.e., measure productivity)

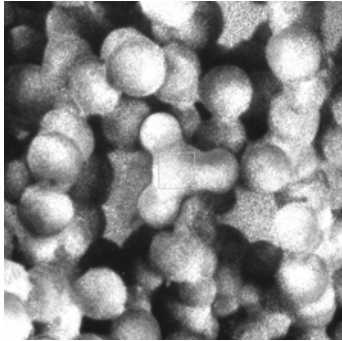
Levels of Complexity







Chromosomal DNA



We have come a long way in just 20 years

