


The term “ecology” coined in 1866


“By ecology we mean the body of knowledge concerning the economy of nature - **the investigation of the total relations of the animal both to its inorganic and its organic environment**; including above all, its friendly and inimical relations with those animals and plants with which it comes directly and indirectly into contact - in a word, ecology is the study of all those complex interrelations referred to by Darwin as the **conditions of the struggle for existence.**”



Ernst Haeckel 1866

The Modern Definition

Ecology -



Characteristics of Ecology

- Studied at several hierarchical levels
- Uses the scientific method
- Is interdisciplinary
- A great way to make a living

Ecology is studied at many hierarchical levels

Organisms

Populations

Communities

Ecosystems

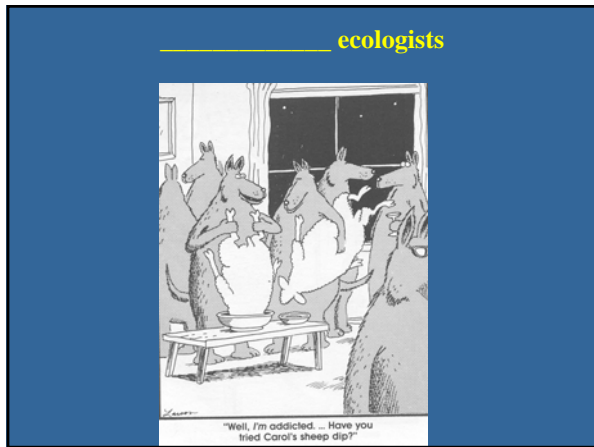
Landscapes

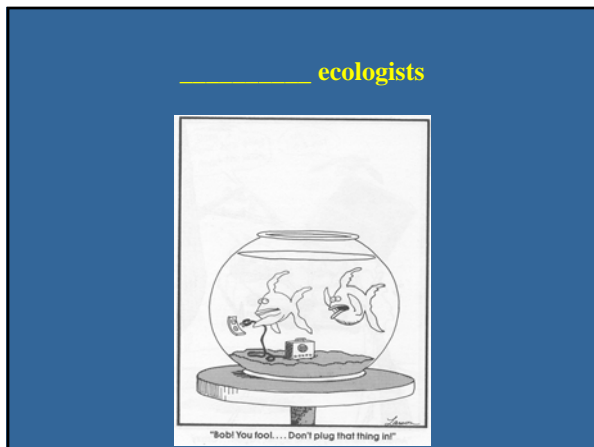
Ecosphere (A.K.A. The Biosphere)

_____ ecologists










_____ ecologists.



_____ ecologists



Ecologists use the scientific method to understand the order of the natural world

Observations

Identification of patterns

Formulating hypotheses

Test hypotheses with experiments, and/or more observations

Interpret & publish results

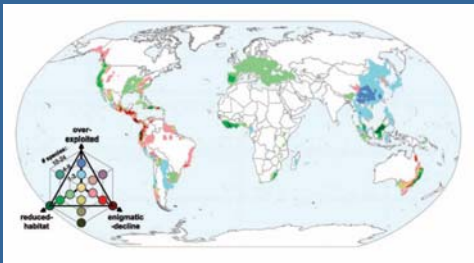
Case Study of Ecology in Action

Observations -

In 1989 scientists meeting in England for a herpetology conference discovered that all over the planet their colleagues were noticing amphibian declines and disappearances. No one knew what to make of it.

Patterns observed in amphibian decline

Rapid declines are widespread
16 countries & 5 continents



Stuart et al. 2004; Blaustein & Wake 1990

Patterns observed in amphibian decline

Many species are threatened

32.5 % are either vulnerable, endangered, or critically endangered.

Some declines have been dramatic

In Oregon, 80% disappearance of *Rana cascadae* populations

Some populations may have gone extinct

Not all species within the same regions are affected

Declines have been noted in remote areas

In Sequoia-Kings Canyon National Park, by late 1980s, 98% of ponds that formerly had *Rana muscosa* had none.

Species Examined

Hyla regilla (Pacific treefrog)
Populations NOT declining

Rana cascadae (Cascades frog)
Populations known to have decreased

Bufo boreas (Western toad)
Populations known to have decreased

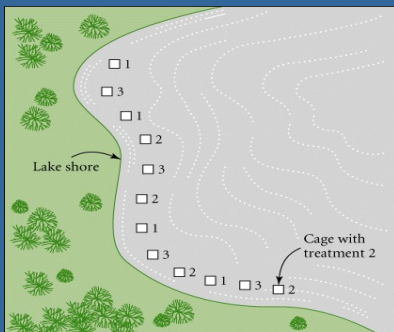
In nature, the eggs of these species are laid in open water & highly exposed to sunlight.

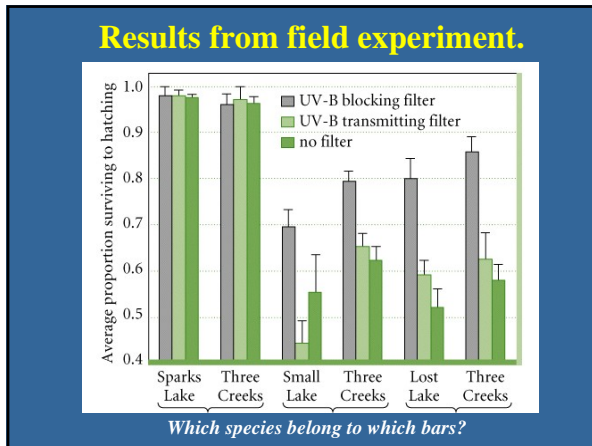
Testing in the Lab

Photolyase Activities
in egg & oocyte extracts



Testing in the Field





Results of similar experiments have been published and have shown both similar and contrasting results.

Required Reading Assignment
Articles 1-4

Stuart et al. 2004. Science
Blaustein et al. 1995. Ecological Applications
Corn, P.S. 1998. Ecological Applications
Blaustein et al. 1999. Ecological Applications

All articles & study questions can be obtained at the Bio. 221 web site
