Conservation Biology
ECOL 406R/506R
University of Arizona
Fall 2003
Kevin Bonine
• Announcements
  • Jobs
  • Readings
• Final Exam (Friday 19 Dec. 1100-1300h)
• Conservation Meets Creativity
• Economics of Conservation
• Tidbits
• Evaluations

Ran out of time for grading!
Everyone high C or better.
5 December: Air Quality and Climate Change

Global Air Quality and Pollution
Hajime Akimoto
[Abstract] [Full text] [Web resources]

Modern Global Climate Change
Thomas R. Karl and Kevin E. Trenberth
[Abstract] [Full text] [Web resources]

28 November: Freshwater Resources and the Energy Picture

Global Freshwater Resources: Soft-Path Solutions for the 21st Century
Peter H. Gleick
[Abstract] [Full text] [Web resources]

Energy Resources and Global Development
Jeffrey Chow, Raymond J. Kopp, Paul R. Portney
[Abstract] [Full text] [Web resources]

21 November: Fisheries, Soils, and Food Security

Tropical Soils and Food Security: The Next 50 Years
M. A. Stocking
[Abstract] [Full text] [Web resources]

The Future for Fisheries
Daniel Pauly et al.
[Abstract] [Full text] [Web resources]
Competent before radical...
Data and science, then fingerpainting

CONSERVATION MEETS CREATIVITY:
AN ECOLOGICAL AWARENESS EVENT

- Main Lobby - Forbes Building
- Monday December 8, 2003
- 9am to 1pm (Slide Show at 10:30)

Photography, Music, Games, Food, ideas about how you can reduce your ecological footprint and so much more!!!!

Brought to you by ECOL/RNR 406R/506R - Conservation Biology Fall 2003

Photos courtesy of Ben Joslin
1. Role of Human Population Growth
2. Neoclassical Economics
3. Externalities
4. Environmental Economics etc.
5. Genuine Progress Indicator
6. Examples
Conventional Neoclassical Economics

- Private Property
- Economic Growth always good
- Allocate based on price
- More always better for an individual (utility curves)
Scavengers are key; we can't really throw things away.

Return to pre-neoclassical ideas

Ecological or Environmental Economics

Figure 2-3 Ecological view of economic activity. Ecological economists see all economies as human subsystems that depend on resources and services provided by the sun and the earth's natural resources. A consumer society devoted to economic growth to satisfy ever-expanding wants assumes that our technological cleverness will allow us to find (1) substitutes to overcome any limits on resources and (2) ways to keep pollution and environmental degradation at acceptable levels. To ecological economists, such a society is unsustainable because of its depletion and degradation of natural resources, many of which have no substitutes.

=14-2 Miller 2003
VanDyke, 2003

~1700

Overwhelm?

~2000

Figure 12.10
An alternative view of the relationship between the economy and the environment, as understood within the framework of environmental economics. The physical environment provides raw materials and energy, stock (nontirable) resources, flow (renewable) resources, a sink for wastes, and key life support systems including water, air, climate regulation, food, and biodiversity. However, it is limited globally. (a) In the past, the human economy was small relative to the biosphere, and sources of raw materials and sinks for wastes were relatively large. (b) As the human economy has grown, the source and sink regions of the biosphere have diminished because of use and degradation, and so have their capacities to provide resources and absorb waste. Thus, the human economy must increasingly make environmental constraints a more explicit consideration in producing goods and services and disposing of the waste that such production creates.

Adapted from Goodland, Daly, and El Serafy (1992) and Costanza et al. (1997).
What is the purpose of the economic system?
   - to what end all of this wealth? Ultimate value beyond market?

0-Classical Economics

1-Environmental Economics (catch-all term, think cyclically)

2-Steady-State Economics (John Stuart Mill 1700’s, Herman E. Daly)
   - in = out
   - ‘Virtue and character higher goals than material wealth.’

3-Sustainable Development (Lester Brown)
   - do away with many subsidies
   - replace income tax with environmental tax

Stocks and Flows, → Entropy
Nicolas Georges-Roegen
~”a Cadillac now means fewer human lives later”
Economic Growth vs. Development
- efficiency, sophistication, utility

Nonrival (air to breathe) or nonexclusive goods (UV protection from ozone)

- Producer Pays/Polluter Pays
  - Dramatically less waste (packaging, scrubber sludge)

- Taxation/Subsidies
- Pollution Rights
- Precautionary Principle
- Insurance

Government strategies and regulation
- Stable, democratic government required?
Government strategies and regulation
Stable, democratic government required?

(VanDyke p. 356:)
NEPA, ESA, Clean Air, Clean Water...

- Work b/c require full and open disclosure of process and those involved.

- How do Cheney secret meetings with industry leaders to plan energy policy fit in?

SDCP and findings from economic analyses...
Figure 2-5 Comparison of the gross domestic product (GDP) and genuine progress indicator (GPI, left) and the per capita values for these indicators (right) in the United States between 1950 and 1998. (Data from Clifford Cobb, Mary Sue Goodman, and Methis Wackernagel)

Miller 2003

Genuine Progress Indicator

Index of Sustainable Economic Welfare

Figure 12.11 VanDyke, 2003
Changes in the U.S. Gross National Product (GNP) and Index of Sustainable Economic Welfare (ISEW) since 1950. Although the GNP has increased, the ISEW has failed to grow.
Zimbabwe
CAMPFIRE Program

Communal Areas Management Program For Indigenous REsources

-aimed at creating worthwhile returns to villagers from the sustainable use of natural resources,
giving them income security and a stake in the preservation of the natural environment and wildlife of their area.

Communal areas are divided into regions which have local committees and projects.

-Fees, Meat, Hides
-up to $50k/week hunting
-photosafaris etc.
Zimbabwe CAMPFIRE Program
Local Control and Projects

but...
11 million people
Robert Mugabe

Economic and Political Turmoil

Poultry Farming in Masvingo
Ecotourism?  
-Highly Contentious

UN website:  
Masai in Eastern Africa and Masai Mara N.P.  
-lost grazing lands, lost rights  
-(native american analogy?)

Tourism works, but need many visitors  
-degradation  
-roads  
-infrastructure  
-sewage  
-deforestation for heating and cooking  
-corruption?
African Southern White Rhinoceros
*Ceratotherium simum simum*

<200 in 1900

>11,000 today (and growing)

habitat loss, poaching ($)

CITES Appendix I
White Rhinoceros *Ceratotherium simum*
poaching for:
medicine, aphrodisiac, dagger handles

horn up to 10kg:
prices $600-10,000/kg
($60,000/kg for Asian Rhino = ~5x price of gold)
“...land management system that seeks protect viable populations of all native species, perpetuates natural disturbance regimes on the regional scale, adopts a planning timeline of centuries, and allows human use at levels that do not result in long-term ecological degradation”

Ecosystem:
- energy and nutrient processing system with physical structure and function that circulates matter and energy.
Ecosystem Management (Ch10 Van Dyke text)

Why?
- erosion, pollution, waste disposal, sedimentation
- small or uncharismatic species, recreation, intrinsic value
- single species approach very expensive

(SDCP model)

-driven by CAPACITY to deliver goods, services, functions; NOT Demand for them

(forest as an ecosystem, not just a tree farm)

-management experimental and adaptive (SDCP)
  - monitoring

-cooperation, stakeholders
“Managers recognize the need for human communities to utilize some ecosystem resources” (VanDyke p.272)

- Define “some”
- Where do we draw the line?
- Human population increase?

Unit of ecosystem management?
- watershed?
- make sure include important components (Everglades and Lake Okeechobee)

Ecosystem Processes: Necessary vs. Sufficient
- Hawaii missing 90% native vertebrates
- fire, water, herbivory, predation
Tucson Watershed (Tucson Basin 1,700 sq. miles = 1 million acres)
- Restoration Ecology (CH11)
- Biocultural Restoration

- Processes

e.g., Guanacaste, Costa Rica

e.g., Everglades, Florida