Lecture 8, 17 Sept 2009
Biodiversity IV

Conservation Biology
ECOL 406R/506R
University of Arizona
Fall 2009

Kevin Bonine
Mary Jane Epps

Biodiversity Readings
Primack Ch3
Costanza et al. 1997
Driessen 2004
Primack Ch4
Suzuki Link
Biocontrol Link

3rd Lab SATURDAY 26 Sept 7am northwest corner BSE

Updated 16 Sept 2009

Week 4

Tues Sep 15, Biodiversity Value and Threats (pdf2 or pdf6)
(Primack Ch4, David Suzuki Website)
Optional: Readoff Finals (green except, VanDusen except, Measuring Diversity, Hardy Weinberg)

Q2 - Due by 4am Monday 21 September to JM as DOC attachment.

How should biodiversity be measured? Who would agree with your response and who would disagree? By “who” we mean which groups, organizations, or famous persons relevant to Conservation Biology. You will obviously have to choose just a few to include in your essay. The best essays will be organized, well written, defend their point of view, and include citations of literature.

Thurs Sep 17, Biodiversity Threats, Invasive Species (pdf2 or pdf6)
(Primack CH2, TREE article on Biodiversity 2007)
- JMD
1430h: Diversity and Conservation in our National Parks (pdf2 or pdf6)
Both Sections 4 EPS optional: optional paper about regulatory stroganoff

Week 5

Tues Sep 22, Global Climate Change (pdf2 or pdf6)
(Primack CH4, Weller et al. 2004, Nature)
(Optional: National Geographic Global Warming issues: Part 1, Part 2, Part 3)

Thurs Sep 24, EXAM ONE (CH1-4, and associated lectures and readings)
• 2009 Review, 2008 review guide, 2008 Ex1 KEY, and Examples of Excellent Answers: 2007 midterm examples (not all topics)

Week 6

Tues Sep 29, Global Turtles Conservation
Ed Mills (Ch.7 of his 2004 book, The Ecology, Evolution, and Conservation of River Turtles)

Thurs Oct 1, Extinctions and Small Populations (Island Biogeography, Metapopulations, etc.)
(Primack CH5, Harper et al. 2003, Quammen, Song of the Dodo except6)
Chapter Five Footnotes

5. A more recent version of Malaria and the DDT story can be downloaded from the Institute of Economic Affairs website at http://www.iea.org.uk/isedp.php?type=publications&ID=11
7. The chemical Aler was used to regulate the growth and ripening of apples, until it became the subject of an attack launched by Fenton Communications, the NRDC, and CBS’s "60 Minutes." In a later interview, David Fenton admitted that "the PR campaign was designed so that revenue would flow back to NRDC from the public." See Banner Cohen, John Carlisle, et al., The Fear Profiteers: Do socially responsible businesses now use health scares to reap monetary rewards? Arlington, VA: Lexington Institute (2000).
8. In so doing, Rockefeller ignored thousands of pages of scientific evidence attesting to the pesticide's safety and expert recommendations that it be used for malaria control.
ECONOMICS

Adam Smith 1909 (voluntary transactions)
Invisible Hand - "turning selfish, uncoordinated actions into increased prosperity and relative social harmony"

- Tragedy of the Commons
- Externalities
- Private Property

Market Failure
resources misallocated:
"a few individuals or businesses benefit at expense of the larger society" (Primack 2006)

Economic Growth...

How is Economic Development Different?
How is Economic Development Different?

Takes quality of life into account:
- life span, infant mortality
- education
- health care
- environmental quality
- pollution
- clean air and water
- percent of population below poverty line
- etc.

“For poor women the only holiday is when you are asleep.”

Women:
- Do 2/3 of the work
- 10% of the income
- own 0.01% of the property
- 70% of the world’s poor
- 2/3 of the world’s illiterate

(page 87 Miller 2005)
Figure 2-5: Comparison of the gross domestic product (GDP) and genuine progress indicator (GPI) with the per capita values for these indicators (right) in the United States between 1960 and 1998. (Data from Clifford Cobb, Mary Sue Goodman, and MathisVENKATESH 2003)

Figure 12.11: Van Dyke, 2003
Comparison of 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.

Gross domestic product (GDP) sums together all economic activity, whether good or bad. It does not account for benefits such as volunteering or for external costs such as environmental degradation and social upheaval. The genuine progress indicator (GPI) does account for these factors and, as a result, can often be quite different in value from the GDP. Shown here are values for GDP and GPI for the United States in the year 2000. Data from Clifford Cobb, Mark Glaccum, and Craig Chase, The Genuine Progress Indicator 2000 Update, Redefining Progress Issue Brief, 2001.
EXTERNALITIES

Figure 2.13 An Indonesian boy wading in a polluted river suffers external costs. External costs are costs not borne by the buyer or seller; they may include water pollution, aesthetic harm, human health problems, property damage, harm to aquatic life, aesthetic degradation, declining real estate values, and other problems. Brennan and Withgott 2005

Internal Market Costs vs. Externalities
-External to Market Forces

-Noise
-Pollution
-Acid rain
-erosion
-Global Warming
-Eutrophication
-Disease
-Asthma
-Birth Defects
-Behavior and Intelligence

Not always negative!
Over the past 50 years, the federal government has provided more than $500 billion in subsidies to the fossil fuel and nuclear industries, investing a fraction of that in energy efficiency and renewable sources of energy such as wind, solar and geothermal. As a result, coal, nuclear power, oil and gas provide more than 91 percent of our electricity needs in the U.S. This dependence on fossil fuels carries severe public health consequences, including asthma attacks, respiratory disease, heart attacks, and premature deaths. Moreover, fossil fuels, such as coal and oil, pollute the environment from the point of extraction to combustion in the form of global warming, acid rain, oil spills and runoff pollution. At the same time, nuclear power has left us with a nuclear waste problem for which no safe solution exists.

http://www.pennenvironment.org/PE.asp?id2=17700
Conservation, Economics, Sustainable Development

That which seems to be wealth may in verity be only the gilded index of far reaching ruin.

- John Ruskin, 1883

What is the purpose of the economic system?
- to what end all of this wealth? Ultimate value beyond market?

1-NeoClassical Economics (growth always good)
2-Environmental Economics (catch-all term, think cyclically)
3-Steady-State Economics (John Stuart Mill 1700's, Herman E. Daly)
   - in = out
   - 'Virtue and character higher goals than material wealth.'

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

Stocks and Flows, → Entropy
Utility vs. Throughput
Throughput

Nicolas Georgescu-Roegen

~“a Cadillac now means fewer human lives later”

Killing the Natives, Chapter 3

U.S.: 4% global population
25% fossil fuels
>25% cars
50% advertising spending

Goods vs. Bads

$80 billion on shoes, jewelry, watches
$65 billion on higher education

Americans since 1950 have consumed more than all in history preceding

# indivs/house dropping in US

Jimmy Carter – malaise speech, reduce consumption…Reagan
How to Change Economic Behavior?

- Producer Pays/Polluter Pays
  - Dramatically less waste (packaging, scrubber sludge)
- Taxation/Subsidies
- Government strategies and regulation
  - Stable, democratic government required?

Product itself

Nonrival goods
  (air to breathe)

or

Nonexclusive goods
  (UV protection from ozone)
C: ~$436 billion
B: >$6.8 trillion
1:16 -> C:B

Wright and Nebel 2002

Private Property?

nomadic Maasai

Table 28.1: Water use by people in different sorts of communities in Arabia

<table>
<thead>
<tr>
<th>Type of community</th>
<th>Domestic water use per person (L/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern Arab town without major industry*</td>
<td>745</td>
</tr>
<tr>
<td>Traditional agricultural village</td>
<td>120</td>
</tr>
<tr>
<td>Small desert settlement with supply by government water truck</td>
<td>80</td>
</tr>
<tr>
<td>Small desert settlement with traditional water supply</td>
<td>28</td>
</tr>
</tbody>
</table>

Source: After Goodie and Willkinson, 1977. *New York City has a similar usage rate. (Hill et al. 2004)
**FIGURE 23-3** Environmental economic view of economic activity. The natural environment encompasses the economy, which is constrained by the resources found within the environment.

**FIGURE 24-5** The development cycle spawned by the Highway Trust Fund.

Wright and Nebel 2002
Utility vs. Throughput
Utility not measurable; it is an experience

Circulatory system vs. digestive system
(perpetual motion machine)

Wealth vs. Ith (accumulation of goods vs. bads)

Micro vs. Macro economics
(MR=MC vs. endless)

Herman Daly
Former Environmental Economist with Worldbank
Professor at U. Maryland

If resources infinite then price = 0,
but if pay for resources then can redistribute wealth
Warren Buffett: Tax Inherited Estates

By LAURIE KELLMAN - 14 Nov 2007

Billionaire Warren Buffett told the Senate Finance Committee on Wednesday that Congress should keep the estate tax rather than repeal it and help a few rich Americans like him.

"I think we need to ... take a little more out of the hides of guys like me," Buffett told the panel. One of the world's richest men and biggest philanthropists, Buffett has been outspoken against efforts, mostly by Republicans, to repeal or reduce the federal tax on inheritances. Democrats argue that a repeal would amount to a huge windfall for the nation's wealthiest families.

Estates worth up to $2 million this year and next will be exempt from the federal estate tax. Portions of estates above that threshold will be taxed at 45 percent.

In 2009, the exemption level rises to $3.5 million, and by 2010 the estate tax will be repealed — but only for a year.

Unless Congress changes the law, it comes roaring back in 2011 with an exemption threshold of only $1 million and a top tax rate of 55 percent.

Buffett said inheritance taxes preserve a measure of meritocracy, and with it opportunity, by recycling portions of great wealth through public coffers.

"The resources of society I don't think should pass along in terms of an aristocratic dynasty of wealth," Buffett told the panel. "I believe in keeping equality of opportunity as much as you can in this country."

Committee Chairman Max Baucus, D-Mont., citing information from the IRS, said that of nearly 2.5 million deaths in 2004, about 19,300 estates paid the estate tax.
What are the major threats to biodiversity?