Wednesday 08 March 2006, 24th class meeting  
(Miller Chapter 6 and 7)  

Environmental Biology (ECOL 206)  
U. Arizona, spring 2006  

Kevin Bonine, Ph.D.  
Alice Boyle, Kristen Potter, Graduate TAs

1. Conservation Approaches  
2. Lecture schedule updates on your website  
3. 206 Lab Website for handouts and assignments  
   No Lab this week

- next installment of Group Project due Wed 08 March

- Exam II Friday 10 March 2006 (review sheet on website) 
- Lab Notebook (Fri), Current Events (Mon after SB?) 
- Card for Alice Boyle
The Energizer

Amory Lovins has a vision: The U.S. economy keeps going and going and going—without any oil

As told to Cal Fussman
Photography by Ben Stechschulte

AMORY LOVINS IS A PHYSICIST, ECONOMIST, INVENTOR, AUTOMOBILE DESIGNER, CONSULTANT TO 18 HEADS OF STATE, AUTHOR OF 29 BOOKS, AND COFOUNDER OF ROCKY MOUNTAIN INSTITUTE, AN ENVIRONMENTAL THINK TANK. MOST OF ALL, HE’S A MAN WHO TAKES PRIDE IN SAVING ENERGY. THE ELECTRICITY BILL AT HIS 4,000-SQUARE-FOOT HOME IN OLD SNOWMASS, COLORADO, IS FIVE DOLLARS A MONTH, AND HE’S CONVINCED HE CAN DO THE SAME FOR ALL OF US. HIS BOOK WINNING THE OIL ENDOGAME SHOWS HOW THE UNITED STATES CAN SAVE AS MUCH OIL AS IT GETS FROM THE PERSIAN GULF BY 2015 AND HOW ALL OIL IMPORTS CAN BE ELIMINATED BY 2040. AND THAT’S JUST FOR STARTERS.
WIND

IF I COULD DO JUST ONE THING TO SOLVE OUR ENERGY PROBLEMS, I WOULD allow energy to compete fairly at honest prices regardless of which kind it is, what technology it uses, how big it is, or who owns it. If we did that, we wouldn’t have an oil problem, a climate problem, or a nuclear proliferation problem. Those are all artifacts of public policies that have distorted the market into buying things it wouldn’t otherwise have bought because they were turkeys.

ELECTRICITY

A QUESTION I ASK A LOT IS, WHAT’S THE RIGHT SIZE FOR THE JOB? I HAVE A book called Small Is Profitable: The Hidden Economic Benefits of Making Electrical Resources the Right Size. It points out 207 benefits of distributed resources, such as solar and wind power. When I begin to describe them, you’ll find them really obvious.

ENERGY

Until then, the energy problem was generally considered to be: Where do we get more energy? People were preoccupied with where we could get more energy of any kind, from any source, for any price—as if all one needed were the same. I started instead at the other end of the problem: What do we want the energy for? You don’t generally want lumps of coal or barrels of sticky black goo. You want comfort, illumination, mobility, baked bread, and

OIL

Let's start with one basic problem: Saudi Arabia has a quarter of the world's oil reserves. It is the sole swing producer with significant capacity to increase output, and therefore it controls the world price.

DEFENSE

A MAJOR PLAYER IN OUR ENERGY FUTURE WILL BE THE PENTAGON. HERE'S why: Trailing behind every half-mile-a-gallon Abrams tank—a peerless fighting machine if you can get it there—are two unarmored fuel trucks. Guess what the bad guys shoot at?
Kanab amber snails and the management of the Grand Canyon

Hans-Werner Herrmann
(w/ Melanie Culver)
What are Kanab amber snails (KAS)?

*Oxyloma haydeni kanabense*

*Oxyloma* occurs in N-America (> 12 species and subspecies), Europe and S-Africa

**Family SUCCINEIDAE**

**Beck, 1837**

The shell of succineids offer little indication of generic and specific identity, and identification is difficult. Genera are differentiated anatomically and many nominal species are poorly understood.

*Oxyloma* haydeni kanabensis

⇒ subspecies

What is a subspecies?
sometimes KAS is listed as species

the nominal subspecies

*Oxyloma haydeni haydeni*

Niobrara amber snail (NAS)
“strange” non-continuous pattern, large gaps
sympatric populations in Arizona and Alberta?

overall spotty distribution possibly related to habitat’s
permanently wet soil surface and/or shallow standing water (*Typha*)
The conservation status...

- beginning of 90’s KAS was only known from Three Lakes in the Kanab canyon, S Utah, in two small populations on private land (the Vasey’s Paradise population was discovered in 94)

- 1992 emergency listing in Endangered Species Act (ESA) after populations were almost destroyed by earthmoving equipment

- KAS is the smallest species in ESA

- and why species? Isn’t KAS a subspecies?
Kanab Amber Snail

Brandt Child bought 500 acres of property in Utah in 1990, planning to build a campground and golf course near its three lakes. The next year, the U.S. Fish and Wildlife Service told him he couldn’t use his property because the lakes were inhabited by 200,000 federally protected thumbnail-sized Kanab amber snails. The snails differ from other snails only because of their golden color.

A few months later, Mr. Child discovered 10 domestic geese near his ponds. After dutifully notifying federal officials, he was told that if the geese had eaten any snails, he faced a fine of $50,000 per snail! A state wildlife agent and a Highway Patrolman arrived with a shotgun intending to shoot the geese and remove their stomachs to find out if any snails had been eaten.

The only thing that saved the geese was a reporter with the Southern Utah News who showed up and told them that she would photograph the massacre. The agents then decided to back off and finally settled on forcing the geese to vomit. No dead snails were found.

The geese are now safe, but Mr. Child is still out $2.5 million because he can’t use his property, and the government refuses to compensate him for his loss.

The Wall Street Journal -- December 27, 1993

VIS = very important snail

Major threats (for all SW *Oyxloma* species):

- loss of habitat (restricted distribution)
- de-watering
- trampling
- flooding
...and the Grand Canyon

Glen Canyon dam:
- built 1963
- power plant
- water release from power plant 20,000 to 25,000 cfs
- before 1963 seasonal high @ 100,000 cfs
- record of 300,000 cfs in 1884
Colorado river ecosystem:
- re-install natural river dynamics
- encourage sediment transport
  - experimental floods of 45,000 cfs (approximately twice the normal power plant discharge)
  - March/April 1996 (ca. 7 days) w/ estimated 10.7% of the total snail habitat and 7.7% of the population @ Vasey’s Paradise lost (1275 KAS were translocated above the floodzone)

Would a full blown flood wipe out the KAS and NAS populations?

What have we got so far?
- a taxon of uncertain status (is KAS a species, subspecies, population?)
  
  shells

- weird distribution pattern (huge gaps, sympatry of KAS and NAS (??))
  A&A

- very high profile conservation status with considerable legal consequences
  Mr. Child & Glen canyon dam

- a lot of information on the Vasey’s paradise population (including a MSc thesis on the population’s ecology and one on host plants)
Should we flood the Grand Canyon?

Can Tropical Rainforests Be Saved?  
(PBS Home Video, 1991)

Think about:

- Global Interconnectedness
- Economics, Politics, Development
- Timeline of Economic Return
- Sustainability
- Consumption
- Human Population
- Developing vs. Developed World
- IMF, World Bank
Group Projects...