Club of Rome and “Limits to Growth” (1972)

- Simple version – built on basic model of species carrying capacities
- In simple model, carrying capacity = world resources (food, water, air)
- Exponential growth in population adversely affects c.c., leading to greatly reduced population. (“overshoot and collapse”)
“Limits to Growth” Scenarios

- Modeled trends of 5 interrelated phenomena into the future – industrialization, population growth, malnutrition/food, depletion of nonrenewable resources and deteriorating environment
- Conclusion – without rapid check in population and industrial output, population and industrial capacity will ‘crash’ within 100 years
- Even doubling resources or reducing population only delays the inevitable
• Criticisms of “Limits to Growth”
  – Underestimated ability of technological change to increase supplies of food and resources
  – Underestimated ability to change behaviour in response to scarcity and higher prices of resources

• However, 30+ years later, many trends still occurring:
  – Sea-levels have risen 10-20 cm since 1900
  – Gap between rich and poor is widening
  – Despite increased land food production, world fisheries near collapse for many species
  – 38% of arable land has been degraded
Increased industrialization (esp. now in developing world) has increased global consumption, demand for resources, commodity prices and pollution.
Global Warming Scenarios

- Under all major global climate change models, air temps still expected to increase by 2 to 5 C. by 2100
First suggested by Garret Hardin, explanation of overexploitation and how to integrate new approaches to conservation.

- “central for understanding our ecological problems; why people tend to overexploit common-pool resources, such as public grazing lands, fisheries, and aquifers, and why they pollute (Hardin 1968; Hardin and Baden 1977 qtd in Penn 284).”
- Humans respond inappropriately to environmental hazards, we tend to ignore large-scale environmental problems

Example: American consumers learned which companies produced most of the toxic wastes in the U.S., environmentalists publicly shamed these companies and disseminated the information to others. These companies responded rapidly to avoid public humiliation and save their reputation (Graham qtd. in Penn).
Imagine there are four shepherds who each own four sheep. They graze together on a commons that provides enough grass for sixteen sheep. As long as each of the shepherds limit their flocks to four sheep, the commons will sustain them indefinitely...

What would happen if I got another sheep?

The "smart" shepherd figures he can add a sheep to his flock and get a positive benefit of +1...

...while the negative effect of overgrazing, a fraction of -1 is shared by all four of the shepherds...

Why should I be sure it's yours?

Each shepherd must add another sheep... then another, until there's no grass left on the commons...

In fisheries, forests and farmland we see how the logic of self-interest always leads humans into a cycle of boom & bust...

Air and water are also commons. Instead of taking stuff out, humans are putting stuff in... a tragedy of the commons in reverse!

"Some day, son, none of this will be yours."

Unless...

*Garrett Hardin - Science 162 (1968)