Lecture Notes: 2/8/02- Biodiversity

Biodiversity - values

- Economic
  - “direct” – e.g., a log costs $5,000
  - “indirect” – e.g., tourism – Kenya- estimate elephant worth $1.2 million
- Potential
  - Undiscovered medicines, Genetics
- Aesthetic (i.e., charismatic)
- Scientific
  - Basic scientific or social knowledge
- Ecological
  - Other species depend on them
- Intrinsic (the “right” to live)

Case study: Termites

- 200,000,000 years old
- Closely related to cockroaches
- Over 3000 species in world
  - Most not pests!
- Called “white ants”

Life cycle
1) “Alates” – winged reproductives emerge from nest
   Surrounded by workers to defend them
2) Female alate lands and releases sex pheromone
   ➢ Beats wings to disperse smell
3) Male finds female
   ➢ Break off wings and start nest
4) Male and female (“queen”) mate
   ➢ Female can lay 1 egg/ second
   ➢ Up to 3,000,000/ yr.!
   ➢ “workers” build mound
   ➢ 5,000,000 per mound
   ➢ Eventually, make more alates (starts over)

The Mound...
Life in the mound:
3 social castes:
1) Workers – job primarily building, cleaning mound

2) Harvesters

3) Soldiers

Predators: Pangolins, aardvarks, aardwolf
Biggest predator: ants
- find tunnels underground
- Mighty battle with soldiers
  - to prevent ants from getting to colony center where queen lives.
  - If ants invade queen's chamber they eat her (rich source of protein & fat)
  - end of queen = death of whole colony, so life and death struggle

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Extinction is "natural"
99.9% all species now extinct...what about this mass extinction?
5 natural mass extinctions (before humans)

Then why are we so concerned?
- extinction rates 100-1,000 higher than "background"
  - natural rate (last 600 MY) ~ 1 species per year
Why are species going extinct?

Case study - amphibians

1) habitat destruction/ fragmentation/ alteration
   - greatest single threat
   - reasons:
     - urbanization
     - agriculture
     - timber/ fuel
     - grazing
     - land speculation
2) non-native predator and competitor introductions

3) exploitation/ overharvesting
   - direct commercial exploitation (e.g., right whales)
   - environmental "side effects" (e.g., oil spills, mines, etc.)
   - unintentional mortality of non-target organisms (turtles caught in fishing nets)
   - overhunting
   - pet trade
4) pollution and toxification
5) disease transport

6) secondary effects and synergistic interactions
   - synergism- 2 effects greater than sum of their parts- e.g., Leopard frogs- pH and UV light alone- no affect, but together significant reduction in survival
   - “tipping point”

Things to think about:

Is a beetle worth more than a monkey? Even if the beetle is endangered?
Is a human worth more than a monkey? Is a beetle worth more than a rat?
Would you support a new apartment complex in Pullman?
   What if it destroyed habitat for the Giant Palouse earthworm?
   Cougars?

What if your dad owned the complex and it meant free rent?

More information/ get involved:
The Nature Conservancy – purchases land and sets it aside as preserves: http://nature.org/

World Wildlife Fund: http://www.wwf.org/

Defenders of Wildlife: http://www.defenders.org/

Greenpeace: http://www.greenpeace.org

IUCN (Internation Union for the Conservation of Nature – red list of endangered species)
http://www.iucn.org/themes/ssc/red-lists.html