April 17, 2015

Threats to Biodiversity: Part 2

Announcements

- Critical Thinking Question #6 due Sunday April 19th 11:59 pm
- Clicker Questions Next Week= Extra Credit Points (5 total for the week
- YouTube Video Due by Wednesday April 22
- Last Day of classes Monday April 27th
- Final Exam Monday May 4 1300-1550
    - Office hours 0900-1200

#3 Overharvesting

- Overharvesting: Harvesting wild organisms at a rate higher than a population can reproduce
- Anytime Birth Rate< death rate the population will decline
- Both Plants and animals at risk
    - Cutting trees for wood products has led to decline in rare tree species
    - Marine organisms (fish, oysters, crabs, shrimp) have suffered extreme population declines due to overharvesting
- Can occur from both commercial **and** recreational activities

Overharvesting and Genetic Diversity

- Overharvesting can cause a bottleneck effect
    - Type of microevolution
    - Event (harvesting) kills a large number of individuals and only a small subset of population is left

- Changes allele frequencies in population

- Example: Northern Elephant Seal
  - Hunted for fur and blubber (used for oil) during 1700s and 1800s
  - Thought to be extinct until 1892
    - 30 individuals discovered on island in Pacific Ocean
    - 10 immediately killed to be put in a museum
    - Hunting them resumed
  - Hunting banned in 1922
    - Population began to increase
  - Population now estimated to be over 100,000
    - Reduced genetic diversity- 20 genes with zero variability
    - All developed from original 30 or 20 (10 that the Smithsonian took for documentation)

Overharvesting and Commercial Fishing

- Technological advances→bigger catch→Fish removed faster than reproduce→ Loss of economic benefits
  - Bigger ships, and better nets lead to more fish caught and more money for fishermen however organisms are not reproducing and the hauls get smaller and fishermen lose their economic benefits
  - Boom and Bust periods for fishing
    - Periods of great profit and then barely enough to live on
- Fishing is one of the biggest industries that gets cited for overharvesting
  - Has been going on for over a century

- Current status of global fisheries
    - Global decline of large fish (tuna, cod, halibut)
    - 50% fisheries around the world are at maximum sustainable yield
        - Harvesting at a rate that is just under overharvesting level
    - 32% are overexploited or depleted fisheries
- Fishing down the food chain
    - Decline in top predators causes shift in fishing effort to lower trophic levels
    - Apex predators are biggest fish and yield most for industry
        - Once those are gone we move to the next level down
        - Eventually we will run out of fish to catch

Clicker Question

If you went to a restaurant and had the following options on the menu, which would you choose?

a) Orange Roughy

b) Slime head

- From Bycatch to Target Species (fishing down food chain)
    - As preferred species are overfished, commercial fisherman shift to alternate species
    - Species once considered bycatch (not wanted) may become the target species
    - Ex) Hoplostethus atlanticus (slime head [initial name] aka orange roughy [restaurant name])
        - Long-lived fish species
            - Lifespan ~149 years
            - Slow growing