

**Bio Lecture 18**

**CHAPTER 11:**

**SLIDE 1:** Mariana's flying fox. **A keystone species.** Not the most abundant species on the island, however it is a species that has a very important role into the structure of the ecosystem of the island. It is the main pollinator of the island. It is the species responsible for the reproduction of many species of trees within the island. The disappearance of that species would have a MAJOR effect on the ecosystem as the plant species would not have an adequate pollinator for their reproduction.

Three levels of biodiversity:

1. Genetic diversity
2. Species biodiversity
3. Ecosystem biodiversity

**SLIDE 6:** Paddlefish - no longer in Canada, not entirely sure why. Probable it was a human impact. Yet there is a healthy population in USA.

Main threat to biodiversity is loss of habitat.

**SLIDE 9: Ecosystem engineers** have the ability to modify a habitat.

- Example 1: A tree, as its presence (its growth) means that its ecosystem will change. Will have invertebrates (birds, etc) connected to it. Basically changes the structure of an ecosystem.
- Example 2: A beaver as when they hear water running they have this behaviour that makes them want to build a damn/hut in the damn. This affects the ecosystem.

**SLIDE 10:**

Primary producers - autotrophic species (uses light as a source of energy and use inorganic matter as a source of carbon)

- If starts from autotroph and the impact goes up (we are talking about a bottom-up impact)
- When we go top-down we have an abundance of carnivore that will have an impact on the abundance of species in the lower part of the food chain.

(This is explained better later)

**SLIDE 11:** Energy hypothesis - Only 10% of the energy accumulated in organic matter in one level is transferred to the next one. Meaning energy transfer is not that efficient between various trophic levels.

**SLIDE 12:** Main point to take from this point is to see how complex things can be and how important one species is in this particular ecosystem.

**SLIDE 13:** Sea otter - population has fluctuated a great deal in the last 200 years since they were also hunted to extinction, then they were protected, and then a new predator came into play.

**Bio Lecture 18**

- **Top-down model:** Sea otters feed on urchin. Urchins are herbivores that will feed on kelp forests. The abundance of kelp forests is closely related to the abundance of urchins, which is closely related to the abundance of sea otters.
- **Bottom-up model:** New predator (orcas) on the prey (sea otter). The impact has been drastic as sea otters most affected by orcas population went down, then urchin population got high and kelp forest went down.

**SLIDE 14:**

- ★ Main threat to biodiversity is **destruction of habitat**.

Another threat to biodiversity is **introduction of species**:

- Example 1: Common starling - Introduction of this species had an impact on native species of bird. This is because common starlings are fierce competitor for food and nesting sites. Native birds were likely basically pushed out of their habitats from the presence of the common starlings. Reduced abundance of native birds.
- Example 2: Zebra mussels - Introduced in North America from Europe and have been very successful in abundance. They literally “exploded” in population size in our waterways and lakes. Zebra mussels like pipes and clog them.
- Example 3: Brown tree snake - Small population (island) so extinction is more easy to occur. It is said this snake is directly responsible for the extinction of 12 species of birds and 6 other species of snakes. They are a fierce predator, very agile.

Elephants and whales are dramatically affected by hunters. Protection is fairly good but illegal hunting is common and some countries even refuse to ban whaling.

**SLIDE 23:** Another threat to biodiversity is **global climate change**.

- Slides particularly concentrate on the effects of climate change on the Arctic.
  - Polar bears are primarily affected. (Video): As summer goes on, the temperature increases and the polar bears must use most energy to obtain its food (often seals). Floating ice in the arctic during the summer is going down today.
  - Pack of ice is also the site of important ecosystem for the arctic, there are alot of invertebrates that are associated with floating ice.
  - The arctic is losing a big portion of their albedo (dark environment, more heat absorbed by ocean).
  - Another issue is acidification of the ocean. The sea is one of the main sinks for CO<sub>2</sub>. CO<sub>2</sub> + H<sub>2</sub>O + Ion Carbonate = an acid. More acidic environment means that the survival of the primary producer and the erbavors (mussels, etc) will have more problems in terms of making up their exoskeleton or their shells. Rippling effect on food chain.
  - Rising of sea levels economic effect on coastal communities.

Solution to global warming? Limit it by stop emitting carbon into the atmosphere.

(CHAPTER 11 CONTINUES IN LECTURE 19)