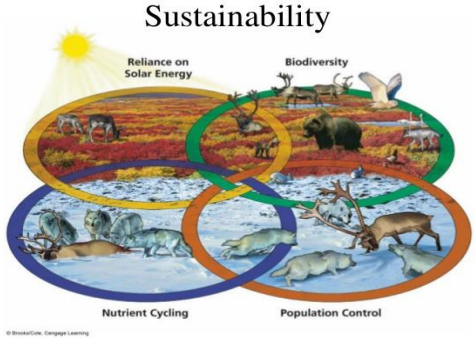
HOW HUMANS INFLUENCE ECOSYSTEMS

What is Ecosystem Sustainability?

- Refers to the ability to meet the needs of the present generation, without compromising future generations from being able to meet their needs.
- Remember that ecosystems thrive and support themselves without outside influence by design. It is human actions which are threatening the sustainability of ecosystems.

Four Scientific Principles of Sustainability



The Effects of Deforestation

- Deforestation is the clearing or logging of forests for human use.
  - Driven by need for agricultural land and forestry products

The Effects of Deforestation

- Loss of biodiversity as plant species are removed and habitats are destroyed
- Less carbon sequestration by trees
- Increased soil degradation (loss in quantity and quality of soil) that occurs due to increased soil erosion.
  - Plant roots play an important role in holding soil together and slowing the flow of water.

The Effects of Agriculture

- The need for agricultural land has resulted in draining of wetlands.
- Wetlands are special ecosystems that contain waterlogged soil for long periods of time.

- Wetlands contain high biodiversity and are known for filtering impurities out of the water.
- Because they hold large amounts of water, they can help prevent flooding.

The Effects of Agriculture

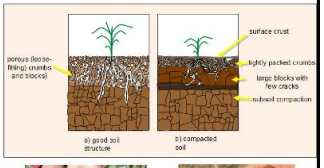
- On the prairies we often plant only one species of crop at a time – referred to as a monoculture.
- Monocultures reduce biodiversity and leave the crop vulnerable to pests and disease.

The Effects of Agriculture

- In fields left without crops (meaning the soil has been ploughed or tilled), water & wind can cause erosion.

The Effects of Agriculture

- In wet areas, soil can become compacted due to farm machinery or animals.
- Compaction happens when soil particles are squeezed together so there is no room for water or air to enter the soil. This limits plant growth.



Resource Exploitation

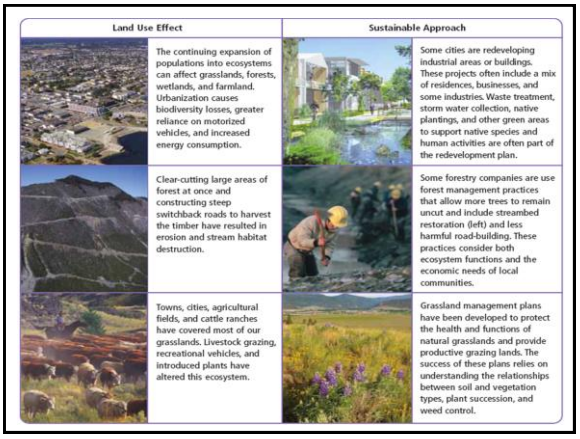
- Humans use resources (such as oil, gas, and minerals) for jobs, materials, food, shelter and energy.
- Exploitation can lead to habitat loss, soil degradation & contamination of water supplies.

Resource Exploitation

- Overexploitation is the extraction of resources until they are gone.
- Can result in extinction (e.g. passenger pigeon due to hunting) or endangerment (e.g. giant panda in China due to deforestation)

Ecological Restoration

- Many mining and resource exploitations require reclamation efforts, which aim to reduce environmental impacts of exploitation and restore the original habitats.



Traditional Ecological Knowledge

- Current ecological restoration & usage guidelines often involve Traditional Ecological Knowledge from Aboriginal councils.
- Traditional Ecological Knowledge is passed down from generation to generation in Aboriginal cultures. Knowledge is found in stories, beliefs, rituals, community laws, songs & traditional practices.

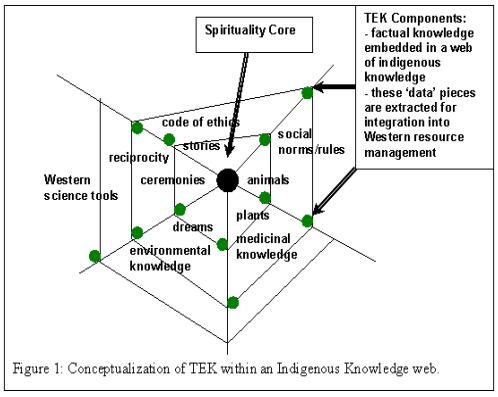


Figure 1: Conceptualization of TEK within an Indigenous Knowledge web.

Traditional Ecological Knowledge

- This knowledge reveals what past conditions were like, & how the ecosystem & humans interact.
  - Fire suppression has led to recent issues like Dwarf Mistletoe infestation & huge wildfire losses.
  - Traditions such as the "Spring burn" allow ecological renewal.
  - https://www.youtube.com/watch?v=vn1ym5r7pog