

Topic 7 - The Sixth Extinction

In the last 600 million years there have been five major declines in the Earth's biodiversity. There has however, over the last 65 million years, been an increase in diversity greater than the rate of extinction. The rate of extinction is thought to be 1 species per day over the age of life on the planet. The rate today is 70 extinctions per day. Natural selection is a slow process. Even if there is a lot of variation within a species, sometimes the changes in the environment are so drastic and so quick, that none of the individuals within a species can survive. Natural **extinction** can occur as a result of:

- catastrophic events (volcanic eruptions, earthquakes, floods, fire)
- lack of food (due to overpopulation)
- disease

Not all extinctions happened millions of years ago. Diseases and natural events occur all the time and when they do, a species, within a particular area, can be **extirpated** very quickly. Sometimes organisms have adaptations that suit them only to a very narrow set of environmental conditions. This usually occurs in a relatively stable area, where the environment does not change for a very long period of time. This is called **overspecialization** and it is another cause of extinction. The giant panda is a species that is overspecialized, because it relies on bamboo, making it vulnerable to extinction, when the bamboo is scarce.

Extinction is the disappearance of every individual of a species from the entire planet. It is a natural part of the Earth's history. Scientists estimate that 99% of species that have ever existed on the Earth are now extinct (many by mass extinction - sudden environmental change, like the Ice Age). Most extinction take place over long periods of time, but the rate of extinctions is rising, and this is reducing the biological diversity of our planet.

Extirpation is a local extinction, or the disappearance of a species from a particular area. Most extinctions and extirpations today are caused by human activity, such as **habitat destruction** - as a result of – Urbanization, Construction, Agricultural development, Logging, Damming of rivers, Pollution, Pesticides, Herbicides and Fertilizers Extinctions and extirpations reduce biological diversity. When an organism disappears locally or globally, many other species are affected. The cycle of life is adversely affected. <http://www3.gov.ab.ca/srd/fw/escc/aspsr.html>
[The General Status of Alberta Wild Species 2000](#)

Human Impacts on Biodiversity <http://www.nysm.nysed.gov/bri/process.html>

The stresses of urbanization and habitat intrusion by farming and industry have resulted in a decline in genetic, species and ecosystem diversity. Extinction, population decreases and degradation of ecosystems all reduce biological diversity on the Earth.

Disappearing Habitats

As a **bioindicator species**, the Grizzly Bear helps us to determine the human impact on an ecosystem. This large carnivore's ability to survive or disappear is historically a sign that human interference in an ecosystem is occurring or not.

Human Impacts on Rainforest Ecosystems

The population globally is on the increase. With new methods of farming and better ways of preventing disease food and medicine are allowing people to live longer. This large population is putting pressure on the environment, because of increased human activities stated previously.

The Population Explosion

The impact of population is not shared equally around the globe. The hardest hit is developing regions where diversity is most threatened. Tropical rainforest are being clear cut to make way for farmland, cattle ranches, pineapple and coffee plantations, and fuel. Loss of rainforests, mean the extinction of specialized organisms depending on the forests for food and protection. Because the soil in a rainforest has few nutrients the farms and plantations are successful for only a short time and then it is difficult to repair the damage to the original rainforest. The loss of diversity is permanent.

Human Activities and Extinction

The impact of loss of diversity, through extinction, has been studied and our understanding of its importance has changed. When **introduced species** use the same resources, as native species, competition will cause a decline in the numbers of native species, simply because there is less to go around. The introduced species will have no natural predators to limit its population and will, in time, take over from the native species. **Over-hunting** was the major cause of the decline and eventual extirpation of the plains **Bison**, as well as the extinction of the **passenger pigeon**. Sometimes species are hunted to deliberately extirpate them. The **black-tailed prairie dogs** were considered a pest in the 1930's and were hunted to reduce their numbers.

Some Recent Extinctions

