

Causes of Declining Biodiversity

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Have you ever thought that our world is in danger of a mass extinction on the scale of the 5 mass extinctions before our time? Those extinctions were due to either climate change, volcanic activity, asteroid impact or for other reasons we do not know of yet. It has been 65 million years since the last major extinction, but many scientists consider the great reduction in **biodiversity** today to be the beginning of another mass extinction and man will have caused it!

Man has used technology to kill creatures and chop down forests more efficiently and he has been able to produce food to feed 7 billion people. Due to this activity, we have hit a rate of extinctions of about 100 times the rate of natural extinctions where man is not involved!

Why is biodiversity important? Natural diversity in ecosystems provides things we need to live comfortably such as medicine, food (crops and animals), clothing, shelter and fuel. Furthermore, recreational, cultural and aesthetic values are sustained by biodiversity.

There are 5 causes of recent declines in biodiversity: **Habitat loss and destruction**, **Introduction of invasive alien species**, **Pollution**, **Population growth**, and **Over-exploitation of resources**. The first letter of each cause is used to write the acronym **HIPPO**.

1. Habitat loss and destruction: (H) This is one of the greatest threats to biodiversity and can be linked directly to human interference. In the rainforest, humans have converted natural forest to ranches, agricultural land, and urban areas. Lowland tropical wet forests are being cleared, logged and burned. Logging results in a one-time profit for the large logging companies and there is no concern about the long-range effects. Animals and plants that only grow in these areas will disappear when the areas are cleared. There are also serious problems with declining species in freshwater wetlands, sea ice habitats, salt marshes, coral reefs, seagrass beds and shellfish reefs.

2. Introduction of Invasive Alien Species: (I) The introduction of exotic species that replace native species is one of the biggest reasons for biodiversity decline. This often will cause the extinction of the native species. For example, the rabbits introduced to Australia and the goats introduced to St. Helena have put the ecosystems at risk. In the 16th century, The first sailors to land on the remote Atlantic island of St. Helena, introduced goats, which quickly extinguished over half the endemic plant species. The predatory brown tree snake, which came by cargo from the Admiralty Islands, has eliminated ten of the eleven native bird species from the forests of Guam. There are many more examples like these. In the United States, we have lost \$1.4 trillion dollars due to invasive plant and animal species.

3. Pollution: (P) Industrial, agricultural and waste-based pollutants can have horrible effects on some species. Pollution and contamination can have irreversible damage. Besides chemical pollution, noise and light can disrupt wildlife behavior too. Light can make it harder to catch prey and noise interrupts hunting and mating signals in many species. Freshwater ecosystems are being polluted by phosphates and nitrates from fertilizers so that fish stocks are declining. Wastes are being disposed of in landfills, incinerated or disposed at sea. All of these ways of getting rid of waste have consequences to certain species. In developing countries, 90% of their wastewater is sent directly, untreated, into their waterways. As populations increase, so does the issue of disposal of waste!

We must not underestimate the problems associated with the increase of carbon dioxide and the greenhouse gases into the air. As the planet warms and climates change, organisms are affected. Migratory patterns, water and nitrogen cycles, mist in the air and soil moisture amounts are all altered, affecting species in complicated ways we don't really know about yet. Infectious disease will increase since microorganisms that cause disease are affected by humidity, temperature change and rainfall.

4. Population Growth: (P) The human population right now is greater than 6 billion and some estimates say that it will reach 10 billion by the middle of this century and 12 billion by 2100! Will our diverse species be able to survive under the pressure of such numbers? Will birds be able to migrate and will large animals be able to roam and forage for food?

The great increase of the human population during the 20th century has caused a growth in agriculture in order to feed everyone. In order to do this, we have converted wildlands to croplands and diverted water from lakes and rivers. We have polluted water and land with pesticides and fertilizers. As a result, we have destroyed disturbed and disabled ecosystems, often killing organisms. We need properly designed agricultural systems!

Also, many more people mean we need more homes. In most countries, half the population live in cities. We need properly designed cities to support the people and cause less stress on biodiversity. Every city needs parks and streams in the right size and number to support the animals and plants who live there. There has been research done which says the human population size in a particular tropical area directly correlated with the number of endangered species!

5. Over exploitation of resources: (O) Over-hunting, over-fishing or over-collecting of a species can quickly lead to its decline. Large animals are hunted for their meat and skins (fur) and other body parts. Frogs and toads are hunted for medicine and chemicals like poison for arrow tips. Turtles are hunted for food and Chinese medicines. Many animals are trapped for zoos, as pets or medical research. Many of the animals that we humans prey upon are part of their food chain, and when they are taken, other animals in the chain perish. Fishermen kill aquatic animals indiscriminately by using fishing techniques that employ insecticides and/or dynamite.

COMPLETE THE FOLLOWING IN YOUR SCIENCE NOTEBOOK!

Directions: Answer the following questions in your notebook in complete sentences. Each answer should include a minimum of 3 sentences to provide a full and complete response.

Title: Causes of Declining Biodiversity

1. Summarize the five causes of recent declines in biodiversity.
2. Using information from the article, how is the current decline in biodiversity different from previous declines over the history of our planet?
3. Using evidence from the article, describe how human population growth is responsible ultimately for the decrease in biodiversity.
4. How does biodiversity affect you and everyone else and why is it important?
5. In 1859, 12 rabbits were sent to Australia (an island continent) so that William Austin, a native from England, could populate rabbits on his property and continue his hobby of rabbit hunting. However, within ten years the population had grown to be in the millions devastating Australia and causing several planet species to become extinct. Why do you think the population of rabbits grew so fast? Why are rabbits considered an invasive species in Australia, but are not invasive in the United States? What would you suggest to Australia to help them in their current dilemma over 150 years old?