

A are also regularly harmed by different types

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A Human Footprint: Pollution Threatens Earth's Biodiversity Have you ever wondered how we, as humans, impact our environment? Take a look at any ecosystem in the world and there could be multiple types of contamination such as streams filled with toxic chemicals, rivers overloaded with nutrients that come out of farms, trash blowing away in landfills, and even city's skies covered in smog, but here's the thing.

Among all the threats our environment face, pollution is actually the biggest one against our biodiversity and here's why. For starters, pollution is the introduction of contaminants into a natural environment causing adverse changes. This may harm landscapes, poison soils and water paths, or even kill plants and animals. If you haven't noticed, humans are also regularly harmed by different types of pollution in negative ways. Long-term exposure to air pollution can lead to chronic respiratory disease, lung cancer, and other mortal diseases. On the other hand, pollution from human activities has caused the ozone layer to be depleted in the stratosphere, leading to the "hole" in the ozone layer. When ozone in the protective layer has been destroyed, it lets more UV rays reach the ground which can cause sunburns and skin cancer in people, harm crops, and marine algae. Furthermore, the release of toxic chemicals and pollutants into various ecosystems (seas, air, and land) results in the accumulation of toxins/harmful substances in the environment where they are released.

This concentration of toxic chemicals and pollutants (also known as biological magnification) eventually accumulates and gets absorbed by lower organisms in the food chains. This means that the toxic chemicals that start to get accumulated in the top predators can make some species unsafe to

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eat, affecting humans dependent on these. Moreover, these problems cause a gradual loss of species on local, regional, or global levels. Species diversity is very important because it's the number of species that are represented in a given community, but the loss of one species affects many other species and causes imbalance. As a result, many functions within the ecosystem will not be carried out anymore. Fewer species, mean less diversity which completely unbalances the ecosystem causing a disruption. When there's disruption in an ecosystem, competition for introduced species decreases which means that their survival rate increases. With pollution, many species are affected (they die because they aren't adapted to the new changes in their ecosystem) and this is the reason why competition slows down.

The thing is we introduce those species in different environments, not only decreasing a species population when adding them, but the effective number of them to create equally abundant species. In addition, chemical pollutants that make their way into animals' systems have been shown to cause direct changes to their genetic diversity. For example, one study found out that exposure to heavy metals from smelter plants in Finland caused an increase in the genetic diversity for wild populations of the great tit and an opposing decrease in populations of the pied flycatchers. Furthermore, asymmetry, which is a physical change that signals genetic abnormality, also suggests a decrease in the genetic diversity of species with pollution, leading them to have an inability to respond appropriately to stress. This means that if there is less genetic diversity, organisms have less genetic-makeup characteristics that will allow them to succeed in a changing climate environment. Meaning

that those species will be less resilient to a disease and will have fewer possibilities of reproducing.

Continuing on, if an area is fragmented and it's suffering from pollution changes, animals won't be able to migrate anymore and they will have fewer chances of survival because their environment is changed and they can't adapt. This is all caused by pollution because species in a certain environment have different traits to survive in them, but with all the changes that pollution produced in their ecosystems, those species can't evolve new traits to adapt and survive in those new changing circumstances occurring in their natural habitat (their genetic traits are limited). Another unintended consequence of pollution is acid rain. Acid rain is precipitation that has nitric and sulfuric acid in its composition and its usually caused by pollution that comes from power plants that burn extensive amounts of fossil fuels.

As you might realize, acid falling from the sky is not great for the things it lands such as rivers, lakes, trees, even buildings, or cars. The thing is that the organisms that live in those lakes and streams that receive the acid rain have a hard time surviving in acidic conditions. Meaning that those species will die because they can't resist the new environmental conditions in their habitat (have limited traits to survive). Not lasting, acid rain also hurts trees by damaging their leaves, slowing their adequate growth, and making the soil of the land more toxic for plants.

Pollution also contributes to climate change which continues to threaten species and their habitats over the world. The problem now is that anthropogenic climate change caused by human activity is making the

climate change a lot faster than it normally would. How did we do that? By burning extensive amounts of fossil fuels (overexploited natural resources for human use) which are a necessity in our daily lives for cooking, driving, and other industrial activities. This increases the amounts of CO₂ released into the atmosphere which leads to smog that can restrict sunlight from reaching the earth.

Hence, preventing many plants to do their process of photosynthesis. Also, this climate change affects ecosystem diversity because temperatures are rising up, changing completely the characteristics found in a certain environment. For instance, warming temperatures may force some species to migrate to higher latitudes or elevations for them to have more chances of survival. Similarly, as sea level rises, this causes saltwater to intrude into freshwater systems, forcing some key species to migrate or die, thus removing predators or preys that are critical in the existing food chain. This means that pollution is constantly changing these ecosystems by elevating their temperature and decreasing the species variety found in the ecosystems either in terrestrial or aquatic ones (they're the ecosystems around the world). With climate change, species are less resilient to survive in new climates which impact completely the structure of each ecosystem.

This is why we need to create a major solution for this humongous threat for us to save our environment/biodiversity. One of the best solutions for pollution is bioremediation. This way, we could use living organisms such as prokaryotes, fungi, or plants to detoxify a polluted area. These microorganisms can be used in other ecosystems to remove toxins from soils

that are contaminated by accidental oil or fuel spills. We could also use clean energy technologies like solar, wind and geothermal for us to decrease pollution.

Governments of various countries have provided grants to consumers who are interested in installing solar panels for their home. This will go a long way to curb air pollution as well. So, now you know that stopping pollution is the best solution to save our home and preserve our biodiversity!