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Geographic Perspectives of the Environment

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Final Essay Question #2

Biodiversity is the number of species in a biological area. Over the past few years it has become an increasingly popular subject. As species are becoming extinct at a rate that is about 1,000 times greater than the natural rate (Marsh 355), scientists and preservationists are becoming more and more concerned. Much of the earth's past has been filled with species coming and going. However, over the last 3 centuries, humans have interfered with the natural processes of biodiversity in noticeable ways. In some ways they have contributed to the growth of species, particularly those that are in danger of extinction. But in many other ways they have contributed to the extinction of hundreds of species.

There are many ways in which a species can become extinct. There are even two types of extinction. Pseudoextinction is when the ancestors of a species become extinct but their genes live on in their descendants who have mixed with other species. It is considered pseudospecies because the original genes endure, while the older species disappears. True extinction is another type of extinction that is widely seen as more meaningful. True extinction occurs when a species and all of its descendants become extinct. In most cases, the extinction that humans are responsible for is true extinction. (358-359)

The reason that humans tend to cause true extinction of a species is largely the result of the characteristics of the species they kill off. Because of overpopulation and expansion, humans have been forced to occupy land that was previously only occupied by animals. They are constantly finding new ways to invade habitats and new areas in order to make room for themselves, or their businesses. For example, one major offender is the paper industry, which has ravaged the rainforests throughout the world by cutting down trees. This has wreaked havoc on the species of the rainforests where there are thousands of different kinds of species. By invading their habitat and killing them off, this process is destroying hundreds of species.

Because the species of the rainforest are so obscure, (so obscure that many remain unidentified) they reach true extinction easily since they are located only in small areas, or ranges. The range of a species is critical to its risk for extinction. If a species only lives in a small area, when that area is destroyed, like certain sections of the rainforests are being cut down, the species disappear with them. In a similar way, if global warming continues, many of the species that inhabit the polar ice caps will find themselves endangered or extinct as their habitat is melted away.

Extinction is a natural process that would occur with or without human interaction. In fact, scientists estimate that a clade, “defined as a species and all of its descendants” (359) has a life span of between 1 and 10 million years for plants. Similarly if we didn’t disturb a certain species it would naturally die out after a certain amount of time as well. Even certain events in the earth’s cyclical life can cause many species to become extinct at once. Perhaps the most famous example of

this was the extinction of about 75% of the world's species including the dinosaurs and other reptiles, in what is known as the K-T Extinction 65 million years ago.

(361) In this case the earth was set into a deep freeze by the impact of a large asteroid. There were no humans at the time, so this was not a result of human interaction, but it is just one of many natural spikes of extinction rates in earth's history.

While humans can be blamed for the extinction of hundreds, if not thousands, of species, there are many who have tried, and succeeded, in preventing the extinction of many species. There are several tactics that can be used to prevent extinction and promote evolution of species. Perhaps the most common is conservation and preservation. This became popular in the United States in the late 19th century and early 20th century with the creation of national parks and other conservation areas. These areas were protection for species, and it became illegal to hunt and intentionally kill animals within their boundaries.

Perhaps even more helpful in preventing extinction was the Endangered Species Act of 1973. This act created two categories of species that were identified as in danger of extinction. Endangered species were "defined as those in imminent danger of extinction in all or a significant portion of their ranges." (369) Threatened species are those with rapidly declining populations that were likely to become endangered in the near future. (369) By enacting this legislation the United States made a commitment to preserving species that were in danger of becoming extinct, thus promoting their evolution.

Going hand in hand with protecting the species is the creation of new species, called speciation. Like extinction, speciation can occur naturally, and as of relatively recently, with human interaction. One force that can cause speciation is geographic isolation, where a barrier is created which forces the separated species to evolve independently of one another. For example, when the continents separated millions of years ago, species that had lived in the same area, were forced apart and separated by oceans. Therefore the separated groups of one species were subjected to different breeding conditions and evolved into new species.

Nature plays a large role in both extinction and speciation. However, it's becoming increasingly clearer that humans are causing both to happen at unnatural rates. Whether pseudo- or true extinction, humans contribute to the death of dozens of species per year. At the same time, construction, habitat destruction, and population growth are contributing in their own ways to speciation.

Speciation and extinction are just two more examples of natural processes that humans have evolved to interfere with. What's important is that our efforts to promote speciation compensate for those of our efforts that promote extinction. Otherwise, the biodiversity that makes our planet unique will be lost.

Bibliography

Marsh, William M.; Grossa, John Jr. "Environmental Geography: Science, Land Use, and Earth Systems" 3rd Ed. John Wiley & Sons, Inc. 2005.