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The Extinction of Baiji and Global Biodiversity Loss

At some point during the late seventeenth century, not long after humans arrived on Mauritius, the dodo was doomed. Although there was limited human population living on the island, hunting activity was quite intense around the coastal area and killed massive amount of dodo. Besides, competition and predation by introduced animals, such as rats, monkeys, pigs, goats and deer, which was brought by the people who landed on Mauritius, was another main reason why dodo became extinct. Dodo has become one of the most famous birds in the world and has been portrayed as an icon of extinction of species on Earth. Hundreds of years has passed since the tragedy of dodo but species extinction has never stopped. There are more and more species wiped from the surface every day and it is happening at a surprisingly fast rate. And most of the time, species extinction took place in an implicit and unknown way; when the last individual dies somewhere in the forest, most people around the world just have no idea about that and the only thing they could probably do is to waiting for years until the effect accumulates and becomes noticeable. Species extinction not only happens at a high speed but also has a large scope with places ranging from high diversity tropics to less diverse or peripheral habitats such as oceanic islands. Biodiversity loss is caused by many factors such as climate change, pollution, and other environmental impacts from the exploitation of natural resources. And it has become an urgent issue around the world and has devastating impact on sustainability and humanity.

Climate change plays an important role in the extinction of species by creating difficulties for species to adapt to new climate patterns. Although it is still disputable that whether climate

change is extremely harmful to lives of millions of species on Earth, climate change definitely increases the level of difficulty for species to survive in the ecosystem. According to studies conducted by researchers Settlele et al., our planet is warming faster than at any time in the past 10000 years (p.5). With these fast changes happening, species are forced to adapt to new climate patterns, such as: variations in rainfall, longer and warmer summers, abnormal precipitation patterns and so on. According to researchers Settlele et al., winters have become shorter and milder, resulting in many changes in the timing of some events of species life, and they found that "northeastern birds that winter in the southern United States are returning north in the spring 13 days earlier than they did in a century ago" (p.5). The fate of an individual species under the pressure of global climate change would largely depend on its ability of adaptation, such as: the ability to migrate away from previous less favorable living habitats and find new areas that are more suitable for its survival. Researchers Groffman et al. stated that "In recent decades, in both land and aquatic environments, plants and animals have moved to higher elevations at a median rate of 36 feet (0.011 kilometers) per decade, and to higher latitudes at a median rate of 10.5 miles (16.9 kilometers) per decade" (p.32). Since the middle of last century, climate change has become one of the most important reasons for global species extinction.

Besides climate change, harmful human activity is also a very important factor that is responsible for species extinction. Throughout the history, many species became extinct due to some harmful environmental impact created by human activities including inappropriate use of science and technology, over-exploitation of natural resources and all kinds of pollution. Baiji is a very famous extinct species that was wiped from the surface of the earth by harmful human activity in China. Yangtze River dolphin, or Baiji, is a freshwater dolphin found only in the Yangtze River in China, also nicknamed "Goddess of the Yangtze". It has long been recognized as one of the rarest and most endangered mammal species in the world (Chen, Hua

et.al). In China, Baiji is a very typical example of endangered or nearly extinct species when mentioning biodiversity loss. Baiji population declined drastically in the years when Chinese industrialization increased use of the river for fishing, transportation and hydroelectricity, posing great threat to its living condition. Several major domestic and international efforts had been made to conserve the species since the last century, but none of them succeeded in saving the species from extinction. During the last century, researchers Zhang et al. spent decades tracing the living situation of Baiji. They reported a rapid and steady decline of the number of Baiji living in the Yangtze River from the 1980s to 1990s with only 400 individuals left and by the end of the last century, there was a minimum estimate of only thirteen Baiji in the Yangtze River (p.51). Harmful human activity creates destructive impacts on accelerating the rate of species extinction and, in this case, was the major reason why Baiji became extinct.

The extinction of Baiji is the first human-caused extinction of cetacean species and one primary factor is the overfishing in Yangtze River during the last century, which directly contributed to significant reduction of many kinds of smaller-sized fish, shrimp and other creatures that were the food sources of Baiji. Overfishing caused such a drastic depletion of resources and slowed down the biological growth rate of Yangtze River in a quite short time period. Although there was little fishing of Baiji itself, Baiji still had to taste the bitter fruit of the damage to other species in Yangtze River and it seemed not able to recover and keep up with the recovery speed of the whole river ecosystem. Also, overfishing is the cult of the tragedy of Baiji in another unexpected way. Harmful fishing practices such as the use of rolling hooks and electro-fishing nets was widespread in Yangtze River due to their high efficiency in fishing activity. According to the observation and survey conducted by researchers Lin et al., at least half of all known Baiji deaths in the 1970s and 1980s were caused by rolling hooks and other fishing gear, and electro-fishing accounted for 40% of Baiji deaths recorded during the 1990s (p.77). Overfishing significantly affected the survival of Baiji in many ways and led to

dramatically reduction of the number of Baiji in a very wide range.

Another human activity responsible for the extinction of Baiji is the destruction of its habitat caused by intense water project construction. The Three Gorges Dam, started in 1994 and finished in 2016, is one of the biggest dams in the world, which, according to researchers Wu et al. "has been inserted in the middle of a biodiversity hot spot in south-central China" (p.2). The dam serves to increase the Yangtze River's shipping capacity and reduce the potential for floods along the bank of the Yangtze River. However, it has negatively affected biodiversity and ecological processes in the area, poses a threat to the living conditions of Baiji. Since the last century, the construction of the dam has immediately led to the loss of hundreds of acres of habitat area. And with more and more parts of the project being finished, Three Gorges Dam has been increasing the isolation of the remaining habitat patches, which was concluded as "habitat fragmentation" by researchers Wu et al. (p.2). Wu et al. also stated that the Three Gorges Dam had caused the local ecosystem to "adjust to the newly created landscape configuration and regional context for decades" and suffer from "increased tourism activities" and "reduced species diversity" (p.2). Excessive water project construction caused irreversible changes to Baiji's habitat and posed great threat to Baiji's survival.

Water pollution in the Yangtze River also became the catalyst for the extinction of Baiji. People can find traces of industrialization along the Yangtze River since the 1970s including hundreds and thousands of chemical and pharmaceutical factories built near the river. By dumping poisonous industrial waste into the Yangtze River, these factories have seriously damaged the river ecosystem as a whole. Researchers Yan et al. claimed that "The increasing application of mineral fertilizers in agriculture and municipal wastes from a growing population leads to detrimental contamination of surface and groundwater of the Yangtze River" (p.42). By using tracing element method, Yan et al. reported that the contamination included "increased soil erosion caused by deforestation on the steep slopes above Pingshan, the

upstream of Three Gorges Dam", "sediment shortage for land creation in the river mouth" and "regional erosion of the Changjiang delta resulted from the reduced particulate load and drawn attention to the impacts of the Three Gorges Dam on sediment transportation" (p.42). The seriously contaminated Yangtze River during the last century was no longer a favorable habitat for Baiji to live and led to massive death of Baiji.

The extinction of one species is not a small individual incident, but has important connection to the endangerment of species around it in the ecosystem. In fact, Baiji is a very typical example. Researchers Isaac et al. stated that "The extinction of Baiji represents the loss of a disproportionately large amount of mammalian evolutionary history." (p.5). It is also recognized by researcher Flemming as representing "the first documented global extinction of a 'megafauna' (greater than 100kg) vertebrate for over 50 years, since the disappearance of the Caribbean monk seal (Monachus tropicalis) in the 1950s" and would "create a domino effect, for sure, a bad one, that may cause disorder of the functioning of other species around itself" (p.333). In fact, throughout the history, there has been intensive persecution of marine mammals such as the Atlantic gray whale Eschrichtius robustus, but very few of them had ever been pushed to total extinction. They seemed to remain on the verge of extinction and had never actually been added to the list of extinct species. However, it was not so lucky for Baiji, which is the first cetacean species known to be pushed over the edge of extinction and actually driven to extinction by human activity. Many people do not agree with the seriousness and negativity of the extinction of species happening in every corner of the world, believing that the disappearing of one species does not have significant effect on the whole ecosystem. However, since species in an ecosystem are interdependent and constantly interact with each other, the extinction of one species would have surprising influence on the balance of the whole ecosystem.

The extinction of species has many negative effects on sustainable development of global

species by posing great threat on species richness as well as species composition and interaction. First of all, the level of species richness strongly affects productivity of species and the overall stability of ecosystem processes. Researchers Murphy et al. believed that decline of species richness could be an indicator of biodiversity loss and could negatively influence the ecosystem. They conducted studies and measured the effects of human disturbances on changes of species richness including 327 empirical values of change in species richness taken from 245 previous experimental and observational disturbance studies. And they concluded that the decline of species richness caused by human disturbances has negative consequences in many aspects including species consistency, response predictability and the healthy development of ecosystem (p.97). In addition to the decline of species richness, extinction of species also leads to devastating effects on species composition and interactions. Species composition is generally characterized by the array of species in an ecosystem and how they function to affect environmental conditions and processes. Different kinds of species living in an ecosystem play different roles in regulating numerous bio-processes going on every moment, for example, capturing and transferring energy and nutrients. Researcher Davidson believed that "in general, each loss of species will lead to impoverishment of the system" (p.52). He also used an interesting metaphor of "threads being pulled from a tapestry, until finally it becomes threadbare, and the grand design is lost" (p.52) to describe the irretrievable damage to the species composition and even the whole ecosystem. Also, biodiversity loss, featured with extinction of different kinds of species, would destroy the interactions between different species. It would disturb the existent mechanisms such as competition, parasite, cooperation and so on, thus making destructive changes to the ecosystem and all the species living in it. The extinction of species, which is associated with biodiversity loss, has negative impact on the overall sustainable living of species around the world.

Nowadays, biodiversity loss has become one of the most urgent issues for our generation.

Fortunately, many people have felt and realized the urgency of saving endangered species and reducing biodiversity loss. For example, photographer and environmentalist Meridith Kohu made an impressive documentary called “Chile’s changing culture of fishing”, including many valuable photos and videos showing how WWF worked with the local government and industry to improve fishing practices and regulations (p.2). Biodiversity loss has many negative effects on the long-term development of ecosystems on Earth and could affect us, human, too. It is extremely important for people around the world to realize the urgency of biodiversity loss and work together to reduce harmful human activities in order to make our world a better place.

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