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Extinctions In the Rise: A Study on the Pandemic in the Pacific

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ABSTRACT
The paper examines the Anthropogenic climate change is a key cause of biodiversity loss. The Galapagos Islands are a global hotspot for environmental change. The unique and endemic biodiversity of the Galapagos is at risk. The Galapagos Islands are located near the equator where temperature is likely to change above the global average level. Due to climate change, the island is in the verge of extinction. The island faces serious environmental threats such as rise in sea level, increased retreat of glaciers, decrease in annual runoff and increased vulnerability to floods and droughts. Many species can't migrate or adapt in response to changing climate conditions making them particularly vulnerable. Climate fiction explores the impacts of climate change on environment, society, and individuals. Climate fiction is an immediate action. Climate fiction not only has the potential to represent the aftereffects of climate change, but also the capacity to provide a space in which to address the Anthropocene's emotional, ethical, and practical concerns. Due to climate change, there is an increase in extreme weather patterns. The results of the review are important aspects to understand the far-reaching implications of climate change on the islands. Methods of qualitative research were used in this study. The results of the qualitative study were acquired from a range of secondary sources, including press reports, scholarly journal articles, and previous theses. An overview of the causes of the negative environmental effects on the island was provided using a discourse analysis method, along with a few case studies that were taken from news reports and journals. When the islands become an exploiting hub rather than exploring place it is where problem rises. The study's most essential finding is that climate fiction is more than simply a discussion; it is a necessity. To conclude it is better to maintain the existing ecology than to prevent it from destruction if it is too late. The repercussions of climate change have already begun; but current attempts can mitigate the effects to a certain amount rather than preventing the planet from apocalypse. It further paves way to blue humanities, deep ecology and many aspects.

KEYWORDS: Climate fiction, environmental destruction, Anthropocene, ecocriticism, Eco science, global warming

1. INTRODUCTION

The Galapagos Islands have fascinated people all over the world ever since Charles Darwin's time. As far as we know, the Galapagos Islands are the last true natural paradise. Author of the first written report of the Galapagos, Thomas de Berlanga, noted "many seals, turtles, iguanas, and birds, but so silly that they

do not know how to flee". Galapagos is an archipelago off the coast of Ecuador that straddles the equator and consists of 13 main islands and over a hundred smaller islands. The ancient Spanish word for tortoise was Galapagos. Thus, the Galapagos Islands are also known as the Tortoise Islands. In addition to the Galapagos tortoise, the islands are home to several endemic species. Charles Darwin's theory of evolution, developed in 1835, owes much to the rich biodiversity of the Galapagos Islands. On the 19 islands that make up the Galapagos, you'll find everything from pristine white beaches to jagged black lava fields on Santiago. To this day, visitors from all over the world are captivated by the island's status as a "living museum" and "showcase of evolution. More over 30% of the plant species found in the Galapagos are endemic, meaning they can only be found in the islands [1].

Due to their proximity to the equator, the Galapagos Islands experience warmer than average temperatures. Climate change has put the island's survival in jeopardy. Sea level rise, glacial retreat, decreased yearly runoff, increased vulnerability to floods, and increased droughts are only some of the severe environmental risks the island faces. New diseases pose a serious threat to indigenous populations as well. Isolation and the meeting of four ocean currents have resulted in an ecosystem rich with endemic species. Many species are particularly fragile because they cannot migrate or adapt to new environmental circumstances or invading species. Climate change, invasive species, illegal fishing, and the alteration of ecosystems as a result of human activities are major causes of species extinction in the Galapagos [2].

Figure 1: location of Galapagos islands

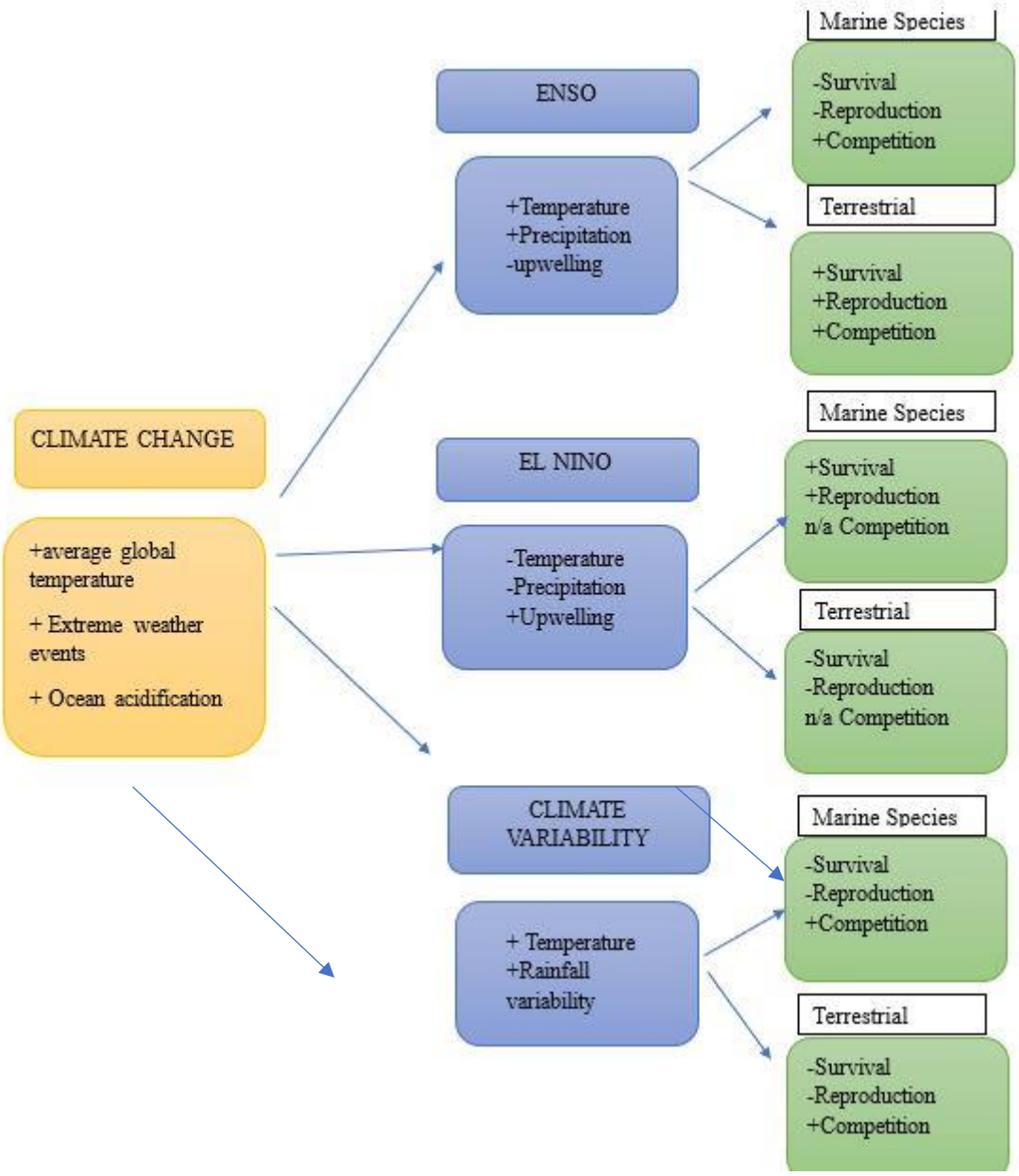
1.1 THE CLIMATE IN THE GALAPAGOS

“We are hurtling towards the day when climate change could be irreversible”.

The Galapagos Islands lie at the confluence of three ocean currents: one from the south, one from the north, and one from the west, all of which bring with them nutrient-rich, cooler waters. The effects of 'El Nino' on the local climate of the Galapagos are significant. The increase in ocean temperature is best explained as a natural occurrence, especially in the Pacific Ocean. As a result, the water at the ocean's surface warms. Many species have declined irreparably because of the double whammy of increased water temperatures due to El Nino weather cycles, probably exacerbated by climate change, and overfishing. Scientists sound the alarm that the dismal picture being painted in the Galapagos today may be a portent of things to come for the world's waters. Since the oceans absorb a lot of heat from the atmosphere, their surface waters are bound to get warmer. As a result, the marine life in the area around the Galapagos

Islands would be severely impacted by the warming water. Increasing temperatures would cause migration, which would negatively impact nesting success. A rise in temperature may increase the number of different kinds of insects, which could affect the success rate of egg-laying. Increases in seawater temperature around the Galapagos Islands are common during El Nino years. An El Nino event, which occurs roughly every ten years, contributes to increased global warming and a decrease in food availability. Many threatened animals perish from hunger during El Nino. Scientists have discovered that El Nino years are becoming increasingly common as a result of global warming [3].

Galapagos species are especially susceptible to the effects of climate change. Galapagos life forms require cold water for survival. Antarctica's cold currents provide nutrients for the entire food chain on the islands where they collide. However, as the water warms, this cold water no longer reaches the surface, killing off fish and algae and leaving animals that rely on them to starve. Reduced nesting success may result from migrations triggered by warmer temperatures [4]. The success of a nest can decrease if temperatures rise. Reduced egg production is a direct result of the invasion of new bug species brought about by warmer temperatures. Increased rainfall on land is one of El Nino's most visible effects. The giant turtle, an icon of the Galapagos, has suffered because of El Nino. Since the tortoises' eggs couldn't survive in the soggy nests, their population began to decline. If the temperature isn't kept steady, the eggs won't develop. The number of tortoises consequently decreased. Climate scientists have found clear differences between El Nino and climate change [5]. El Nino's impacts are temporary, typically lasting no more than a year. Nevertheless, climate change is permanent and has far-reaching consequences. Because the consequences of El Nino and climate change are so similar, studying the latter for insights about how species could adapt to longer-term climate change is preferable. Unfortunately, scientists have speculated that El Nino will persist and that, due to climate change, it may become more frequent or intense. The entire food chain in the Galapagos Islands is disrupted during El Nino years when currents decrease and trade winds die down, putting numerous species in danger of mass hunger and even extinction. The Galapagos penguin, to provide just one example, is in peril. Because of the Humboldt current's cooling effect and the Cromwell current's upwelling of deep-water coolness, these penguins can make it through the year. The Galapagos penguin population is in danger because of global warming. They face danger from human activities such as pollution, fishing, and the introduction of disease-carrying species [5].



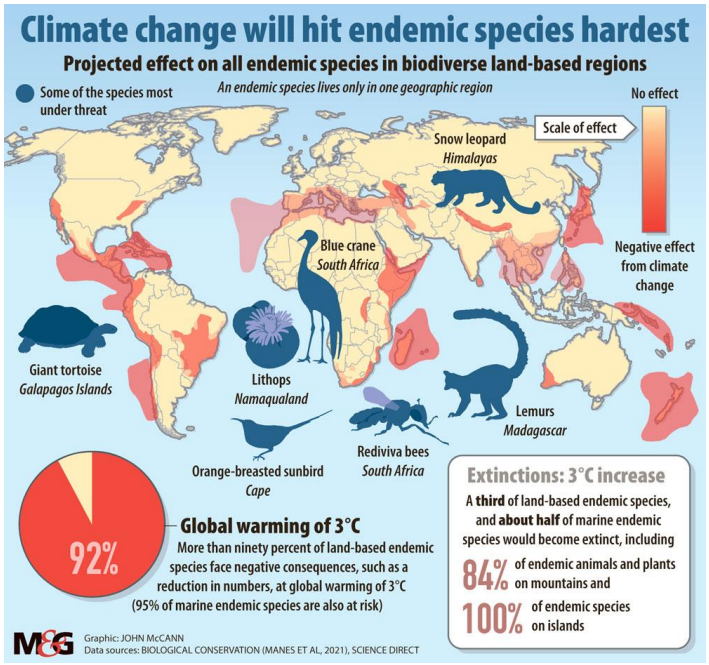
2.THREATS FACED BY THE GALAPAGOS

Ever since they were initially uncovered, the islands of the Galapagos have been utilised as a haven of concealment by numerous pirates. In later years, whalers who worked in the Pacific Ocean used these locations as staging areas and transit camps for their activities. Alfred W. Crosby, an American historian who is credited with coining the phrase "Ecological Imperialism," describes how European powers, via the movement of people, plants, and animals, transformed the environment and, as a result, built a supremacy over the communities that were native to the area. Crosby believes that this led to the establishment of a dominant position over the indigenous societies. The idea of ecological imperialism sheds light on the ways in which colonial powers exploited and altered the ecological system of the Galapagos Islands for the purposes of furthering their own political and economic development. The islands were affected by ecological imperialistic activities such as the extraction of resources, the introduction of alien species, the change of the landscape, and the pursuit of the Giant Tortoise [6].

Those travellers who used to stay on the islands had access to a source of fresh meat in the form of the enormous natural tortoises that inhabited the islands. Because these tortoises were able to go up to

a year without eating, there was never a shortage of them. Because of this, thousands upon thousands of enormous tortoises were able to be taken aboard the ships and hauled on board to be used as a source of food. As a direct result of this, there were fewer native tortoises to be found in the neighbourhood[7]. The effects of human activity were a crucial element that led to the extinction of several species that had previously inhabited the island. For instance, it was estimated that there was a decrease in the population of enormous tortoises prior to the 19th century of approximately 20,000 individuals. In addition to this, there were an even greater number of problems that were brought about as a result of human meddling [8]. They introduced a wide variety of new plant and animal species to the islands. They brought in a variety of creatures, including pigs, rats, goats, and so on. To give just one illustration, the rodents devoured all the penguin eggs. There was a change brought on by the disruption in the environment [9]. Because of this, penguins were very close to becoming extinct and are today regarded to be an endangered species. The newly introduced animals were able to quickly expand because to the abundance of food supplies. This was made possible by the fact that they did not have any natural enemies that might compete with them. They were locked in a severe battle for food resources with indigenous animals such as the tortoise. Most of the introduced plants immediately turned into rivals for the species of native plants that were already there. As a direct consequence of these happenings, the indigenous animal and plant species of every inhabited island are now in jeopardy [10].

The term "postcolonialism" refers to the critical academic study of the cultural, political, and economic legacies of colonialism and imperialism, with a primary emphasis on the effects of human rule and exploitation of colonised people and the places they inhabited. The harvesting of giant tortoises, the hunting of whales, and the introduction of non-native species into native territory are all examples of postcolonial actions that took place in the Galapagos Islands.



[Bega, 2021] Figure 2: Climate change affecting native species.

In recent years, there has been an increase in the number of dangers that these islands face [11].The widespread migration of people from mainland Ecuador, the lack of a quantitative system to prevent the introduction of alien species, illegal fishing that puts a significant amount of pressure on the marine resources of the islands, and the absence of an adequate legal framework to guarantee the long-term

preservation of the archipelago are all factors that have contributed to the deterioration of the archipelago. It was Alexander von Humboldt who made the groundbreaking discovery that ocean currents have a lower temperature than the air around them and that as they move away from the coast, their speed picks up significantly. In the year 1800, while touring through Venezuela and witnessing the destruction of its forests and the depletion of its soil by European colonists and planters, Alexander von Humboldt regretted how civilization was affecting the climate. As a result, he unknowingly became the founder of the environmental movement. Since the islands were found for the first time in 1535, anthropogenic alterations have been the most significant influence in determining the size of the animal and plant populations. Human activity has had an impact on regions with a high diversity of plant life. Parts of the humid zone have been cleared for agricultural use in order to meet the requirements of the expanding human population [12].

2.1 FISHING

Illegal fishing is just another danger that the islands will have to face. The most significant industry that has a direct impact on marine biodiversity is illegal fishing, which is also the most widespread. [13]The fishermen only targeted a select few species and used just basic equipment. At the beginning of the 1960s, free divers caught an abundance of lobster, which they then began to export in an effort to boost their economy. As overfishing became more widespread around the world and coastal fisheries in Peru collapsed, the islands emerged as a new source of seafood and specialised products. The Galapagos Islands are home to about a quarter of the world's marine biodiversity, much of which can be found nowhere else on earth.

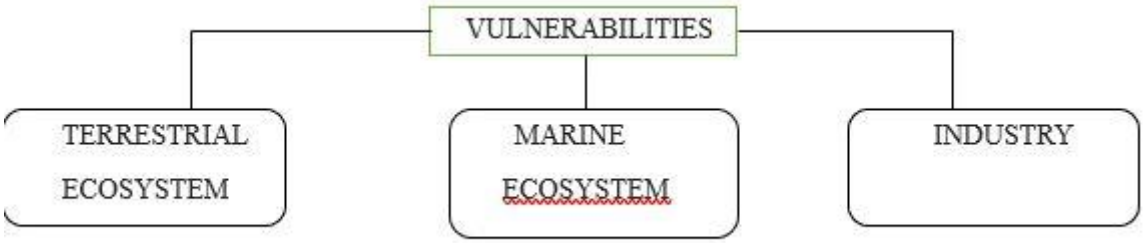
The locals took advantage of this fact to produce revenue. When it became clear that a world heritage site needed to be protected so that it could be handed down to subsequent generations, the area around the site evolved into a social and economic powerhouse [14]. Overfishing has also significantly weakened the marine ecosystem’s ability to recover from the devastations caused by the El Nino of 1982-83, which triggered abnormal weather conditions. The climate event destroyed coral reefs in the archipelago, many of which had persisted for at least four hundred years. Fishermen had removed so many large predatory fish and lobsters from the islands’ sea, that huge numbers of sea urchins were able to colonize the area. They then overgrazed the coral, damaging it further and preventing it from re-establishing. Sylvia Earle of the National Geographic Society wrote “Nowhere on Earth are the combined impacts of climate change and overfishing more clearly defined than in the Galapagos Islands. Decades of data link recent fishing pressures to disruption of the islands’ fine-tuned systems, making them more vulnerable to natural and anthropogenic changes in climate.”

2.2 TOURISM

The Galapagos Islands are influenced by several factors, one of which is tourism. Because of the strong ocean currents that run through the islands, sea riders have the impression that these islands are always moving, which is how they got the moniker "the Bewitched Islands." Following the discovery of the islands and Charles Darwin's subsequent advocacy on their behalf, tourists initially visited the region in small groups. And this was the driving force behind the islands' booming tourism industry. [15]Each year, tourism contributed between almost 4 and 7 million US dollars to the economy. Greed quickly spread throughout capitalist society as it realised earnings had increased. The sheer volume of tourists adds to the burden that is placed on the aquatic ecosystem. The discharge of waste from ships, such as garbage or

bilge oil, into the ocean not only pollutes the water but also creates the potential for the introduction of new species to the islands. The development of tourism cleared the path for international markets and increased demand worldwide for high-value marine items. An expansion of the floating population coincided with the beginning of the tourism boom. In the Galapagos Islands, population growth is recognised as one of the most significant challenges to conservation efforts. Tourism and migration both contributed around 6% to the growth of the population from 1982 to 1998. Because of these factors, there is now an underlying pressure being placed on biodiversity. It refers to the practise of bringing in species from other countries that threaten native plant and animal life by competing with resources or eating them. Rats and other marine critters that could pose a threat to endemic species are introduced to the island by fishing boats and tour boats that come from off the island. Both human visitors and the changing climate pose significant risks to the unique animal and plant life that can only be found on the Galapagos Islands and nowhere else on the planet.

2.3 ECOLOGICAL VULNERABILITIES FACED BY THE GALAPAGOS



2.4 THREATENED AND ENDANGERED SPECIES

Acquiring knowledge is one of the most important factors in winning the fight. The native flora and fauna of the Galapagos Islands are in danger as a result of the introduction of non-native species, as well as the effects of humans, tourism, and other aspects of the local climate. [12]As the official mascot of the Galapagos Islands, the giant tortoise serves as a symbol of the archipelago. The Galapagos Islands were once home to more than 200,000 enormous tortoises two centuries ago. Sadly, four kinds of giant tortoises have died extinct since then, and there are currently only 10% of the original population alive. Whalers in the early part of the 19th century over-exploited the population of Galapagos giant tortoises by harvesting live tortoises and storing them as food for long voyages. As a result, there was a significant decline in the population of this species. In recent years, Galapagos tortoises have been and continue to be threatened by predation and habitat degradation caused by invasive species. Both threats are caused by invasive species. This danger has been present throughout this entire period.

The next group is the finches, which Charles Darwin thought to be the best illustration of how natural selection works. [16] Around fourteen distinct species of passerine birds are included in the group of birds that are collectively referred to as Darwin's finches. As a direct consequence of the slow but steady decline in its number over the course of many years, the mangrove finch is the species of bird that faces the greatest risk of becoming extinct. Less than one hundred mangrove finches are known to exist in their natural habitat at any given time. The invasive fly known as *Philornis downsi*, which is a parasite and feeds on the blood of young finch nestlings, presents the greatest threat to the finches. This fly has been known to kill young finch nestlings.

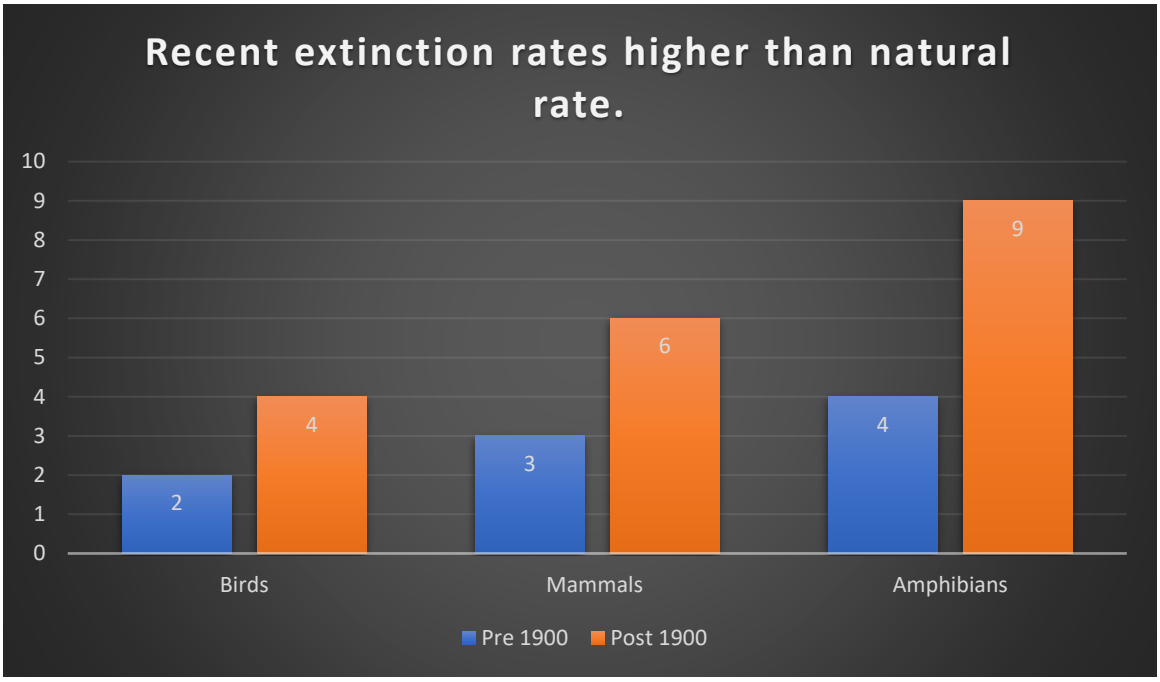


Table 1: Comparing pre and post extinction rates.

El Nino is a naturally occurring event that takes place every 5–7 years in the Galapagos Islands. [4] The endangered marine birds known as penguins and flightless cormorants are the ones that are most at risk on the islands because of El Nino's presence. The Humboldt Current, which supplies the Galapagos Islands with water that is rich in nutrients, is disrupted by El Nino. The lack of nutrients causes the fish and algae to progressively perish, which has a knock-on effect on the marine birds like penguins and flightless cormorants that consume the fish. [17] The more regular occurrences of El Nino have increased the risk of extinction for the Galapagos penguin by thirty percent over the next one hundred years.

S.NO	SPECIES NAME	GROUP
1	Barrington Land Iguana	Reptile
2	Fernandina Island Galapagos mouse	Mammals
3	Floreana Coral	Corals, Jellyfish and sea cucumbers
4	Galapagos Hawk	Birds
5	Giant tortoise	Mammal
6	Shark	Water mammal

Table 1: Species that are about to be extinct.

3. PROTECTIVE MEASURES

'Never doubt that a small group of thoughtful committed citizens can change the world; indeed: it the only thing that ever has.'

-MARGARET ATWOOD

The absence of human influence is the most effective method for preventing the extinction of any species or species group. [18] The Galapagos Islands were known for their pristine natural beauty; nevertheless, following Charles Darwin's arrival and the widespread dissemination of his theory of natural selection, an increasing number of individuals began to focus their attention on the islands for the sake of research and conservation. Since half of the island has already been developed, it is imperative that what

is left of it, at the very least, be protected. [19]The government ought to take responsibility for the upkeep of the island. The Charles Darwin Foundation is a scientific organisation that was established in 1959 and operates without making a profit. The foundation is made up of a large number of researchers, research assistants, support staff, and volunteers who work together to ensure the islands' continued existence and the construction of a secure future for them. The prevention of the introduction of new species to the islands is the most effective kind of protection that can be taken. People who are visiting the islands as tourists should not cross any limits, should maintain the island clean, and should not take any dead flora or animals off the islands. People shouldn't put their money into businesses that deal in animal by-products. [20] Some common protective measures:

- Protect especially vulnerable species and ecosystem.
- Protect emblematic species to sustain tourism.
- Strengthen the quarantine system to limit the introduction of the invasive species.
- Improve management of coastal and offshore- water fisheries.
- Promote climate research and establish climate- response monitoring protocols.
- Adopt a sustainable eco-tourism approach and coastal development.
- Improved education opportunities and promote community awareness.

3.1 PRESERVED GALAPAGOS – ECONOMY LOSS

When people start taking action to preserve the Galapagos Islands, a significant amount of stock is put at jeopardy. When protecting the environment is the hot topic of the day, on the other hand, doing so can be detrimental to the state of the global economy. The Galapagos Islands are a very popular destination for vacationers [19]. The tourism industry contributes enough to the national economy. But they are only dimly aware of the fact that these incursions are the primary cause of the deterioration of the ecosystem. If Ecuador and the people living on these Galapagos Islands cared about the well-being of its indigenous species, they would let the islands remain in their natural state. It is impossible to hope for that shift, however, because these islands serve as a path of escape from poverty for a great number of people on the mainland. People here prioritise economic development over environmental protection. Before the pandemic, tourism made up about 80 percent of the GDP of the Galapagos islands. It was also Ecuador's largest export of services and its fourth largest export of non-petroleum goods before the pandemic. The economic well-being of the islands, particularly those that are actually indigenous to the Galapagos, is crucial to the nation's survival. The Galapagos Islands bring in a significant amount of cash that benefits not just themselves but also the economy of Ecuador as a whole; nevertheless, this comes at the expense of the ecosystem. Another interesting fact is that the Galapagos Islands are home to a diverse marine ecology that is kept healthy by the interaction of multiple ocean currents. All forms of terrestrial life on the islands are maintained by this. On the other hand, illegal industrial fishing and overfishing by locals pose a risk to this richness.

Migrants to the islands who are unable to find work in the tourism business sometimes find employment in the fishing industry instead. Both the Galapagos Sea cucumber and the sharks that live there have become targets of poaching because of their popularity in Asian markets as aphrodisiacs and medical products. Despite the fact that the government prohibited overfishing, fishermen, who were pleased with the increased economic activity in their communities, began engaging in illicit fishing due to the high value of the product. According to the findings of modern marine biologists, both sea cucumbers

and lobster populations are still at precariously low levels. Illegally entering the marine reserve in quest of rich catches, such as sharks, which are caught primarily for their fins, are ships from other nations.

4. CONCLUSION

'The earth is what we all have in common'.

-WENDELL BERRY

The globe is speeding towards the point where the effects of climate change may no longer be reversible. The novel "Galapagos," written by Kurt Vonnegut, paints a picture that is spot-on accurate of the current situation facing the islands. The storyline of the book serves as a metaphor for the way in which human beings live as though they are on vacation, as if we can expect to be saved at some point in the future. It is laughable to observe how most people behave towards the environment, as if nobody calls this place their permanent home. Throughout the book, Kurt Vonnegut places an emphasis on two different motivations. It was the large brains that humans possessed in the 20th century that suggested that they held the ability to think on a higher level than other animals. And secondly, it is the economic collapse that occurred because of the greed that was visible in both the attitude and behaviour of humans. This greed caused the collapse of the economy. When humans interfere, nature is already in a severely degraded state. We human beings are the cause of the problem, yet unfortunately, we look for the cure outside to preserve nature. We don't realise that the solution is inside ourselves. To illustrate this point, Mahatma Gandhi once said, "You must be the change you wish to see in the world." Humans were drawn to the Galapagos Islands because of their diverse ecosystems and abundant resources, with the intention of exploring rather than exploiting them. It is already too late for humanity to come to the realisation that it is more important to save nature for the sake of future generations than to exploit it out of greed. Before it is too late, people all around the world need to become more aware of the damage that humans can cause to the environment and to the valuable species that are currently at risk of extinction. People in this world give a higher priority to economic growth than they do to protecting the environment. If things were to change, the globe would become the most wonderful location for families to live together for generations.

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