

## **HABITAT LOSS AND ITS EFFECT ON THE BIODIVERSITY: A REVIEW**

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### **الملخص:**

يعد ضياع أو تدمير الموائل ، فضلاً عن تجزئتها أو تدهورها ، العامل الأكثر أهمية في تحديد بقاء عدد من أنواع الحياة البرية والبحرية حيث يصبح النظام البيئي الطبيعي غير صالح للبقاء إذا أدت الأنشطة البشرية إلى تغييره بشكل كبير، في هذه الحالة قد لا تتمكن الحياة البرية والبحرية من الحصول على الغذاء والماء والغطاء وأماكن تربية الصغار التي يحتاجونها للبقاء على قيد الحياة في النهاية يؤدي هذا إلى انقراض الأنواع وفقدان التنوع البيولوجي. خلال هذه الدراسة سوف نتعمق أكثر فيما يتعلق باختفاء الموائل والعوامل التي تسهم في ذلك. كما سيتم مناقشة تأثير فقدان الموائل على التنوع البيولوجي للأنواع المختلفة ، وكذلك كيف يمكن للحفظ أن يساعد في عكس هذا التأثير على التنوع البيولوجي. بذلت محاولات في هذا التقييم لمعالجة كل هذه الجوانب الحاسمة بالتفصيل مما يجعلها الأولى من نوعها.

**الكلمات المفتاحية:** التنوع البيولوجي ، تجزئة الموائل ، الحفظ ، الانقراض

### **Abstract:**

The loss or destruction of habitat, as well as its fragmentation or degradation, is the most critical factor determining the survival of a number of wildlife species and marine. The natural ecosystem may become unfit for survival if human activities have significantly altered it. In this case, wildlife and marine may no longer be able to obtain the food, water, cover, and places to raise young that they require to survive. In the end, this leads to the extinction of species and the loss of biodiversity. Throughout this study, we will delve into further depth concerning the disappearance of habitats and the factors that contribute to it.

Also discussed will be the impact of habitat loss on the biodiversity of different species, as well as how conservation might aid in reversing that effect on biodiversity. Attempts have been made in this evaluation to address all of these crucial aspects in detail, making it the first of its sort.

**Keywords:** Biodiversity, habitat fragmentation, conservation, extinction

### **Introduction:**

It is estimated that humans have changed more than 75% of the world's land surface, and the consequent loss of habitat and degradation are considered the primary causes of biodiversity loss and decline worldwide. In addition to habitat loss, one of the most significant effects of alteration in landscape is that after enormous blocks of natural habitat have been broken into smaller blocks, they often occur inside a network of human-modified land use, such as farms and settlements (Isaac et al., 2018). Nature has clearly demonstrated that habitat loss has a negative impact on species diversity simply by lowering the number of places in which species adapted to a given environment can be found (Haddad et al., 2015).

The loss of habitat has been and continues to be the most serious threat to biodiversity. More than half of several biomes, including the Mediterranean and temperate forests, tropical and sub-tropical dry broadleaf forests, and tropical and sub-tropical wet broadleaf forests, had been converted by 1990, according to the report published by the Millennium Ecosystem Assessment (2005). In western part of Europe, only 2 to 3% of initial forests are still remaining in their natural or similar condition (Assessment, 2015).

Zooming in on more specific categories of habitat has little effect on the overall image of the environment. A recent study recorded in Finland, the changes in the 368 habitats and their quality and quantity with the great majority regarded as endangered or critical, with just 74 habitat types classed as of least concern. Despite the fact that the human population is growing and the need for resources is rising, the conversion of natural ecosystems into farmland, pastures, plantations, developed areas, and infrastructure continues (Chetcuti, et al., 2020). It is quite understandable that when a species or population's environment is damaged or destroyed totally, the population and species suffer as a result. Despite this, many concerns relating to the changes in biodiversity due to habitat loss are not well differentiated and they are not commonly acknowledged, as is the case with many environmental challenges (Hanski, 2011).

The main concerns are the nonlinear nature of the changes in the biological responses of species to habitat loss and fragmentation at the landscape scale. Habitat loss and other environmental changes do not always result in fast responses from species; in fact, the opposite is often true. This happens especially when we analyze changes occurring at large continental scales. The loss of habitat has resulted in a significant decline in the number of species, with some species eventually becoming extinct as a result. (Hanski, & Ovaskainen 2002).

When we become unaware of this "extinction debt," we are more likely to underestimate the extent to which biodiversity is in peril. It is possible to lose habitat due to accidental destruction, such as the bioconversion of boreal forests to densely managed forests in northern Europe, or deliberate changes in land use. Habitat loss can be caused by both intentional and unintentional loss (Hanski, I., & Ovaskainen, 2002).

Increased edge effects as a result of diminishing habitat area and growing fragmentation of the habitat are two instances of this phenomenon. Hundreds of studies have been carried out in fragmented landscapes to evaluate the relative impact of habitat quality with fragmentation area, and connectivity in influencing the presence or absence of species (Prugh, et al.,2008).

But the vast majority of this research is of limited value as it was incapable of acknowledging the relative importance of habitat quality with fragment area, and connectivity. Moreover, this concept is also highly dependent on landscape structure and heterogeneity. The destruction of habitat and fragmentation also results in ecological and molecular consequences (Raven, & Wagner,2021)

### **Purpose and framing of research questions**

The aim of this Paper is to find out what the biodiversity conservation research conducted in the world is focusing on through reading and analyzing recent scientific literature. The research questions aims to answer what problems that exists in the biodiversity conservation research in the world and what ways to halt the biodiversity loss in the region that exists according to the literature. (Kingsford,2000)

### **The Most Common Types of Habitat Loss:**

When people think about habitat destruction, the image of a bulldozer ripping down trees comes to mind. It has become synonymous with the term since it depicts the most typical elements of the phenomenon. Physical habitat

degradation occurs as a result of a variety of activities such as dredging rivers, filling up marshes, mowing fields, and cutting down trees.

Habitat fragmentation: Roads and development have fragmented most of the remaining terrestrial animal habitat in the United States, causing many species to go extinct. The habitats of aquatic creatures have been disrupted as a result of dams and water diversions. Some species may need a broad region where they can locate mates and food, and these shards of habitat may not be big or well-connected enough to maintain them. As a result of habitat loss and fragmentation, it is more difficult for migratory animals to locate suitable resting and feeding grounds along their migration paths. (Duploux, et al.,2013)

Destruction of habitats: Pollution, invading species, and disturbance of process in the ecosystem including increasing the intensity of fires in an environment are some of the ways in which habitats may become degraded and they are not ready for the native animal populations to sustain. (Giam, et al.,2010).)

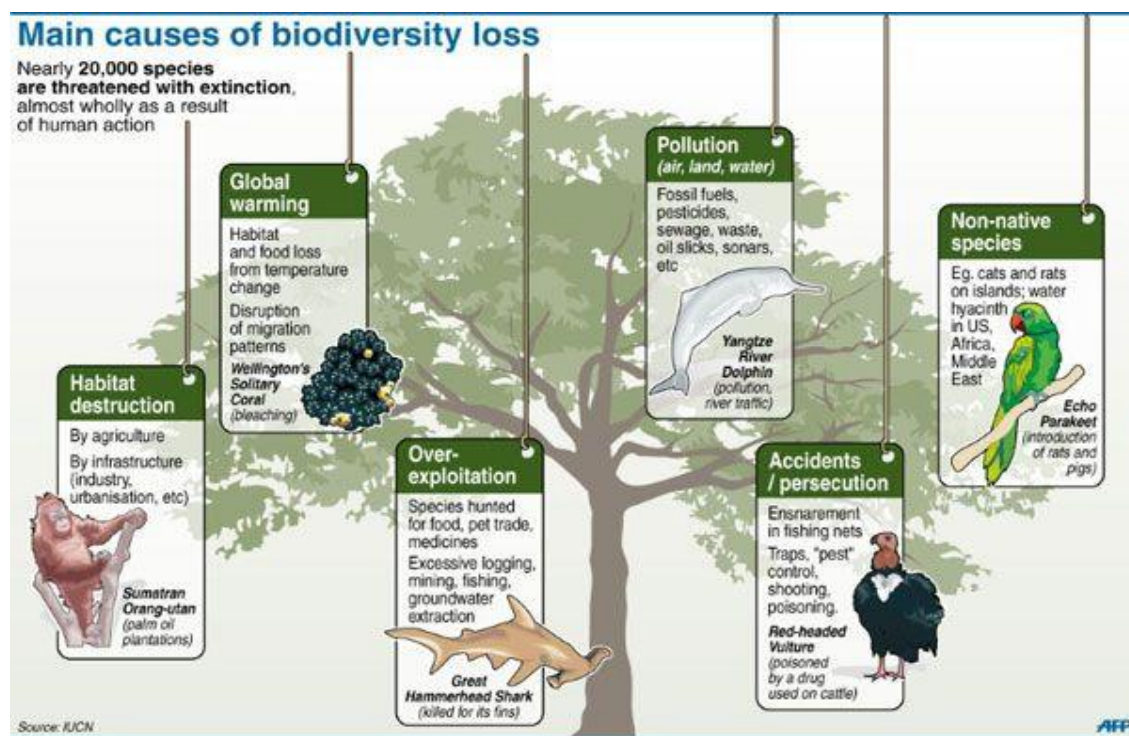


Fig. 1. Main causes of biodiversity loss, with examples of endangered species (IUCN, 2008)

**Causes of Habitat loss**

**Agricultural reasons:** Since humans converted woods and grasslands to croplands hundreds of years ago, agriculture has been responsible for a major amount of habitat degradation. Converting natural land into agricultural fields for the production of high-value food and biofuel crops is in high demand right now and thus causing habitat loss to a great extent (Raven, & Wagner 2021).

**Land conversion for development:** Despite the present economic downturn, the conversion of areas that were originally used for animal habitat into roadways, housing projects, malls, parking lots, and industrial locations continues (Raven, & Wagner 2021).

**Development of waterbodies:** Dams and other water diversion projects sucking up and disconnecting fluids, changing the hydrological and chemistry of the water bodies they influence. This prevents the nutrients to flow downstream. This is the same situation that has happened with the Colorado River. This river has little to no water by the time it flows into the Sea of Cortez due to the lengthy dry season (Kingsford,2000).

**Pollution:** pollution is another cause of causing water damage. The freshwater wildlife is the most severely affected by water pollution. Wastewater that has not been treated and mining waste that has not been handled as well as fertilizers, and pesticides are thrown in lakes, rivers, and wetlands results in increasing the pollution of freshwater bodies (Mateo-Sagasta et al., 2017).

**Climate change** is a new cause of habitat loss, and it is becoming more prevalent. Wildlife that requires the cold atmosphere and resides in the high altitudes, may soon be forced to find new homes because of a lack of available habitat. As sea levels rise, it is possible that coastal creatures may find their natural home submerged((Giam, et al.,2010).).

Table (1) showed the Causes, effects and solutions of habitat destruction.

( <https://environmental-conscience.com/habitat-destruction-causes-effects-solutions/>)

Habitat Destruction		
Causes	Effects	Solutions
Agricultural processes	loss of biodiversity	Reduction in mining practices
Deforestation	Endangerment & extinction of species	Higher fines for illegal dumping
Mining	Ecological imbalance	Reduction in greenhouse gas emissions

Global warming	Destruction of breeding grounds	Protection of our oceans
Illegal dumping	Floods	Reduction of the use of fertilizers and pesticide
Soil pollution	Droughts	More nature reserves
Littering	Erosion	Stop deforestation
Overpopulation	Reduction in crop yields	Altering of our consumption behavior
Noise pollution	Spread of pests	Reduction in waste
Water pollution	Invasive species	Population control measures
Excessive consumption	Global hunger	Education
Waste production	Health effects	Raising awareness
Natural disasters	Higher mortality	-

**Habitat loss and its effect on biodiversity:****1. The extinction of resident species:**

A unique plant and animal diversity coexist with various species. This co-existence helps in the formation of a habitat. In the Kelp forest, several invertebrate communities such as epiphytic, mussel beds, and other assemblages co-exists. Another example of such co-association is the fish communities that are located on or near coral reefs. The consequences of habitat loss are expected to be far more severe than the costs of individual species extinction. The interconnectivity among the species are also lost with destruction of their natural habitats. Because of that the loss of biological interactions between species ultimately results in a cascade of negative consequences (Airoidi, et al.,2008).

**2. Loss of food sources:**

The majority of biogenic ecosystems are more productive compared to the simpler habitats. Most of the nutrients and the organic materials are generated by these systems. All of which may be directly used as food supplies by other species in the environment. Furthermore, habitat loss entails the loss of these foodstuffs, which will have a negative effect on the survival of many other species as well as the productivity of specific species and groups, with much more serious consequences likely to propagate up food chains (Airoidi, et al.,2008).

**3. The loss of ecosystem functions :**

Habitats with a high degree of structural complexity provide a diverse habitat for many species in the environment, including the supply of food and shelter for other species. Because of the loss of habitat, there is an increase in the trapping and retention of sediment, as well as changes in sunlight and hydrodynamic conditions. Additionally, the maintenance of system resilience is compromised.



In the absence of habitats, the functions that are connected with them are likewise absent. Changing the composition of algal canopies with turfs on rocky beaches, for example, has an impact on sediment dynamics since fronds hinder sediment buildup whereas turfs tend to gather particles even on exposed coasts. (Airoldi, et al.,2008).

**Habitat loss and its Impact on organisms:**

The degradation of natural habitats is one of the most serious challenges affecting plant and animal species all over the globe. There are far-reaching consequences to the habitat loss for the planet's capacity to support life. However, habitat destruction, which can be defined as the alteration of the conditions necessary for animals and plants to survive, has a detrimental impact on more than just individual species; it has a negative impact on the entire ecosystem as well (Keil, et al.,2015).

Habitat loss largely happens to human activity. However this is not always the case and it is estimated that almost that clearing land for grazing, farming, urbanization, drilling, and mining, has an influence on the species that resides in the forests. Every year, around 15 billion trees are removed from the forest. According to a study that has evaluated the tree density it was reported that the number of trees on the planet has declined by almost 46% since the beginning of human civilization. Beyond the loss of habitat, deforestation decreases the potential of forests to offer the vital benefit of carbon sequestration, which aids in the mitigation of the consequences of global warming (Jetz, et al.,2007).

When it comes to rivers and coasts, as well as the ocean itself, the situation is substantially worse. The majority of marine species locate their breeding grounds in estuaries along the shore, which is where they originated. When inland wetlands, as well as other bodies of water, are dredged and filled, animals' ability to give birth and care for their young is reduced. Through the passage of streams and rivers, pollution and effluents from the land can easily make their way to the ocean, where they have a severe impact on the health of fish, birds, and marine flora (Jetz, et al.,2007).

Deforestation far from the shoreline may result in erosion that enters the ocean and dumps sediment into the shallow marine waters, preventing coral reefs from receiving the sunlight they need to live. It is also been discussed that loss of habitat can also results in extinction among species (Yincan et al 2022).

The effects of habitat loss on species diversity in local and regional ecosystems all over the world are well documented. However, it is quote surprising that

very little information is available on what might happen in terms of range-wide species extinctions as the amount of remaining primary forest cover approaches zero.

Tropical rainforests have gotten the most of the focus when it comes to habitat damage because of climate change. Currently, fewer than 9 million square kilometers of tropical rainforest habitat remain globally, compared to the estimated 16 million square kilometers of tropical rainforest habitat that existed initially. Current deforestation rates are 160,000 square kilometers per year, which amounts to a loss of around 1 percent of the world's natural forest habitat every year. This affects the habitat of several indigenous animal species and can eventually results in extinction of many species (Alroy, J. (2017).

#### **4. Loss of genetic variability:**

Numerous ecological and environmental factors threaten populations living in fragmented landscapes. The viability of these species can also be compromised by inbreeding, random loss of beneficial mutations, and random fixation of deleterious mutations can effectively results in the loss of genetic variability among them (Frankham, et al.,2002).

In the land Islands, the Glanville fritillary can be found in hundreds of small local populations spread across the landscape, with a high percentage of population turnover. It has been reported that solitary dispersing females are frequently responsible for the foundation of new communities. This finding suggests that copulations among close relatives are more common in the next generation. One generation of mating between siblings causes inbreeding depression, which is significant enough to increase the load of the extinction chances of a population (Duploux, et al.,2013).

#### **Combat Habitat Loss:**

##### **1-Implications for conservation and management:**

Extensive habitat loss eventually occurs in the species extinction that are already threatened or endangered, resulting in a significant loss of overall biodiversity and alterations in the functioning of ecosystems. In part, the detrimental repercussions of habitat loss on the loss of species diversity are motivating increased conservation programs for coastal and marine ecosystems. It is insufficient to consider only the effect of habitat destruction on the diversity of plant and animal species. It is essential that conservation efforts consider the repercussions of habitat fragmentation on all aspects of species composition, as



well as the functioning of ecosystems and the services provided by habitats, in order to be effective.( Higgins, et al.,2019).

### **2-Implication of monitoring programs:**

It is imperative that long-term and large-scale surveillance programmers of alterations in ecosystems and species distributions can be established to understand in more details about these shifts in the environment. It is recommended that this monitoring be supplemented by studies that are designed to treat management strategies that results in habitat loss as large-scale trials rather than small-scale experiments, instead of small-scale experiments.

well-documented example is the use of marine protected areas and marine reserves as instruments to explain the relationships between both the functioning of habitats and the distribution and abundance of target species. A recent report noted that the most effective technique for conserving biodiversity is to avoid habitat modification or degradation, which occurs almost all of the time on a global scale. (Heywood, et al.,1997).

There is a contrasting idea exists between the conservationist regarding weather to protect the fragmented patches of the habitat or the single large area. This debate is also called as the SLOSS debate. This involves a single large area versus several small patches of habitat (Heywood, et al.,1997).

### **3-Providing environmental education:**

Comprehensive environmental education helps people realize how important biodiversity is and informs them about the many ways that they can all contribute to causes that help to preserve many different species alive.

### **4-Creating awareness about the importance of biodiversity:**

The public should make it a priority to aid reporting experts by recording the process of habitat destruction as securely as possible whenever the chance presents itself. Environmental deterioration may lead to bad conditions, and videos and images can serve to graphically depict such events. By generating emotional reactions, videos and photos can encourage people to take action to safeguard natural environments (Giam, et al.,2010).

### **Conclusion:**

The loss of habitat has severe and continuous detrimental consequences for biodiversity. Habitat loss has a detrimental effect on biodiversity in many ways, including its impact on species abundance, genetic diversity, species richness, species dispersion, and species extinction. Hence, it is crucial to understand the impacts of habitat loss and other dangerous phenomena because it has important

implications to support and integrate adaption strategies into policy creation and management response efforts that can prevent habitat loss in future.

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