

Effect and
consequences
phenomena of habitat
fragmentation biology
essay



Habitat fragmentation is currently one of the most concern topics in threatening process of biodiversity. It is a natural process which a particular habitat is separated and divided into smaller pieces due to physical barriers such as mountains, rivers and other landscapes. This process takes place within a long period of time, and speciation occurs through it. However, the interference of human activities has increased the rate of habitat fragmentation. The activities include rural development, agriculture, and urbanization; and habitat destruction caused by these activities happened in short period of time. Species are unable to adapt to the rapid changes of their surrounding, subsequently some species are endangered and eventually go extinct. In this essay, an overview on the effects and consequences, and the solutions of habitat fragmentation will be explored.

Over centuries, people especially prospective developers have been debating on the issue of the protection and conservation of habitat. What is the important of habitat and why do we need it? This is the most common question people asked. Despite human gain profit from the natural environment, we seldom appreciate and understand the need for taking care of it. A habitat is a place which consists of biotic and abiotic factors that favor the survival of various species in a particular area (Miller & Hobbs 2007). Each species plays an important role to the environment and formed a biodiversity. Correspondingly, we obtain many natural resources through biodiversity. For example, medicine, food, woods, and water are sources that come from the natural environment. Furthermore, habitat is essential for future resources such as new cure for diseases from a plant species that are not yet discovered. Habitat maintains the genetic diversity of species and

supports life; therefore there is a need to protect the habitat so that it continues to support life.

Effect and Consequences

Phenomena of habitat fragmentation

Habitat fragmentation begins when there is a decrease in the total area of habitat due to habitat loss. The fragmented habitats areas are smaller and separated with further distance from each other. Similarly, the species population is also divided into smaller groups but increase in the number of patches. As a result, isolation of species occurs and prevents breeding in different areas. The flow of gene remains in the same population and are not allowed to exchange to a broader area. The genetic diversity of a species eventually decreases and the gene variation become lesser.

Habitat loss

The loss of habitat caused limited resources for the species to survive. There will be less food source and nesting site. Furthermore, species have higher chance of getting expose to their predator. For example, the reproductive rate of forest bird was affected by high level of nest predation and parasitism by brown-headed cowbirds (*Molothrus ater*) in highly fragmented forest located in the Midwestern state of United State (Sanderson & Moulton 1999). This can be assumed that the loss of habitat provide insufficient nesting sites for the forest bird to reproduce. On the other hand, cowbirds can easily find and target the nests of the forest bird. Eventually, this factor contribute to high mortality rate while low reproductive rate of forest birds.

Edge effect

Habitat fragmentation also leads to habitat edge, which is a boundary formed between the habitat and the disturbed environment. The zone formed prevents species to migrate from place to place, thus limited the abundance and distribution of species in certain area. The risk of breeding failure is higher for species which live in a small fragmented forest due to small population, compared to the species in large habitat's size. In addition to that, the habitat edge acts as a physical barrier to the species in small fragmented forest, hence they are unable to cross over to other larger fragmented area. Consequently, this factor has increased the loss of species. For instance, a research has conducted on the study of species-area relationship in a threatened monkey community (Marshall et. al. 2010) and found that the habitat area has the greatest contribution to the abundance and diversity of monkey species. Likewise, a small habitat does not favor in species diversity.

Impact to human

Some people think that habitat do not affect much on the human society, nevertheless habitat destruction brings massive negative impacts on human being. First of all, the loss of habitat indicates that the loss of biodiversity and this further implies on the loss of many bioresources which is essential to us. Habitat destruction also leads to imbalance on ecological cycles such as nitrogen and carbon cycle. The natural habitat plays an important role on converting nitrogen in air to nitrogen-contained compound which can be used by living organisms, as well as reduces level of carbon in the

atmosphere. The disruption of these cycles by human eventually leads to many unfavorable situations such as acid rain, climate change, etc.

Moreover, habitat destruction also increases the occurrences of natural disaster such as flood and landslide as habitat serves as a protection from it.

Solutions to Habitat Fragmentation

Habitat Restoration

Habitat restoration refers to the action that contributes to the re-building process of a habitat. The purpose of habitat restoration is to restore biodiversity by protecting and improving the damaged habitats. Strategy used for habitat restoration depends on different situations. Figure 1. 0 shows the determination of conditions before developing the goal for habitat restoration.

Figure 1. 0 Requirement for the development of habitat restoration strategy (Miller & Hobbs 2007).

Agri-environmental schemes are introduced by the British government in order to maintain the vegetative structure and prevent further habitat destruction by agriculture. Research (Moro & Gadal 2007) has showed that the relationship between the abundance and diversity of small terrestrial mammals and the restored fragmented forest have a positive association. It indicated that habitat heterogeneity provides more vegetative structures, thus more small mammals species can cope with their surroundings.

Challenges in habitat restoration

Despite conservation of habitat becomes one of the concern topic globally, there are still others problem that must be solved and these problems have opposite direction to habitat restoration. The rapid growth of global human population is the main factor of all. The increase in human population size requires more land for urbanization. Food crisis is also another factor contribute to deforestation for farming in order to supply more food. Therefore the government should project a suitable plan in order to maintain the balance between human need and the biodiversity of the natural environment.

Conclusion

In summary, habitat fragmentation caused by human activities leads to negative effects on the biodiversity as well as to human benefit. The problem of habitat fragmentation should be aware by the public so that actions can be taken and stop the continuing of habitat destruction.?