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Biodiversity as part of urban green network system planning case study: Pontianak City

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Abstract

Urban ecology is a new paradigm in viewing urban area as human-dominated ecosystem. This kind of ecosystem consists of socio-cultural as well as economical aspects which play important roles. Recently, urban ecosystem had caused major ecological problems such as flood, Urban Heat Island, pollutions, and biodiversity loss. Green network system is crucial factor in urban ecology and become an alternative approach to overcome ecological problems in urban areas. Urban green space in a form of parks (patch) and corridors are integral part of green network system, therefore they are potential urban fabrics (Hough, 1989). Due to specific social and ecological function, green open space in high density settlement should integrate these functions. On the other hand, urban biodiversity serve as indicator of environment quality (Muller, 2013). The aim of this paper is to identify urban biodiversity in the city as a base for planning an urban green network system.

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Key words: urban ecology; green network system; urban biodiversity

1. Introduction

Human and nature are the two thing that can not be separated. Natural system and how human use it to their needs are the main purpose in this planet, especially in urban area where they mostly dwelled. In the former years, the science of these natural system (in term of ecology) and the knowledge of urban area are not connected. In the

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former years, ecologists tend to be more interested in pristine area (Collin, 2000; Grimm, 2008) but recently they start to view urban mosaic as an ecological system.

As the human population grow and the city became major habitat for human, city became the most invansive ecosystem on earth. Due to these human expansion, nature degraded and natural resource is at risk. Urbanization has changed the landscape mosaic and this contribute to the biodiversity loss within the city.

In urban area, natural system play an important role as they support human activities (Forman, 2008). Biodiversity, on the other hand, indicates the quality of environment of these human habitat.(Muller, 2013).

Due to the need to fulfill the 30% of green area in the city, every local government urged to build more parks. A quantitative approach was made to calculate the city needs base on its habitants, the amount of vehicles and the carbon need for the 30 years a head. A masterplan of green open space was made to meet this need, mostly based on the city structure rather than ecological structure.

As a city that is located in the Borneo Island, Pontianak is surrounded by regions that rich in biodiversity. Some rare and endangered specieses, such as crocodile, Orang Utan and lots of bird species and flora were found in the area nearby. This species richness is degraded as the city developed, changing its mosaic, from natural cover to building blocks. The green open space was made, mostly to meet the human need of outdoor space with hard land covered to do their activities outdoor, rather than to feel the nature within the city. This research aim to figure out factors that influence the level of biodiversity of the green open space in Pontianak.

2. Methods

Kota Pontianak is located in the province of Kalimantan Barat ($0^{\circ} 02' 24''$ N, $0^{\circ} 05' 37''$ S, and $109^{\circ} 16' 25''$ E). It has a total area of 107,82 km². its population reached 565.456 inhabitant in 2011 with population density about 5.244 person/ km² (Pontianak Municipal Statistic Berau, 2011). The study area covered the public park managed by the Pontianak City Authority. There are 23 parks that being observed in this research, mostly were designed with ornamental vegetations, some are urban forests and a abandonland.

In order to investigate the relationship between biodiversity level in urban green area, a number of biodiversity level measurement were carried out over the study area. The biodiversity level was developed from Muller's biodiversity level measurement form. The parameter which were measured in the sample area were size, sealing level, linking fuction, species diversity, structural diversity and age of vegetation. Landuse, park and vegetation type were added to the assessment form to find the connection between these parameters. The collected data was presented in a map to overview the spatial pattern within urban structure. A map of spatial pattern was produced to present the connection of parameters within urban spatial pattern.

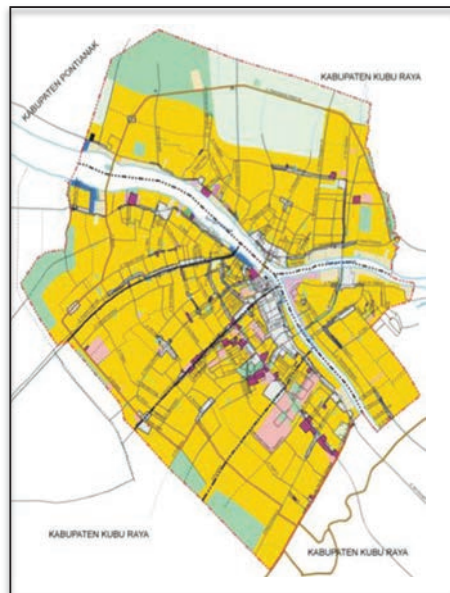


Fig. 1 Landuse Map of Pontianak

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