Strategic Spatial Planning for Green Infrastructure. The Case of the Metropolitan Area of Thessaloniki

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Abstract
Intense and varying environmental challenges have become one of the most pressuring goals that contemporary cities struggle to meet. Climate change, excessive urbanization and fragmentation of space are just some of the issues that contemporary cities are called to respond to. Thus, finding an effective approach to improve the quality of urban areas has proved crucial to cities all around the world. Green Infrastructure (GI) practices emerge as a key measure for cities that seek to increase their resilience to climate change and provide a quality place for people. Through strategic spatial planning, GI can be considered as one of the most appropriate multi-faceted approaches to reciprocate to a constantly changing urban landscape. In the metropolitan area of Thessaloniki there has been no GI planning so far. However, existing and prospective green, open and natural areas can play a catalytic role in the development of a GI network. To address this gap, the paper presents the methodology used for the development of a strategic spatial planning approach for GI in the metropolitan area of Thessaloniki.

Keywords: Green Infrastructure, strategic spatial planning, metropolitan resilience

1. Introduction

Urban areas are confronted with varying and intense environmental pressures. The notion of Green Infrastructure (GI) can be used as a strategic spatial framework for the management of urban development that would ensure the protection of natural and cultural resources, while at the same time enhance urban resilience (Ahern, 2007, Foster et.al, 2011). Under this notion the scope of this paper is to present the methodology used to create a GI network for the metropolitan area of Thessaloniki.

2. Methodology

Initially there was an identification of the elements that could compose a GI network. According to Benedict and McMahon there are three distinct elements that compose a GI network: the hubs, the corridors and the links (Benedict and McMahon 2012). The hubs and the corridors are the most important parts of the network, but without the function of the links there cannot be an integrated network that would maximize the environmental and societal benefits of GI.

Consequently, special criteria that aim to assess the adequacy of the natural areas for their integration into the GI network are documented. Due to the complexity of the relations and connections that are developed between the natural areas themselves but also between the natural areas and the build environment, a number of special features were listed and subsequently established as criteria for the selection of the areas that will be incorporated into the GI network. These were: ecosystemic function, accessibility and distance from the main urban center, areal size, level of existing infrastructures, degree of multifunctionality, and complementary function with other hubs.

Finally, after the detailed study and comprehension of the landscape of Thessaloniki's metropolitan area, the areas that fulfilled the above-mentioned criteria were documented and classified as the main elements of the network. The three classification types that were defined in order to compose the GI network were a) green – key areas and hubs, b) linear green areas and corridors (not necessarily green), and c) links.

3. Development Of The GI Network

Envisaging the creation of a coherent GI network and based on the three classification types identified earlier, a total of five elements were used to compose the proposed GI network for the metropolitan area of Thessaloniki. These elements were (a) the hubs, which form the basis of the network and are important natural areas, (b) the secondary hubs operating in addition to the first, (c) the green corridors that are linear green areas while at the same time function as hub connectors, (d) the blue corridors that are also linear natural areas i.e. rivers and streams and contribute significantly to the protection of the ecosystem, and finally (e) the links that are routes that enable moving from one hub or corridor to another.

Figure 1 depicts the spatial structure of the proposed GI network. In planning the GI network, special emphasis was given to the coastal zone, extending from Kalohori to Angelochori. This zone is proposed to be the main route for the interconnection of hubs and corridors and also a starting point for the further development of the network

at all scales (local, metropolitan and regional), due to its long linear extent, long range of influence and the significance of the recreational uses hosted in this area.

In practice, the coastal corridor functions as an integrating element of the plain of Chalastra, the endpoints of the green corridors of Dendropotamos torrent and of Regional Trench, the Lagoon of Epanomi and the Lagoon of Aggelohori.

Specifically, in the plain of Chalastra stretches a large area of estuaries of rivers, crops and natural vegetation. Apart from the coastal connection of this area with the rest of the GI network, an internal network is expedient to be developed with the main purpose to improve accessibility and exploration options in the area (i.e. develop more cycling routes).

The green corridors that extends along the Regional Trench and the Dendropotamos torrent along with the hub of Kedrinos hill are critical elements of the GI network due to their proximity to city center. Thus, a coherent link between the coastal zone, the green corridors and the hill is recommended, allowing the unobstructed movement of pedestrians and cyclists and the development of recreational activities lengthwise, providing at the same time the much-needed infrastructure for water management. The purpose of these links is to create an urban GI network, which will be of metropolitan importance and will greatly improve the aesthetics, quality and functionality of the urban landscape.

At the same time, part of the proposed GI network is the connection of Kedrinos Hill with the mountain shelter of Hortiatis. This link is proposed to be a natural mountain path while it is advised to develop more natural routes and shelters around the metropolitan area in order to encourage outdoors activities.

Regarding to the water dams of Thermi and Triadi, it is proposed to enhance their connection through the improvement and further development of the walking and cycling paths between the two natural areas. Moreover, it is proposed to connect Thermi's dam with the coastal front so that there is a link from the main urban center to the two dams.

Finally, at the east of the two dams are located two hubs of NATURA sites, the Lagoons of Epanomi and Aggelochori, and the secondary hub of Gerovassiliou estate. For this area, a connection between the two lagoons and the Gerovassiliou Estate is proposed, in order for these three elements to act collectively as a pole of attraction for the residents and visitors.

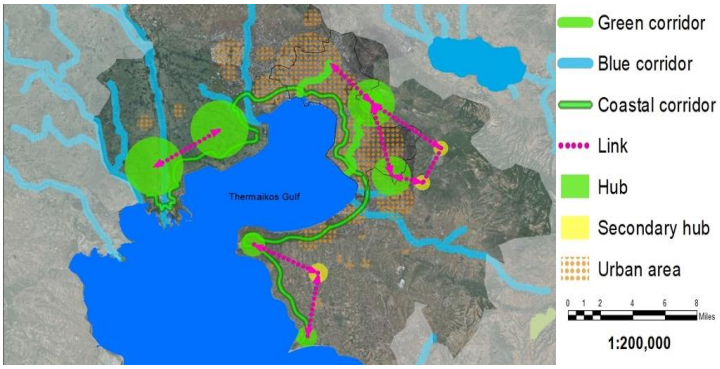

Figure 1. Proposed spatial structure of the GI network

4. Conclusions

The present study highlighted the importance of an integrated spatial planning approach for GI in metropolitan level. The analysis framework that was used provided information on the spatial distribution of the main ecological hubs while at the same time identified the opportunities for enhancing landscape connectivity for people and natural habitats. Policy wise the planning authorities in the respective metropolitan area should influence development sites so as to minimize the impact on GI and recognize the opportunity for enhancing landscape connectivity.

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