24183>The role of Spatial Experiences of Urban Nature in Re-connecting with the Biosphere

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Current rates and levels of global urbanization processes are unprecedented in history and threaten to put acute stress on remote ecosystems as well as on the capacity of social, economic and ecological systems in cities to deliver the necessary services for human wellbeing. By 2050, the world population is expected to increase to 9.3 billion from 7.1 billion in 2013. During this same period, urban populations will increase to 6.3 billion from 3.6 billion. As urban populations will consume most of the planets ecosystem services (Grimm et al., 2008), experiences and attitudes of urban dwellers are potentially pivotal in a time when democracies desperately seek a transition towards a sustainable stewardship of the biosphere (Colding & Barthel, 2013). The gravity of the issue is about whether urban citizens of tomorrow will be willing to support something they no longer regard as directly relevant to their lives (Bendt et al., 2013).

It has been suggested that the early stages of childhood are critical time-windows for the development of an emotional bond with nature and lifelong commitments (Chawla, 1998; Kellert, 2002). Alarmingly, urbanization seems to sever perceived and experienced relations between people and nature as modern life-styles are adopted and as the accessibility to physically engage with natural environments is reduced (Stokes, 2006; Theodori et al., 1998). The literature specifies that absence of first hand nature experiences hinder development of cognitive and emotional frames, which in turn underpin attitudes and pro-environmental behavior (Schultz 2000; Dunlap et al. 2000; Kals et al., 1999). This alienation process has been termed the ‘extinction-of-experience' (Miller, 2005; Pyle, 1978), a sort of ongoing generational amnesia among city peoples about their relationships to, and dependence upon, diverse ecosystems (Kahn, 2002; Barthel et al. 2013). Does the design of green spaces in metropolitan landscape have a role in the establishment of cognitive and emotional attributes of urban citizens that go in line with pro-environmental behaviour? Colding and Barthel (2013) recognized the need for thinking about ‘cognitive resilience building' in relation to the above issue, and they hence put tremendous responsibility on the professions of urban scholars, designers and planners for producing urban spaces that can foster potentials for producing positive affections towards diverse ecosystems.

This session will discuss the spatial and temporal scales at which nature experiences in cities occur, and how such knowledge may help urban developers to include nature experiences in the built environment, and in the daily routines of urban dwellers. We welcome contributions that critically examine the observed and potential role of accessibility, quality and frequency of people to engage with natural environments in cities, and how such interactions may play a role for the development of cognitive frames, affections and social memories about peoples relations to non-humans species, ecosystems and ultimately to the Biosphere.

We aim for a broad coverage of empirical cases and invite historians, architects, ecologists, geographers, anthropologists, sociologists and psychologists as well as other scholars to participate in the session and submit a paper proposal.

25123>Berlin's intercultural gardens: Urban landscapes of social-ecological memory

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Abstract

Efforts to achieve urban sustainability seek a viable intersection among economic, environmental, and social domains of life (Barlett 2005) and embrace a system perspective that highlights the interconnection of humans and the natural world (Folke and Berkes 1998), thus countering the separation of urban life from nature. Civic ecology practices, described as local environment stewardship actions for enhancing the green infrastructure and community well-being in urban systems (Tidball and Krasny 2007) are integral parts of these efforts. One prominent example of a civic ecology practice is urban community gardening – the management of public or semi-public green spaces by groups of volunteers.

People participating in these practices – so the argument goes – draw on their social-ecological memory (SE-memory), that is knowledge, experience, and practice about how to manage local ecosystems and their services (Barthel, Folke and Colding 2010). In this presentation, I want to discuss the components and implications of SE-memory. I aim to briefly address a theoretical aspect by raising often neglected dimensions of individual as opposed to collective memory, and, in particular, review the social implications of SE-memory, meaning the implications for its individual carriers themselves – in my case urban gardeners.

The presentation will centre on Berlin's intercultural gardens. These are urban community gardens where processes of SE-memory are particularly diverse and where I have conducted five months of empirical research, including intensive participant observations and in-depth interviews. My findings have shown that SE-memory processes involve expressions of individuality as well as community and comprise inter-locking streams of both individual and collective or social memory. These processes, I suggest, can play a pivotal role in the context of social urban sustainability. By closely interacting with plants and with people of different origin, reviving, modifying, and transmitting SE-memory can positively influence individuals' experience of sense of belonging, social inclusion, and commitment to cultural diversity in cities.

Design for urban places of reconnection with the biosphere

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The extinction of nature experiences in cities is a widespread phenomenon that strongly undermines the possibility of urban dwellers to directly perceive non-human life. Personal interaction with the biosphere is however crucial for the emergence of an affiliation for the biosphere and it is also a primal step towards intentional behaviors of nature conservation. Since the urban form is the decisive cause for the distribution of time in the urban landscape, the development of cognitive and emotional frames are subdue to the spatial configurations of the urban landscape. It is on the landscape that routines occur and it is the landscape that allows the premises for those routines to be established. This speech addresses the state of art of urban design, neurology, environment psychology and spatial analysis to discuss the intentional design of urban green spaces that support a reconnection with the biosphere. The speech covers the sensory interaction with space in relation to the creation of human places, how urban forms influence accessibility of urban spaces and consequently how they foster the mental construction of places of reconnection with the biosphere. The distribution of nature experiences in the urban landscape reflects the emergence of cognitive and emotional affiliation towards the biosphere. How humankind chooses to design the natural qualities of its most common habitat has the potential to favor the kind of emotional and cognitive attachment to nature that many scholars in the sustainability sciences are calling for.

The abstract is intended to be part of the session “The role of Spatial Experiences of Urban Nature in Re-connecting with the Biosphere”. The abstract and the related work could also be presented in other relevant sessions.

25159>Managing resistance and resilience of urban green space

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Urban green space (i.e. urban biodiversity and green infrastructure) provides multiple ecosystem services in areas of high population density. In these areas, resistance and resilience of green space to e.g. climatic extremes are thus of prime importance for the maintenance of ecosystem services. However, urban green space design and management is still mainly structured for traditional aesthetic and recreational purposes. Opportunities for programming for resistance and resilience are overlooked. Instead, it is assumed that design and management interventions can restore green space functionality if catastrophic loss occurs. Unfortunately, this lack of understanding of the importance of minimizing the necessity for such interventions can be costly. It can lead to significant resource shortages in the management of urban green space, with the consequence that this space cannot be used to its full potential. The overall aim of our project is to develop guidelines for the management of urban green spaces in Ireland which promote resilience. These guidelines will be based on a systems approach, where management decisions are conceptualized as interventions in a socio-ecological system. In order to prioritize action it will be recommended to develop an understanding of system dynamics both in terms of natural processes such as dispersal of organisms and water flow through the landscape, as well as in terms of the human usage and movement in green spaces. This basic understanding can then be used for the design and selection of management scenarios which can enhance resistance and resilience of urban green space. In our presentation we are going to look more in depth at the functionality of urban parks in Dublin City and how their functioning is interrelated with connectivity to the UNESCO Biosphere Reserve of North Bull Island. This is the only UNESCO Biosphere in the world which is entirely situated within a capital city and the Island was formed entirely as a consequence of human intervention through 19th Century construction of sea walls for navigation purposes. We will explore how urban parks can be managed at an ecosystem level to support core conservation zones of outstanding international ecological significance. We will also provide examples of how the community involvement in management of urban parks is changing and influencing traditional parks management to incorporate measures for conservation and resilience of ecosystem services.

25371>People's Perception of Natural Resources – Understanding Urban Ecological Resilience of Surface Watercourses in Medellín, Colombia

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In developing countries, the current urban planning focuses on the construction of necessary infrastructure in order to meet the community's basic needs (UN-HABITAT, 2012). However, the environment is often not taken into account by policymakers and planners, what has led to the deterioration of natural resources in the cities (Duh et al., 2008, Ernstson et al., 2010, and Romero & Qin, 2011). In the case of urban surface watercourses (USWC), there are two perspectives. On the one hand, a large proportion of the settlements next to the watercourses are marginal areas, where the USWC banks are invaded without planning. Additionally, the USWC are used as sewers, due to the absence of an adequate sewage system. On the other hand, invading the banks, channelling and covering the USWC are parts of some planned projects of both public and private, which are developed in both marginal and non-marginal areas. Using the concrete case of Medellín, Colombia, this article analyzes the perception of the USWCs by the population near to them, in order to understand the current trend of urban development and to recognize its role in managing a resilient social-ecological system. For this purpose, 1182 inhabitants from different social groups and communities, who live next to 10 USWCs of the Medellin city, were surveyed with a face-to-face interview format between April and May 2013. The survey included open and closed questions on the evaluation and use of the USWC and its surroundings, and on the possible improvement works in those areas. The water and ecological quality of the selected USWCs were also documented with physicochemical parameters and photo documentation. The data analysis is based on the analytical framework proposed by Ratner et al. (2013): initial context, action arena, patterns of interaction and outcomes. Results shows, peoples' perception on the resilience of a USWC varies according to social and political status of the communities. Particularly, it varies individual to individual, community to community. That is not a contradictory outcome to the scientific community of climate change adaptation science, but the methodology applied here shows its novelty and uniqueness for sustainable development planning in general.

24939>Incorporating Indicators of the Resilience of Water Bodies in an Urban Development Decision Support System

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Throughout the world cities have been founded next to streams, rivers and harbours, but urban development has resulted in the degradation of these water bodies. Contaminants discharged in urban stormwater runoff affect water quality and ecosystem health, with consequential impacts on the ways in which water bodies are used and valued by urban communities. This paper describes research in New Zealand to develop indicators of the resilience of urban water bodies to the effects of development. The context is a multi-disciplinary project to develop a decision support system (DSS) for assessing the impacts of alternative urban development scenarios on ecosystem services available from freshwater and estuarine waterbodies.

The research conceptualizes urban development and stormwater management as occurring within the setting of an ‘urban aquatic social-ecological system.' This (sub-)system is defined as comprising “those elements of an urban social-ecological system which influence the generation and consequences of stormwater-related changes to the provision of aquatic ecosystem services.” The system includes both natural elements, being the receiving water bodies that provide ecosystem services, and societal elements, which can be further divided into built and non-built elements. Built elements include the urban surfaces and infrastructure that generate, convey, control and deliver stormwater. Non-built elements include the governance frameworks and social capital that influence the form of urban development and stormwater management.

A pilot version of the DSS allows users to compare alternative future urban development scenarios by varying inputs representing land use change and stormwater management approaches. These inputs drive a set of models which predict changes to biophysical attributes such as water and sediment quality and indicators of ecosystem health in rivers and estuaries. These attributes are in turn used to assess changes in a range of supporting, provisioning, regulating and cultural ecosystem services, reported as indicators of environmental, economic, social and cultural well-being.

The further development of the DSS involves extending the existing reporting framework to incorporate indicators of resilience. Reflecting the restrictions of the system definition, the research is focusing on indicators of specified, rather than general, resilience. Resilience is defined as “the capacity of the natural and societal elements of an urban aquatic social-ecological system to provide the same, similar or a better level of aquatic ecosystem services in the face of the stormwater-related effects of urban development.” Accordingly, two sets of indicators are required: (1) those which reflect the capacity of natural elements, i.e. receiving water bodies, to provide ecosystem services; and (2), those which reflect the capacity of society to manage, adapt and potentially transform stormwater management to support or substitute for the provision of ecosystem services. Indicators of natural capacity are assessed through the trajectories of key biophysical variables, such as water and sediment quality, and their proximity to critical thresholds. Indicators of societal capacity are assessed through criteria such as diversity, redundancy and adaptability in stormwater management infrastructure and institutions. The current focus of the research is to develop the methods by which this resilience indicator framework can be operationalized within the DSS.

24645>Enhancing resilience and quality of life through the ecosystem services provided by urban community gardens. Case study of the municipality of Madrid, Spain.

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Urban gardens and other green urban areas can substantially contribute to enhance resilience and quality of life in cities through the generation of ecosystem services. These services include regulation services such as air purification, noise reduction, or habitat provision for biodiversity as well as diverse provisioning and cultural services. Over the last decade, but especially since the start of the economic crisis in Spain by 2008, urban community gardens have emerged in the municipality of Madrid driven by neighborhood organizations and several social movements. Most of the existing community gardens in Madrid are integrated in a network -- the Network of Urban community Gardens of Madrid -- which currently gathers more than 30 gardens. Urban community gardens have been also called urban green commons as they are dependent on a collective organization and management. In this study we examined the influence of these gardens on well-being and urban resilience through the characterization and valuation of the services generated and the management practices developed in them. For this aim we conducted from May 2012 to June 2013 semi-structured interviews and surveys to collect data from 20 community gardens and 162 informants. We chose a non-monetary approach for the valuation of ecosystem services through the use of a Likert scale. Results reveal 18 services generated by urban community gardens including provisioning, regulating and cultural services, being the latter the most abundant and better valued. These ecosystem services differ from other valuations performed in different agroecosystems, including different types of home gardens. Within the cultural services category among the better valued were the enjoyment associated to plant growing, socialization and environmental education/knowledge sharing. Within the regulating services maintenance of soil fertility, pollination and maintenance of local varieties were among the most valued. Finally, provisioning services related to food production were among the least valued. The results of this valuation are intimately related to the management practices developed in the gardens including direct democracy practices and agroecological management practices. The study highlights the ecological and social values of the gardens currently omitted in urban green areas management and planning. The links between ecosystem services and social-ecological resilience in cities are analyzed in the light of our results.

24216>Equitable urban ecologies: a study of contemporary Cape Town

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Urban green space is variably configured in response to social and economic drivers. This paper explores the ecology of the City of Cape Town, through a plant functional trait lens. Despite 20 years of democracy Cape Town's urban form still bares the hallmarks of an apartheid city with racial and economic segregation and associated inequality between neighbourhoods. The accompanying plant communities and ensuing ecologies have yet to be explored. In light of the current acknowledgement of the multiple benefits offered by green space to urban dwellers, a full understanding of the ecology of these diverse neighbourhoods is critical in terms of redress and reimagining the City in an equitable form. Plant functional traits have proved a useful means of interpreting landscape form and function, where structural diversity and specific suites of traits can be correlated with ecological rigour. The plant cover, composition, and associated functional traits, of green space were investigated along a social and economic gradient, within a single original vegetation type. Sites of investigation included urban gardens, conservation areas, public green space, and brown field sites. The findings are interpreted in light of neighbourhood social and demographic data, urban structure and form, as well as ecosystem services. Data are explored in light of current theory linking the adaptive capacity of neighbourhoods and ecological status, where undermined ecologies potentially present greater exposure to risk and shock.

23586>Size, Shape and Dispersion: Urban form evolution in Saigon River Basin and its impacts on hydrologic performance from 1990 to 2010

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Urban form evolution causes hydrologic effects. Therefore, an understanding of this critical relationship can provide planning and design solution to make communities more sensitive and resilient to flooding. While several studies have raised concerns on the impact of rapid and uncontrolled urbanization in Ho Chi Minh City on the rise of Saigon River's water level, none has tried to quantify the urbanization process at basin-scale and associate this spatial phenomenon with water upheaval. In addition, the search for a hydrologic-optimal urban form is critical for Ho Chi Minh City region given the low infiltration rate of soil and rapid urbanization so that minimizing impervious surface is a less relevant solution. Response to this research gap and base on landscape ecology approach, this paper provides an empirical study of urban form evolution in term of size [urbanized area], shape [compactness and fractal] and dispersion [aggregation] within 2503 sqkm of Saigon River Basin during a 20-year period of rapid urbanization. During this period, impervious surface increased by 4 and 8 times in the whole basin and in the flood-prone areas respectively while the population increased by 2 folds only. Urban development in the Basin also became less compact, more fractal but more aggregated. Using 5 landscape metrics and a hydrologic index demonstrating run-off coefficient, the author presents potential relationship between those form variables and the hydrologic performance of the Basin. The result of this paper highlights that a more compact and concentrated urban form for Saigon River Basin may result in lower flood risk for Ho Chi Minh city.