BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: B10d
Ecosystem Services in and Beyond Cities
Format: Hybrid
Hosts

	Name	Organisation	E-mail
Host	Tatiana Gadda	Federal University of Technology - Parana	tatianagadda@utfpr.edu.br

Abstract

Urban areas today host about 55% of the world´s population. The unprecedented level of resource consumption makes cities a major cause of disturbances in the environments which provides the ecosystem services cities depend upon. Despite of this, cities are not listed as a main driver of change to ecosystem services or are mistakenly associated solely to land use change. Cities, however, cannot be understood only by the area they take but should be captured in their integrity, including their ability to appropriate resources near and far. This should be an important step to have cities recognized as important instances to advance the agenda towards promoting ecosystem services.

Goals & Objectives

The goal is to collect a number of relevant works discussing the interlinkages between urban areas, biodiversity and ecosystem services in LAC that can help shed light at these Intricate connections. It also aims to promote a network of researchers interested in cities and ecosystem services.

Planned Output

The planned output of the session is a short report of the main points raised concerning urban areas and ecosystem services.

Session Format

Participants will present their work in a short format called PechaKucha, so that the session stimulates discussion. The PechaKucha 20x20 presentation format is a slide show of 20 images, each auto-advancing after 20 seconds. Participants have 400 seconds to tell their story, with visuals guiding the way. The session host will moderate the discussion. In total the session should not take more than an hour

Acceptance of voluntary contributions

Yes, I allow any abstract to be submitted to my session for review.

Relation to ESP Working Groups or National Networks

Biome Working Groups: BWG 10 – Urban systems.

II. SESSION PROGRAMME

Date of session: Thursday 9th November
Time of session: 11:00-12:30/14:00-15:30

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
11:10	Ewura Adwoa Adjeibea	Larbi	Department of Animal Biology and Conservation Science, University of Ghana Legon, Accra..	Thriving in a polluted system; macroinvertebrates as indicators of the quality of the Densu river in Ghana
11:30	Nicholas Nartey	Badger	Department of Animal Biology and Conservation Science, University of Ghana, Legon, Accra	Bacteria Water Quality of the Densu River in the Ga Municipality of Accra, Weija – Ghana
11:50	Ronald András	Kolcsár	. Norwegian Institute for Nature Research, Torgarden, P.O. 5685, 7485 Trondheim, Norway	Linking ecosystem condition to services in urban microclimate regulation – a critical interpretive synthesis
14:10	Kolawole Valere	SALAKO	Laboratoire de Biomathématiques et d'Estimations Forestières, Faculté des	Local perception of mangrove provisioning ecosystem services, and disservices and willingness to pay for their conservation: a

Time	First name	Surname	Organization	Title of presentation
			Sciences Agronomiques, Université d'Abomey-Calavi, 04 BP 1525	case study in Benin, West-Africa
14:30	Padmi	Ranasinghe	University of Texas at Arlington and UNU-CRIS	Ecosystem Services in Cities: Assessing New York City Bluebelt System with the UN Ecosystem Restoration Decade Mandate
14:50	Gonzalo	Pradilla	Leibniz University Hannover	Blue Infrastructure as a Multifunctional Space: Comparative Analysis of Ecosystem Services in Colombian City Master Plans
15:10	Taícia Helena	Negrin Marques	Facultad de Ciencias, Universidad Nacional Agraria La Molina	Identificación de servicios ecosistémicos urbanos utilizando la técnica del photovoice en estudiantes universitarios

III. ABSTRACTS

1. *Type of submission*:

B. Biome Working Group sessions / Sesiones del Grupo de trabajo sobre Biomas: B10d - Ecosystem Services in and Beyond Cities

Linking ecosystem condition to services in urban microclimate regulation – a critical interpretive synthesis

First author(s): Ronald András Kolcsár

Presenting author: Ronald András Kolcsár

Other author(s): Bálint Czúcz, Attila Novák, Márton Kiss

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Through their positive effects, such as air pollution removal, cooling, or recreational values, urban ecosystems can significantly enhance the quality of life in cities. While there is a large body of literature linking specific services (ES) of urban vegetation to their characteristics (ecosystem condition, EC), there are very few synthesis studies that could give an overview on the main EC-ES relationships. To analyze the links between urban vegetation (EC) and microclimate regulation (ES), we performed a qualitative systematic review (critical interpretive synthesis, CIS). We started out from an initial set of 10 "benchmark studies" which was designed so that it would cover a broad diversity of urban structures, relevant ES, geographical contexts, and academic traditions. Then we fine-tuned a search expression in Web of Science (WOS) so that it would efficiently capture all of the seminal studies with as few other articles as possible. We processed each paper in two phases: a title-abstract phase (checking eligibility) followed by a full-text phase, where detailed information about the studied ES and EC variables and their relationship were extracted in a structured way. After processing a sample there was a phase of synthesis, where we drew a "map" of relevant EC-ES relationships. For this we first identified meaningful "groupings" between the different concepts and variables, also documenting terminological, definitional and methodological conflicts down the way. After the synthesis we drew a next sample, processed the new papers, followed by a new synthesis phase. This was repeated until reaching a "theoretical saturation", when the new iteration did not bring any relevant changes to the "EC-ES map".

Being a work in progress study, the current presentation primarily focuses on the novelties of our methodology and on our first results. There is a need for further analyses in the research gaps identified (e.g. developing and testing ES indicators with strong well-being relevance). EC indicator selection for decision support has to take as many relevant aspects into account.

Keywords: urban vegetation, microclimate, ecosystem condition, ecosystem service, critical interpretive synthesis

2. *Type of submission*:

B. Biome Working Group sessions / Sesiones del Grupo de trabajo sobre Biomas: B10d - Ecosystem Services in and Beyond Cities

Local perception of mangrove provisioning ecosystem services, and disservices and willingness to pay for their conservation: a case study in Benin, West-Africa

First author(s): Kolawole Valere SALAKO

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Achieving long-term and sustainable mutual social-ecological resilience requires understanding human-nature interactions. Mangroves are costal ecosystems that provide multiple benefits to human-being. They are however among the most vulnerable and threatened ecosystems worldwide due to both anthropogenic activities and natural hazards. Impacts of anthropogenic activities on mangroves can efficiently be addressed with a better understanding of local people perceptions of their ecosystem services (ESs) and disservices and attitudes for their restoration and conservation. Using data from individual interviews (n=184) in three mangrove sites in Benin, we studied local perceptions of mangrove provisioning ESs and disservices, and willingness to pay (WTP) for mangroves conservation. Eleven provisioning ESs were mentioned. Fish, firewood and crab stood as the most important ESs, and the most collected for both domestic usage and commercialization. Gender, income generating activities and age played important roles in people perceived importance of provisioning ESs. Men showed positive attitude towards fish and crab, and women high appreciation towards salt, firewood, honey and straw. Informants practicing fishing were more appreciative of fish and shrimps, and those involved in firewood collection showing high saliency towards firewood, honey and shrimp. Most informants were willing to pay at least US$10 per year for mangrove conservation. Results further showed that informant WTP more was associated with high environmental sensitization experiences. Interestingly, proliferation of mosquitoes and barriers for fishing opportunities were perceived as mangrove disservices, and partly explained people WTP less. Collectively, our findings suggest that (i) socio-economic profile of local people are crucial in their sustainable involvement in mangrove conservation, (ii) environmental education/sensitization is needed to better engage local people in conservation activities,

and (iii) perceived mangrove disservices should be mitigated to ensure effective participation of local people in their conservation.

Keywords: Cultural valuation; firewood; gender; mangrove goods and services; social role.

3. *Type of submission*:

B. Biome Working Group sessions / Sesiones del Grupo de trabajo sobre Biomas: B10d - Ecosystem Services in and Beyond Cities

Thriving in a polluted system; macroinvertebrates as indicators of the quality of the Densu river in Ghana.

First author(s): Ewura Adwoa Adjeibea Larbi

Presenting author: Ewura Adwoa Adjeibea Larbi

Other author(s): Jones Kpakpa Quartey, Rosina Kyerematen, Francis Gbogbo Emmanuel R. Blankson

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Aquatic ecosystems are amongst the most diverse ecosystems globally. Despite the benefits associated with these ecosystems, they are also one of the most adversely impacted. In urban areas the situation is much worse. For instance, most backyard gardens located along the banks of freshwater bodies within urban spaces continually receive pollutants from surface runoffs. Similar patterns are observed along the Densu river in Ghana, an important source of potable water to the Accra Metropolis. Using benthic macroinvertebrates as bioindocators and the physico-chemical parameters of the waterbody, we investigated the ecological integrity of the Densu river. Data collection involved the use of a hand corer, a multiparameter water quality testing probe and laboratory identification of samples. The physico-chemical parameters of the water column measured include ph, temperature, salinity, dissolved oxygen, conductivity, turbidity and total dissolved solids. Our results presented Melanoides tuberculata , an invasive gastropod species as the most abundant, constituting 95% of all samples collected, with Gabbiella sp. and Ferrisia sp. making up 3% and 2% respectively. Generally, there was strong to moderate correlations between macroinvertebrate distribution and physico-chemical parameters (Spearman rank correlation, $-0.6 \leq rs \leq 0.8$). Melanoides tubercula showed a positive correlation with temperature, dissolved oxygen and turbidity. Based on international standards, the abundance of Melanoides and relationship with the parameters is indicative of pollution in the water. Gabbiella sp. and Ferrisia sp. identified in the samples raise public health concerns as these species serve as major intermediate hosts of infective trematodes.

Keywords: Macroinvertebrates, physico-chemical parameters, ecosystems services, Densu River, Ghana

4. *Type of submission*:

B. Biome Working Group sessions / Sesiones del Grupo de trabajo sobre Biomas: B10d - Ecosystem Services in and Beyond Cities

Ecosystem Services in Cities: Assessing New York City Bluebelt System with the UN Ecosystem Restoration Decade Mandate

First author(s): Padmi Ranasinghe

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Cities are considered the main drivers of change to ecosystem services and are often associated with land use changes. As such, cities are severely impacted by climate change impacts, including stormwater management. New York City's Bluebelt system integrates Nature-based Solutions (NbS) that integrate natural eco-hydrological processes to mitigate stormwater and Improve water management while enhancing ecosystems through restoration and conservation. Bluebelt provides multiple urban ecosystem services besides capturing and storing stormwater runoff, but it also increases water quality, air quality, public health, recreational places, and habitats for terrestrial and aquatic species and enhances urban biodiversity. Today, more than 400 acres of freshwater and riparian wetlands and 11 miles of stream corridors make up the NYC-Staten Island Bluebelt, which is further expanding, with the vision of preserving and enhancing natural stream corridors and wetlands at low cost, instead of hard/gray infrastructure. This approach incorporates many ecosystem restoration concepts, Nature-based Solutions guidelines, frameworks, and policies. Ecosystems around the world are in urgent need of restoration. As global governance pathways such as UN Ecosystem Decades gain attention, its goal is to assess and evaluate best practices and successful interventions. Using Bluebelt as a model, this study examines how it supports the restoration of ecosystems within urban areas and provides other environmental services. The study recognized Bluebelt as a significant prototype for NbS initiatives aimed at restoring ecosystems, enhancing stormwater management, and conserving the environment. The Bluebelt design interventions that fit the principles of restoration have the potential to be scaled up and match the Decade mandate at scale. Thus, stream corridor interventions may be scaled up to national or regional levels. This is a successful example for other urban areas across the world that ecosystem services and natural capital to build a sustainable future.

Keywords: Ecosystem services, restoration, NbS, Bluebelt, Cities

5. *Type of submission*:

B. Biome Working Group sessions / Sesiones del Grupo de trabajo sobre Biomas: B10d - Ecosystem Services in and Beyond Cities

Blue Infrastructure as a Multifunctional Space: Comparative Analysis of Ecosystem Services in Colombian City Master Plans

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Green and Blue Infrastructure (GBI) is crucial for urban resilience, well-being, biodiversity, and health. Integrating the Ecosystem Services (ES) framework can provide planners and citizens with a better understanding of the benefits and trade-offs associated to the management of GBI, thus enabling more sustainable land-use decisions. A content analysis was conducted on the Master Plans of seven Colombian cities, focusing on water-related elements such as rivers, wetlands, and sustainable drainage urban systems (SUDS). An iterative coding process was used to identify both explicit and implicit references to Provisioning, Regulation, and Cultural ES. The results show a high acceptance and incorporation of the ES paradigm in all assessed Master Plans, albeit varying in depth and scope. The cities of Medellin, Bogota, Cali, and Monteria lead the way with a more robust and wide-ranging utilization of ES. Notably, Cultural Services were the most recognized, surpassing Regulation and Provisioning Services in frequency. Recreation & public space provision, buffering of climatic hazards, contemplation & aesthetic experiences, hydrological cycle regulation, water provision, and habitat & connectivity maintenance were the highest-ranked ES. Rivers and wetlands are consistently recognized as significant ES sources, while the potential of SUDS is still in early stages. Interestingly, one of the middle-sized cities stands out for its comprehensive approach to articulating SUDS within the broader urban GBI network. Acceptance and incorporation of ES in Colombian local planning are widespread and higher than previously reported for the Latin-American region. Despite some limitations, the approach used provides an understanding of how the ES concept is being integrated into local plans by considering both explicit and implicit use. Furthermore, the results highlight the increasing recognition of Blue Infrastructure as a key multifunctional element in Colombian urban planning.

Keywords: green and blue infrastructure; ecosystem services; sustainable urban planning; Latin America and the Caribbean (LAC); land-use plans

6. *Type of submission*:

B. Biome Working Group sessions / Sesiones del Grupo de trabajo sobre Biomas: B10d - Ecosystem Services in and Beyond Cities

Bacteria Water Quality of the Densu River in the Ga Municipality of Accra, Weija – Ghana

First author(s): Nicholas Nartey Badger

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Other author(s): Juliet Ewool, Jones, Kpakpa Quartey

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The Densu River is one of the most important water resources in Ghana, due to the provisional, regulatory, support and cultural ecosystem services of this system. Notably, the Densu River hosts an important dam that serves treated potable water to the western part of Accra. Socio-economically, the river supports fishing, farming and salt winning activities. Despite the enormous value attached to this resource, anthropogenic activities have hugely impacted upon its ecological processes and as such, questioned its integrity. We therefore carried out a study on the bacterial quality of the water column and sediments within the catchment area of the river, having identified human, animal, and agricultural activities as the main sources of pollution. This was achieved through the measurement of physico-chemical parameters of the water and collection of both water and sediments samples from selected areas within the catchment of the river. From results, the water was generally basic (9.94-10.64) at temperatures between 29.15 to 31.29oC. Total Dissolved Solids were within acceptable ranges Dissolved Oxygen levels varied from 0.64 to 1.18 mg/L. Sediments were more diverse (15 species) with bacteria species than water samples (10 species). Proteus mirabilis species dominated the sediment with a prevalence of 13.33%, whereas Salmonella paratyphi A was the most abundant bacteria the water column with a prevalence of 28.18%. Despite being statistically non-significant, the isolated bacteria species showed varying correlations with the physic-chemical parameters. The presence of some bacteria species e.g. E. coli, Salmonella, Klebsiella, Shigella,Proteus spp, Vibro parahaemolyticus, etc in the two media, demonstrates the importance of public health concerns and as such calls for education and capacity building of users of this water resource.

Keywords: Bacteria, Densu river, Physicochemical parameters, Sediment, Water column

7. *Type of submission*:

B. Biome Working Group sessions / Sesiones del Grupo de trabajo sobre Biomas: B10d - Ecosystem Services in and Beyond Cities

ASSESSMENT OF WATER QUALITY AT THE KPONG HEADPOND USING MACROINVERTEBRATES AS INDICATORS

First author(s): Kelvin Tawiah Nai

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The impoundment of water bodies to form dams or reservoirs plays a critical role in sustaining the communities it traverses, serving purposes such as irrigation, hydroelectric power generation, industry, and domestic use. Anthropogenic influences have over the years impacted water quality leading to diverse disruptions in functional ecology of freshwater bodies. In this study, we assessed the water quality of the Kpong Headpond using macroinvertebrates as indicators and examining physicochemical parameters at nine sampling locations. Physicochemical parameters, including total dissolved solids (TDS), pH, and turbidity, were measured using standard procedures and compared to acceptable limits for drinking water. Benthic macroinvertebrates were sampled using a hand corer and sweep net, with identification performed using standard keys. A total of 212 macroinvertebrate individuals from eight orders and 24 families, belonging to the Phylum Mollusca and Arthropoda, were recorded, and identified. The dominance of macroinvertebrates followed the order: Gastropoda (72.6%), Insecta (25.5%), and Arachnida (7.07%). Correlational analysis between macroinvertebrate abundances and physicochemical parameters indicated moderate associations. The absence of pollution-sensitive taxa and the dominance of less sensitive taxa suggest pollution within the Head Pond. Consequently, monitoring and controlling anthropogenic activities in the area are essential to reduce pollution and improve water quality.

Keywords: Benthic macroinvertebrates, Environmental Impact Assessment, Water Quality, Sustainable Water Management, Anthropogenic Influences

8. *Type of submission*:

B. Biome Working Group sessions / Sesiones del Grupo de trabajo sobre Biomas: B10d - Ecosystem Services in and Beyond Cities

Identificación de servicios ecosistémicos urbanos utilizando la técnica del photovoice en estudiantes universitarios

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El reconocimiento de los servicios ecosistémicos urbanos asociados a las áreas verdes y al arbolado aún es una brecha de investigación en las ciudades peruanas. En los últimos años, el crecimiento poblacional urbano y el desarrollo de la infraestructura de las ciudades ha ocasionado el desplazamiento de un considerable porcentaje de áreas verdes, dejando de lado los servicios que estas ofrecen. Al respecto, muchos de los campus universitarios se convierten en refugios de vida silvestre por su extensión y la biodiversidad que albergan, tal es el caso de la Universidad Nacional Agraria La Molina en la ciudad de Lima. Sin embargo, no todas las comunidades universitarias están al tanto de la importancia de estas áreas para la generación de servicios ecosistémicos. En este sentido, el presente estudio aplicó de modo piloto una técnica descriptiva que usa el storytelling y las imágenes, como es el photovoice, para explorar cualitativamente la forma en la que los estudiantes universitarios perciben la biodiversidad y los servicios que ésta ofrece. A través de este método se han identificado descriptores de servicios ecosistémicos urbanos que serán esenciales para describir las diferentes clases de servicios y en el futuro medir su disponibilidad e impacto en las zonas urbanas. Para el estudio fueron recolectadas alrededor de 100 fotografías y narrativas de estudiantes de diferentes ciclos académicos. A partir de las cuáles se identificaron los descriptores de servicios ecosistémicos que fueron asociados y categorizados de acuerdo con el sistema CICES. Como resultado se logró reconocer que los espacios verdes del campus son valorados por los estudiantes universitarios como áreas proveedoras de servicios ecosistémicos, además se verificó que la técnica del photovoice es efectiva para un primer acercamiento a la identificación de servicios ecosistémicos urbanos.

Keywords: Servicios Ecosistémicos urbanos; Photovoice; refugios de vida silvestre; percepción de la biodiversidad; descriptores;