

Nature and Urban Wellbeing Conference

Ghent, May 19-20th 2015

ABSTRACTS AND INFORMATION ON SESSIONS AND PRESENTATIONS



Latvian Presidency
of the Council of the
European Union



Pre-conference training course on Concepts of Nature-Based Solutions, Mon May 18th (Augustinus Auditorium)

Hilde Eggermont, Belgian Biodiversity Platform (Royal Belgian Institute of Natural Sciences, OD Nature),
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Report on the outcomes of the 2014 BiodivERsA workshop on NBS: framing an emerging concept that may deeply influence future environmental research in Europe

[BiodivERsA](#) is a network of national organisations that program, fund and promote pan-European research that offers innovative opportunities for the conservation and sustainable management and use of biodiversity. Considering Nature-Based Solutions as a major emerging issue for the biodiversity research community, the network organised a two-day horizon scanning meeting in June 2014 to exchange views in the concept. During this presentation, we will shed light on the workshop outcomes to inform scientists, policy-makers and other stakeholders on its framing conditions, its added-value with respect to existing concepts, and perceived future challenges for research and management.

Tuesday May 19th

Plenary Session 1: *Scene-setting: Research and Innovation on Nature-Based Solutions* (Augustinus Auditorium)

Chairs: Maurice Hoffmann, INBO (ALTER-Net) and Kurt Vandenberghe, EC/DG-RTD, maurice.hoffmann@inbo.be,
kurt.vandenberghe@ec.europa.eu

- Opening remarks

Maurice Hoffmann, INBO, Chairman of ALTER-Net Council, maurice.hoffmann@inbo.be

Daiga Vilkaste, Director, Nature Protection Department, Latvian Ministry of Environ Protection and Regional Development,
daiga.vilkaste@varam.gov.lv

Kurt Vandenberghe, Director, Climate Action and Resource Efficiency, EC/DG-RTD, kurt.vandenberghe@ec.europa.eu

Pia Bucella, Director, Director, Natural Capital, EC/DG-ENV, pia.bucella@ec.europa.eu

- Xavier Le Roux, Project Coordinator, BiodivERsA, xavier.leroux@fondationbiodiversite.fr, xavier.leroux@hotmail.fr

European Research Area's contributions to Nature-Based Solutions

- Sybille van den Hove, MEDIAN; Institute of Environmental Science & Technology, University of Barcelona, Sybille@median-web.eu

Transformations towards Sustainability: the role of Nature-Based Solutions

Plenary Session 2: *Panel: Learning from cases of Nature-Based Solutions in urban contexts*

(Augustinus Auditorium)

Convener and moderator: Augustin Berghöfer, Dov Soc Sci, Helmholtz Centre for Environ Res (UFZ), The Economic of Ecosystems and Biodiversity (TEEB) for Local Policy, UFZ, Germany, augustin.berghoefer@ufz.de

Panelists

- Daniella Radice, City of Bristol, daniella.radice@bristol.gov.uk
- Gheorghe Falca, City of Arad, lbocancios@primariaarad.ro
- Pamela Mühlmann,ICLEI – Local Governments for Sustainability, pamela.muehlmann@iclei.org
- Heidi Wittmer, UFZ Department of Environmental Politics & Natural Capital Germany, heidi.wittmer@ufz.de
- Patrick ten Brink, Institute for European Environmental Policy, ptenbrink@ieep.eu
- Cecil Konijnendijk, Swedish Agricultural University & Coordinator, project 'Green Infrastructure and Urban Biodiversity for Sustainable Urban Development and the Green Economy' (GREEN SURGE), cecil.konijnendijk@slu.se

This panel discussion is about a cross-cutting issue, which is of relevance to various themes of the Conference: To what extent are supply of and demand for ecosystem service knowledge congruent? What can we learn from past experiences with knowledge transfer for better fitting ecosystem service analyses to actual information needs? While the consideration of ecosystem services has been widely recommended for diverse policy areas, including urban management and planning (e.g. in the TEEB Report for Local and Regional Policy Makers 2010), there is limited documented evidence that ecosystem service studies or assessments effectively support such tasks. In this panel we therefore want to explore the demand side for ecosystem service knowledge: What kind of knowledge has been found useful by practitioners? What can we learn from past knowledge transfer experiences for the design of ecosystem services studies? And which lessons can be drawn about managing an ecosystem service study process? While some issues may be in common with any kind of scientific policy advice, assessing ecosystem services also holds some peculiarities. The panel participants represent knowledge providers, knowledge brokers and knowledge users – each offering a distinct perspective on the questions above, and each drawing on years of practical experience about the issue. The *introductory talk* by Augustin Berghöfer will first point to paradigms which underlie many ecosystem service assessments and which characterize how these are thought to be supporting public decision making. Second, some lessons will be presented from past efforts to enhance the credibility and relevance of ecosystem service knowledge for policy change. The hypotheses drawn from this will serve as starting point for the panel discussion. *To whom is the session relevant and how?* Research interests and scientific procedures do not per se correspond with information needs of urban managers and effective policy advice. The session explores tensions between the supply and demand side of ecosystem service knowledge and is therefore of potential interest to researchers aiming at enhancing the practical relevance of their work.

Session 3/1: *Nature-based solutions should be socially inclusive*

(Augustinus Auditorium)

Conveners and chairs: Dagmar Haase (HU Berlin), Sigrun Kabisch (UFZ Leipzig), Germany, Dagmar.haase@ufz.de
sigrun.kabisch@ufz.de

The terminus of nature-based solutions (NBS) has been more frequently used in policy and policy-related literature and less in scientific publications, recently. So far, the terminus has still the restricted flavour of 'green technology and engineering'. To gain convincing societal impact, interdisciplinary approach to a broader systemic social-ecological way of thinking is necessary. NBS have to encompass complex urban systems beyond air cooling, green rooftops, or flood management by bio swales and pond systems. Particularly the social and environmental justice or equity dimension of cities and its linkage to NBS is missing.

Questions such as the following seek for answers and need to be included in a comprehensive concept of NBS:

- Who has access to and benefits from NBS?
- Can NBS contribute to more social justice in terms of fair distribution of recreational and housing green in cities?
- Does the spatial differentiated availability of NBS increase segregation and fragmentation of urban liveability?
- Are NBS an issue of individual affordance?

The session focuses on the social dimension of NBS with a clear focus on citizens and their expectations. The concept of NBS will be illuminated concerning aspects of human well-being across age classes, gender, income groups and lifestyles. Equity assets in terms of affordability of housing, accessibility to open and green space as well as fresh air, safety, education, socially

and environmentally friendly transport and other social issues associated with the city, are set against the new concept of NBS. Their mutual interdependence as well as obstacles and conflicts will be critically reflected. The session contributes to the three main objectives of the conference: (1) Provide a forum for dialogue across natural and social science research as well as across science and urban practice, (2) Evaluate conditions and options for urban wellbeing by NBS and (3) Build on previous work, knowledge and experience to develop innovations by a more comprehensive concept of NBS. In the session, the following contributions have been included. The session is not restricted to these contributions.

- [Dagmar Haase](#), Humboldt U Berlin; [Sigrun Kabisch](#), UFZ, Germany, Dagmar.haase@ufz.de, sigrun.kabisch@ufz.de

Introduction

- [Rik De Vreese](#), Vrije U Brussel, Human Ecol & Med Sociol Group, Belgium, rik.de.vreese@vub.ac.be

Social Landscape Indicators - a participatory approach to integrated assessment of ecosystem services

- [Nadja Kabisch](#), HU Berlin, iDiv & UFZ, Germany, nadja.kabisch@ufz.de

Green space accessibility as an indicator for environmental justice?

Urban green space availability and accessibility have been the focus of planning and research for quite a while. Some European cities provide per capita threshold values for urban green space or for minimum accessibility for a defined area. In this paper, we address the following research questions: Who has access to nature based solutions (NBS) in form of urban green spaces and; can NBS contribute to more social justice in terms of fair distribution of recreational green in cities? We use accessibility of urban green space as an indicator for socio-environmental justice, using both European land use data and population data for calculation of GIS models. Results for a sample of 290 European core cities are compared with a detailed analysis of two cities – Berlin and Lodz – at district level. The results of the calculation for the demand of urban green space show a heterogeneous picture across the EU. Southern European cities show below-average per capita urban green and accessibility values which is explained by low forest and tree cover in. The above-average values for green, forest and water areas in Northern European cities results from the biophysical conditions and the forest richness in general. Western European cities present a diverse picture. Some cities do have a very high share of urban green. Per capita values of Eastern European cities are below average but still represent a certain provision of urban green and forest areas for city residents. It can be concluded from the results that green space accessibility is always a matter of the data used, their resolution, how urban green space is defined and which threshold values are applied. Although European data provide a broad picture, it is not enough to assess environmental justice.

- [Annegret Haase](#), Dieter Rink, Dagmar Haase, UFZ & Humboldt U Berlin, Germany, annegret.haase@ufz.de

Synergies and trade-offs between land use, UES provision and quality of life in the context of urban shrinkage

- [Kerstin Krellenberg](#), Juliane Welz, UFZ, Germany, kerstin.krellenberg@ufz.de

Are nature-based solutions nothing else than adaption measures to climate change?

Session 3/2: Nature, urban health and wellbeing

(Room Hippo)

Organizer: Jana Verboom, Alterra, jana.verboom@wur.nl

- [Jana Verboom](#), Alterra, jana.verboom@wur.nl

Nature-Based Solutions to multi-faceted health problems in the ageing population: an interdisciplinary complex system approach

Our lifestyle is impacting on our physical, mental and social health and wellbeing; we appear to be caught in a negative socio-ecological spiral. The complex system theory offers a new way of looking at interconnected systems with critical transitions due to positive and negative feedback loops. I assume that (perceived) health is associated with all dimensions of human existence and that humans are constantly interacting with their environment. The balance between factors such as support, stress, strength and vulnerability is important for quality of life. I introduce a novel capacity-burden model for understanding the impacts of greening the environment on the quality of life of fragile elderly and their informal caregivers. Loneliness, social isolation, depression, forgetfulness and onset of dementia all occur in fragile elderly in urbanized neighborhoods. Because the symptoms

and issues are all connected in a network, greening the neighborhood can cause a cascade of positive effects in this web. At least three mechanisms play a role. (1) Stress reduction is one of the proven mechanisms in the investigation of nature and health; (2) Green environment stimulates exercise, exercise stimulates the operation of the brains (in particular, memory), and other bodily functions. Exercise also enhances a healthy body weight; moreover, fresh air and exposure to daylight help prevent insomnia. (3) Green environment promotes social cohesion. Social cohesion promotes health and wellbeing. We perform an intervention study (2015-18) to assess the impact of greening a neighborhood on quality of life in a population of fragile elderly.

- [Vitalija Povilaityte-Petri](#), Dept Therapeutic Chem Pharmacognosy, Univ Mons, vitalija.povilaityte-petri@hotmail.com

The increasing importance of aromatic and medicinal plants for the well-being of modern urban communities

Medicinal and aromatic plants (MAPs) have played an important role in humans' lives for centuries. Some knowledge and interest in MAPs have been lost during periods of intensive industrialization and urbanization, but can be regained in our modern society. Besides well-established applications of medicinal plants as sources of herbal medicines, MAPs can serve in many different ways to improve the well-being of urban communities. Belgian practices, based on medieval traditions, can be presented as a good example for other European countries on how to bring nature closer to the citizens and thereby improving the well-being of urban communities. MAPs are largely used for *urban greening*, such as small private city gardens, collective gardens, school yards, nature playgrounds, public green places, nature and culture centres, educational city farms, university, museum or botanical gardens, libraries or parks. Some of those places are multifunctional. Private gardens of MAPs can serve as source of edible plants and spaces for relaxation, physical activity or gathering; school gardens as outdoor spaces for the pupils to play as well as tools for an integrated education system; nature and culture centres as life-long learning places to explore ethnobotanical knowledge or use of MAPs for modern interior designs; medicinal plants gardens as museums bring together history, folkloric traditions and modern knowledge about MAPs. The mentioned spaces, being relatively accessible to a large number of people, can host various community events and *promote local urban greening projects* (urban planning, access to the urban land, energy efficiency projects etc.). A number of projects are being developed around the cultivation of MAPs to create working places for *disadvantaged members of our society (disabled, unemployed)*, aiming to develop their new professional skills, improve their integration and at the same time use the settings rich in MAPs for eco-therapy. The benefits of some of the described initiatives can be difficult to quantify directly, but there is no doubt that they already contribute significantly to the well-being of modern urban communities. However the lack of similar centres in the most densely populated urban areas remains a problem and distribution of information to the citizens about those activities is an issue. Discussed issues are related to: Nature-Based Solutions to diseases and pandemics; green care and eco-therapy; Nature-Based Solutions for economy and employment; education and information about nature-based solutions; citizen engagement in Nature-Based Solutions; sustainable urban lifestyles and behaviors; nature-based culture and social diversity

- [Magdalena van den Berg](#), Dept Public & Occupat Health, EMGO Inst Health and Care Res, Vrije Univ Med Center, Amsterdam, mm.vandenbergh@vumc.nl

Visiting green space is associated with mental health: a cross-sectional study in four European cities

Despite the large number of epidemiological studies that have found that people living in environments with more green space reported higher physical and mental health than those with less green space, only few studies have investigated the association between purposeful visiting green spaces and mental health. This study investigated the association between the duration of visiting green spaces and the following mental health indices: (1) perceived mental health and (2) perceived vitality. In addition, it was examined whether these relationships differ between four European cities and to what extent gender, age and level of education, and attitude and childhood experience moderate these relationships. Data were used from a questionnaire conducted in the EU-project PHENOTYPE in four cities in Europe: Barcelona (Spain; n= 1014); Kaunas (Lithuania; n = 876); Doetinchem (the Netherlands; n = 831) and Stoke-on-Trent (UK; n = 1027). The combined study sample consisted of 3748 participants. Linear multilevel analyses showed significant positive effects of visiting green space on both outcomes for all four cities combined, as well as for all four European cities analyzed separately. The associations were modified by level of education and time-spent in nature during childhood. No indications were found that age, gender and attitude towards green space were significant effect modifiers. The robustness of the findings indicates that the relationships seem almost independent of different cultural and climatic contexts. The current study support the view that green space should be actual used by purposeful visits to provide mental health benefits.

- [Sjerp de Vries](#), Martin Goossen & Tineke de Boer, Alterra, sjerp.devries@wur.nl

Peace and quiet please! Effects of visitor density on stress reduction by visiting natural areas

Epidemiological studies have shown that mental health is related to the amount of nearby green space. Experimental studies support that contact with nature improves stress reduction. However, the presence of others may influence how relaxing a visit is. Moreover, (anticipated) crowding may keep people from visiting a natural area to begin with. We investigated the relationships between visitor density, perceived crowding and attractiveness as a setting for recreational walks in an experiment (N = 1870) with three factors: visitor density (four levels), type of area (urban park, forest, river foreland), recreation motive

(peace & quiet, socializing with family & friends). Perceived crowding increased with visitor density, and more so if the motive was experiencing peace and quiet. Attractiveness of the area decreased with perceived crowding, especially for experiencing peace and quiet. Moreover, many participants reported that in real-life (anticipated) crowding frequently affected them negatively. Those living in strongly urban municipalities in the West of the Netherlands went considerably less often for a walk in a green environment than those living in other parts of the Netherlands. This region (Randstad) suffers from large shortages in nearby opportunities for recreational walks in a natural setting. Secondary analysis of diary data showed that people living in a neighbourhood with a large shortage generate 20% fewer walks a year than people living in a neighbourhood with no shortage. Conclusion: planning of nature for human health should perhaps not only look at absolute amounts of nearby nature, but also at amounts of nature per capita.

Session 3/3. Waterscapes, blue infrastructure and urban health

(Room Monica)

Organizer: Jochen Hack, Tech Univ Darmstadt, hack@ihwb.tu-darmstadt.de

- Jochen Hack, Tech Univ Darmstadt, Inst Hydraul & Water Resources Eng, Section Eng Hydrol & Water Mgmt, hack@ihwb.tu-darmstadt.de

Improving ecohydrological functions of urban areas and urban streams – Extending immission-based approaches to an ecosystem services perspective

The talk deals with the interaction of urban drainage systems and receiving water bodies of storm water effluents. It introduces and discusses two possible approaches of Nature-Based Solutions (NBS) to improve ecological functions of urban areas: 1. Reduction of runoff from rainfall excess through nature-oriented urban infiltration, storage and evapotranspiration strategies; 2. Improving urban water bodies' ecohydrological capacity to buffer and filter pollution from combined sewer overflows. These approaches are considered from an immission-oriented viewpoint. This viewpoint is extended towards an ecosystem services approach considering not only the effect on receiving ecosystems (e.g. an urban stream) but also the effect on ecosystem service provision. The talk presents ideas, case study examples and on-going work. It aims at initiating a discussion on improving ecohydrological functions of urban areas and water bodies. It addresses practical design issues as well as policy instruments to highlight the variety of on- and off-site benefits (ecosystem services) from ecohydrological improvements. I consider this talk relevant for: researchers from civil and environmental engineering, urban planning and ecology disciplines; policymakers and authorities at local and regional levels of governance; planners and designers of urban spaces. The ideas and examples presented in the talk facilitate practical solutions to improve the ecohydrological functioning of urban areas and their infrastructure. It provides guidance for extending the immission-based approach to environmental protection towards an ecosystem services approach.

- Sophie Moinier, Deltares: sophie.moinier@deltares.nl

The implementation of Nature Based Solutions in delta cities

This presentation provides lessons learned for the design of Nature Based Solutions (NBS) in delta cities. We will focus on the implementation process of NBS in the city of Dordrecht; the solutions will be implemented in the second half of 2015. The project is being conducted as part of a program that has four goals: stimulating ecology, improving the efficiency & multi-functionality of NBS, creating added value for society (e.g. by climate adaptation and/or by increasing water safety) and enhancing implementation of NBS. NBS in urban areas potentially have a high added value for both society and ecology. Implementation of NBS in urban areas comes with specific opportunities and challenges related to stakeholders, finances, available space, accessibility, visibility and acceptance of naturalness. The project area in the city of Dordrecht is a former industrial area that is currently being redeveloped. The design process is currently finished and the result includes small-scale, intermediate solutions between hard en soft engineering. Small-scale solutions can contribute to a network with other solutions, thereby providing extra benefits for both nature and society that account at larger scales. During the implementation process, we experienced how to deal with specific urban issues when it comes to the acceptance of naturalness and the creation of added value for society and ecology of NBS. We investigated the opportunities for ecology by performing, for the first time, thoroughly ecological research.

- *Taylor Tyger*, Fulbright scholar, Aalto Univ Helsinki & SYKE, tyger24@gmail.com

Using PPGIS to map cultural ecosystem services related to blue infrastructure in the Helsinki Metro Area: Methods, collaboration, outcomes and implementation

This talk will present the methods, outcomes, and use of the data collected using a PPGIS (Public Participation Geographic Information System) survey of Helsinki Metropolitan residents in 2014. The online, interactive, map-based survey was created to collect experiential, place-based information from residents about valuable urban aquatic environments. The researchers collaborated with planners and management officials throughout the process to ensure the practicality of the project. This project was carried out as part of an ongoing national project in Finland titled "Environmental justice and ecosystem services: Access, equity and participation in the use and management of aquatic environments in the Helsinki region (ENJUSTESS)." This talk will describe the data collection, analysis (of qualitative data and more than 27,000 mapped points from 2,121 survey respondents), findings, collaboration with planners and management officials, and implementation of the produced data. In particular, the talk will focus on the locations of clusters of mapped destinations, where visitors come from (to understand if it is a local or more regional destination), modes of transportation to the clusters, what type of activities visitors engage in at the clusters, what type of waterfront features characterize the clusters, future wishes for Helsinki's waterfronts, and potential usage conflicts. By presenting a relatively new public participation method for community feedback about urban blue infrastructure and describing the practical use of the collected data, this talk will be relevant for researchers and practitioners interested in public participation methods, spatial analysis, blue infrastructure, cultural ecosystem services, and connections between research and practice.

- *Timo Assmuth*, Jari Lyytimäki, Finnish Environ Inst (SYKE); Antti Simola, Government Inst Econ Res (VATT); Tarja Pitkänen, Natl Inst Health & Welfare (THL); Timo Huttula, SYKE, timo.assmuth@ymparisto.fi

Combining green, blue and grey infra for health: Nature-based urban drinking water production by Managed Aquifer Recharge

This talk build and expands on the poster describing health risk-benefit analytical approaches to a case of Managed Aquifer Recharge with river water, to discuss general issues relevant for evaluation and application of nature-based solutions specifically within urban and regional water supply projects but even in other comparable settings. These include the following interrelated key issues: 1) Transitions to sustainability through the path dependence due to the need to use traditional solutions; 2) Circular economy as related to cycling of water and contaminants; 3) Possibilities and limits of natural attenuation of contaminants, as constraints for nature-based treatment systems; 4) Risks and benefits of alternative water provision options, and the distribution of risks and benefits across populations and in time, 5) variable perceptions of risks and benefits; 6) Integrated governance across geographical scales (facility, local, basin and regional), with particular reference to the resolution of conflicting interests.

Session 3/4: Re-naturing citizens: Public engagement and social learning for empowerment

(Room Nicolaas)

Conveners: *Jiska van Dijk*¹ (Jiska.van.dijk@nina.no), *Bela Györgyi*² (bela.gyorgyi@essrq.hu) and *Thomas Beery*³ (thomas.beery@hkr.se), with *Hans Keune*⁴ and *Karren Fabri*⁵; ¹Norwegian Inst Nature Res; ²AHIA team coordinator of ALTER-Net and Environ Soc Sci Res Group, Hungary; ³Kristianstad Univ; ⁴Belgian Biodiversity Platform and Res Inst for Nature & Forest (INBO); ⁵EC/DG Research (Policy Officer, Responsible Research and Innovation Unit)

Organizer and chair: *Jiska van Dijk*, Norwegian Inst Nature Res (NINA)

Nature Based Solutions (NBS) is a practice and solution oriented approach to major societal challenges. NBS highlights the importance of involving a diversity of actors. It is about how should we work with nature, and maintain natural processes. NBS are often referred to as solutions to the effects of climate change to society (i.e. climate change adaptation, mitigation) based on what nature can give us. The reason to focus on NBS may open several doors varying to more marked based use of nature, technological innovations based on nature's premises and bringing human more or again in contact with nature. It is especially the (re)establishment of the relationship between human and nature (see IUCN ref – still to include) the session would like to address. Enhancement and reestablishment of our relationship with nature may in turn enhance nature conservation and sustainable use of natural resources because nature is acknowledged, because human are acquainted with nature and because we may build up a form of (re)ownership to nature. During especially the past few decades several initiatives to involve local communities in so called 'green projects (i.e. varying from building and maintaining green roofs, urban agricultural sites, citizen science projects, learning societies among others) have emerged. Mainstreaming of Public Engagement in Science, Research and Innovation is also emphasised by European Union's Framework Programme for Research and Innovation, Horizon 2020. During the session, we'll focus on how participatory processes and citizen engagement could support the

creation and implementation of NBS in practice. Historical perspectives, foundation and initiating collaborative processes, new governance practices and structures for NB solution projects and for biodiversity science will be addressed.

Aim of the session and added value: To present how participatory processes could support the creation and implementation of NBS in practice and how collaborative science (responsible research) can foster advancement in social innovation to development of collective solutions to 'glocal' challenge of biodiversity. What would be the role of mutual learning in the creation of NBS and how may in-group structures, governance and spatial variables explain sustainable participatory processes and citizen engagement? The session will give some good examples of existing participatory processes in nature-based solution trajectories. With the active contribution of both keynote speakers and the participants of the session emerging issues and research priorities will be collaboratively defined. Because the NBS is a relative new concept setting emerging issues and research priorities with regard to successful citizen engagement helps us further in societal transformation processes toward a more sustainable society including and securing development, growth and human wellbeing.

The setup of the session will depend on the presentations (keynotes and additional contributions from individual researchers approved by the organizing committee) and on the number of (expected) participants. The organizers will either reserve time (5-10 minutes) after each presentation (15 minutes per presentation) for an active contribution in plenum or there will be made a reservation of an hour in which a carousel-type of work will be arranged and participants will be active in group-work.

- [Györgyi Bela](#), Env Soc Sci Res Group/HU, bela.gyorgyi@essrg.hu

Citizen science, social learning, transforming expertise

- [Thomas Beery](#), Kristianstad Univ, thomas.beery@hkr.se

Outdoor recreation and biodiversity conservation

- [Hans Keune](#), INBO, [Uta Wehn](#), UNESCO-IHE Inst Water Educ, hans.keune@inbo.be, u.wehn@unesco-ihe.org

Citizen observatories focusing on engagement and empowerment aspects

- [Lina Kusaitė](#), Freelancer, BE, linakusaite@gmail.com

Brussels school eco-art education project - "Plant Kingdom": Edible gardening - the tool that unites nature and community

Today the gap between the nature and mankind has grown too great. Even so, while this global problem is huge, most of the solutions available to us are local, personal and empowering. Inspired by and being a part of rising culture of urban gardening - from rooftop gardens to personal green activities, often instigated by artistic initiatives – this project is looking in to how different collaborative design methodologies can bridge that gap. The world we are building today, is the one where children will live-in. Many children by growing in densely, populated, urban environments, find it increasingly difficult to connect lives of plants and animals within their own daily routines. During the talk I will share my vision, results and still ongoing *Plant Kingdom* project that I am initiating within Belgium schools already for 3 years. Plant Kingdom is a systematically designed series of workshops for children that give an opportunity to create a playful space, as a living laboratory, that provides a rich context to explore: art, science, language and many more. This project aims connect and foster children's creativity and openness, that will gives the opportunities to imagine and create their own futures.

Session 3/5: Biodiversity and businesses: winning partners

(Room Carthago)

Convener: *Johan Lammerant, Business Development Manager, ARCADIS Belgium nv, j.lammerant@arcadisbelgium.be*

Organizers and moderators: *Johann Lammerant and Hans van Gossum, ARCADIS, Belgium*

Business and ecosystems are linked. All businesses affect ecosystems (e.g. land use) and rely on the ecosystem services they provide (e.g. freshwater, fiber and flood control). However, 60% of the world's ecosystem services have been degraded over the past 50 years. This scale of loss is clearly material to businesses. In addition, public authorities make efforts to stop the further loss of biodiversity and to restore ecosystems. However, they only have limited funds available for realizing these aims. By showing businesses the benefits nature-based solutions can provide to business profitability we believe there is much perspective for lowering the negative impacts on biodiversity. We suggest key note presentations and a moderated discussion. For the key notes we will attract speakers representing various perspectives on how to link biodiversity to businesses. We aim

at speakers representing business, public authorities, NGOs and research/consultancy. For the discussion we aim at predefined questions or statements on how to motivate businesses to include biodiversity in business strategies and decision making.

- Johan Lammerant, ARCADIS, Be & World Business Council on Sust Dev, j.lammerant@arcadisbelgium.be

WBCSD initiatives on businesses and natural capital

- Hans Van Gossum, ARCADIS

Biodiversity solutions at an industrial site: a case example with Nike

- Debora de Block, Wageningen U, The Netherlands, debora.deblock@wur.nl

Opportunities for entrepreneurs in Ecosystem-based Adaptation

Private sector parties, and more specifically, entrepreneurs, are an increasingly important actor group in the ecosystem-based adaptation (EbA) arena. This presentation addresses the results of a research about opportunities for entrepreneurs involved in European EbA projects. Firstly, a conceptual framework about the opportunity development process, building upon insights from entrepreneurship and political science literature, is introduced. Secondly, the role of entrepreneurs and the processes of opportunity discovery and creation are illustrated based on case study research of 16 EbA initiatives in the Netherlands, the UK and Spain. The findings show that opportunities in EbA are generally discovered, suggesting that entrepreneurs make use of existing resources to develop and implement their ideas. Creation of opportunities, where entrepreneurs are actively involved in acquiring means, are willing to take risks and build relationships with actors outside of the project realm, is currently less prevalent in EbA. With the increasing evidence that substantial additional efforts are needed to adapt to climate change, there is more need for entrepreneurs involved in a creative process in search for EbA options. This presentation contributes to the scientific knowledge base about opportunities in (ecosystem-based) adaptation. Furthermore, it offers insights for policy makers and practitioners about the role of a relatively new actor group contributing to EbA. Conference themes: Ecosystem-based adaptation, Nature-based solutions for economy and employment

- Natuurpunt

A story on good practice examples of business & biodiversity in Flanders

- Jolanda Van Schaick, CREM BV, j.vanschaick@crem.nl

Working with nature in the business value chain

- Miguel Bugalho, Biodiversity Adviser, WWF Mediterranean Program and Univ Lisbon, migbugalho@isa.utl.pt

Engaging business in conservation: a case of Payment for Ecosystems Services in a Mediterranean oak woodland

Session 3/6. Nature-based solutions for risk management and ecological restoration

(Room Amiticia)

Organizer and chair: David Manning, Newcastle Univ, David.Manning@newcastle.ac.uk

- David Manning, Mark Goddard, Ben Kolosz and Ehsan Jorat, , School of Civil Eng & Geosci, Newcastle Univ/SUCCESS project, David.Manning@newcastle.ac.uk

Carbon capture gardens: Managing urban soils for the provision of multiple ecosystem services

Urban soils are often affected by human activity, which influences their composition as well as the ecosystems that they support. Where they contain material derived from demolition (e.g. concrete dust and lime), this can react with dissolved carbonate to form calcium carbonate (calcite) precipitates. We have found that such pedogenic carbonates occur widely in urban soils, to depths beyond 1m, and that the carbon within them is either derived from photosynthesis or chemical reaction at high pH, rather than being remobilized fossil carbon. Measured amounts of carbon in this form (i.e. inorganic carbon; up to 80 t C ha⁻¹) are similar to organic carbon contents typical of agricultural land (approx. 85 t C ha⁻¹), and measured accumulation rates are much higher (22 t C ha⁻¹ a⁻¹ compared with 3.63 t C ha⁻¹ a⁻¹). The carbonation of materials derived from demolition reduces soil pH from 10-11 to around 8 or less. Its net effect on carbon budgets is to close an emission loop, given that the manufacture of the construction materials involves removal of CO₂ from carbonate raw materials. However, carbonation in soils of calcium silicate rocks also occurs, with a net carbon benefit. Observations on artificial soils prepared from dolerite and compost show the formation of calcite with ¹³C data indicating that carbon was derived from the compost. Carbonation is one of a number of

ecosystem services that can be included in the multifunctional design of urban soils, and leads to the concept of 'Carbon Capture Gardens' that are specifically intended to include carbonation as part of a suite of ecosystem services that also include biodiversity conservation, flood regulation and cultural services. If demolition-derived materials occur, it is desirable to optimize their reaction to form calcite as a way of compensating for the carbon cost of their manufacture, as well as to reduce pH. Alternatively, crushed dolerite and other calcium silicate-bearing rocks can be added to soil to enhance carbon capture, without the pH increase (albeit temporary) associated with the addition of construction materials, stabilizing carbon released from organic matter as it is mineralized. Engineering soils in this way appears to be an important management tool for mitigating climate change and providing other ecosystem services in urban environments.

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Developing urban adaptation strategies using ecosystem-based approaches: The case of three pilot cities in the Czech Republic

Climate change presents one of the most important drivers influencing natural ecosystems, biodiversity as well as socio-ecological systems. Ecosystem-based approaches to adaptation (EBA) have been recently put forward as a useful approach to buffering the impacts of climate change while sustaining ecosystems and biodiversity (Jones et al. 2012). Although, current adaptation strategies tend to focus more on technical, structural, social and economic developments, ecosystems and biodiversity can play a significant role in societal adaptation to climate change. Ecosystem-based approaches to adaptations, utilization of green and blue infrastructure can substantially increase resilience of urban areas. At the same time, these approaches provide a wide range of benefits, such as reducing the flood risk and soil erosion, improved water and air quality, biodiversity enhancement, noise reduction or mitigation of urban heat island effect. In this presentation we aim to present outcomes of the on-going work of UrbanAdapt project (Development of urban adaptation strategies using ecosystem-based approaches to adaptation). UrbanAdapt project aims to initiate and further develop the process of preparation urban adaptation strategies in the pilot areas of three large cities in the Czech Republic - Prague, Brno and Pilsen. The project aims to design and evaluate suitable adaptation measures in the selected cities, while taking into account ecosystem-based approaches to adaptation. In order to involve a broad variety of stakeholders, participatory scenario workshops are organized in the pilot cities. This presentation aims to summarize and reflect on use of participatory methods in developing urban adaptation strategies that aims to mainstream ecosystem-based approaches. *References:* Jones HP, Hole DG, Zavaleta ES. 2012. Harnessing nature to help people adapt to climate change. *Nature Climate Change*, 2, 504-509.

- [Katalin Török](#), Anikó Csecserits, Melinda Halassy, Anna Kövendi-Jakó, Imelda Somodi, *Hu Acad Sci C Ecol Res*; Péter Dezsényi, Deep Forest Ltd., Budapest, torok.katalin@okologia.mta.hu

Reconstruction of native habitat in urban industrial area: the Nyíregyháza LEGO project

The new LEGO factory in Nyíregyháza, East-Hungary decided to be the greenest factory in many ways, including the enhancement of biodiversity and the use of nature based solutions to develop green space. The long-term target is to reconstruct self-sustaining, native vegetation at the outer areas of the factory. Scientific evidence was used to decide on the habitat type by applying the potential natural vegetation model estimates. By also taking into account the requirements of the factory, we have chosen to reconstruct a mosaic of open steppe oak forest and grasslands. With an extent of only 290 ha, the open steppe oak forest is one of the most vulnerable communities in Hungary. Aiming to reconstruct 26.5 ha of wildlife, the LEGO project makes a considerable step to harmonize economic development with nature. It is also a great opportunity for outreach as the factory is visited by groups, mostly children. We test the following methods for grassland creation: 1) sowing nurse crops; 2) spreading hay originating from semi-natural grasslands; 3) sowing commercially purchased and 4) collected seeds. The seeds of two fescue species and more than 50 broadleaf species could be purchased for sowing. Forest stands of irregular shape and varying sizes (300 to 3000 m²) were planted in 2014 including eleven tree species and eleven shrub species. Trees were planted with or without mycorrhizae containing root dip. The presentation will focus on the design of experiments and ideas of further use of the model in other industrial/urban environments. The talk could be relevant to developers, researchers and educationalists.

- [Sabine Bouché-Pillon](#), Sébastien Bonthoux, *Ecol Nat Paysage/INSA & CITERES*; Marion Brun, CNRS & CITERES; Francesca Di Pietro, Univ Rabelais, CNRS & CITERES, s.bouche-pillon@ensnp.fr

Urban wasteland trajectories: Forms and informal uses

The continual transformation of cities produces temporarily vacant spaces: urban wastelands and derelict areas. These spaces represent trajectories of mutation which vary according to economic, political, environmental, social and heritage issues at play (Ambrosino & Andres, 2008; Németh & Langhorst 2014). The interim forms differ according to the initial functions and the urban context. These vacant spaces can be the centre of socio-ecological processes offering alternatives to formal urban green spaces (Rupprecht & Byrne, 2014; Unt et al, 2014). In particular, these abandoned green areas, i.e. those providing recolonization dynamics through plant communities, represent a diversity of habitats with a real potential to maintain biodiversity

in cities despite their fragmentation in the urban matrix (Bonthoux et al 2014). What are the temporary usages, what forms of transitory landscape contribute to the urban green infrastructure and what will be the potential benefits to urban dwellers? Part of an interdisciplinary research project, our study aimed to evaluate the contribution of urban wastelands as a biodiversity reservoir in creating additional green infrastructures to other urban green spaces. In this context, past and present urban ecological and landscape dynamics were studied in the cities of Blois and Tours (France) in 76 and 103 abandoned areas, respectively. Nine of the wastelands were selected in each city from the general sample and analyzed spatially to cross reference landscape, ecology and land tenure features with the types of transitory use identified. The transitional phase of the green urban wastelands was investigated and discussed from the perspective of potential temporary usages and, more generally, from the perspective of urban landscape adaptability in relation to the alternative resources. Key words: Urban wastelands; urban biodiversity; informal uses; green infrastructure. *References* : Ambrosino C, Andres L., 2008. Friches en ville: du temps de veille aux politiques de l'espace [Urban wastelands: from the stand-by time to the space policies]. *Espaces et Sociétés*, 134, 37-51; Bonthoux S, Brun M, Di Pietro F, Greulich S, Bouché-Pillon S. 2014. How can wastelands promote biodiversity in cities? A review. *Landscape and Urban Planning*, 132, 79–88; Németh J, Langhorst J. 2014. Rethinking urban transformation: Temporary uses for vacant land. *Cities*, 40, 143–150; Rupprecht C, Byrne J. 2014. Informal urban greenspace: A typology and trilingual systematic review of its role for urban residents and trends in the literature. *Urban Forestry & Urban Greening*, 13 (4), 597–611; Unt AL, Travlou P, Bell S. 2013. Blank Space: Exploring the sublime qualities of urban wilderness at the former fishing harbour in Tallinn, Estonia. *Landscape Research*, 39 (3), 267–286.

Session 3/7: Invitation to discover the inside of sustainability

(Library)

Convener: Tim Horsten, www.innergie.nl, tim@hoe-advies.nl.

Possible presenters: Christel Bassing, Monique Links, Hans Bassing, Hans Smith, Tim Horsten

Goal: the inner approach explained. What is the added value of exploring individual drivers and talents with regard to a mutual and challenging goal of human wellbeing?

Take-away: participants will experience practical tools to discover and strengthen the symbiosis between their internal nature and external project goals and ways of applying them. It will enable them achieving better sustainable results faster.

Contents: The session consists of three parts: a) provisions for insights, b) gamification, c) exchange of best practice.

This topic can be initiated by a talk followed by a work session. The talk would be introductory to the session in which we share, execute and discuss following approach.

One challenge of this age is finding ways to accelerate sustainable behavior of individuals in everyday life, as civilians, consumers and employees. Connecting people's personal drivers and addressing their intrinsic motivations for sustainability, seems critical in achieving that. Interpreting sustainability and agreeing to achievable performance goals, is another. We would love to share and test our belief that by joining these two we create a strong and innovative lever in reaching the ultimate goal of human wellbeing.

Starting from a development-cycle and five natural elements we lead individuals to re-discover their own tendencies and by doing this, connect to their own internal nature. An impactful experience since it is not frequently exercised by many. Preferably this is performed outside being physically in nature, stimulating other senses and adding to the learning effect. Meanwhile the notion of a connection between internal and external nature is growing. It simultaneously puts sustainability and the roles individuals play in a different longer term perspective, an understanding that everything is connected.

Followed by a best-practice encounter and subsequent joined determination of relevant sustainability goals, as a municipality, organization or society will produce a strong and actionable roadmap that is much easier to accomplish. The above approach has so far been a joined effort between Innergie and Eneco.

The session is relevant to anyone that needs to stimulate others in reaching predetermined collective goals in the area of health and wellbeing. Middle & Senior Management and Director level.

We hope to create better insights in and make available the instruments for NBS for economy and employment, i.e. right people in the right position creating the motivation to contribute to common goals. In turn this improves the health, happiness and general wellbeing of the (professional) population. We hope to inspire attendants, stimulate sustainable behavior, engage, inform and educate about NBS. Indirectly this will increase people's appreciation for ecological value and help reduce environmental and social footprints.

Poster theme 4/1: *Biodiversity and ecosystem science for Nature Based Solutions*

Moderators: Marie Vandewalle, UFZ and Erik Stange, NINA, marie.vandewalle@ufz.de, erik.stange@nina.no

1. Lu Sun, Univ Copenhagen, lusun@ign.ku.dk

The history and challenges of a disappearing boundary: the case of the greenbelts in Beijing

The poster seeks to illustrate the planning and implementation process of the first greenbelt in Beijing, China. The first greenbelt in Beijing was first proposed in 1958 and mainly constructed during 1990`s, and later in 2003 it was announced to be completion. However, the current situation in the area of first greenbelt is not the same as the planning. More and more construction has been conducted in limited areas, and green space is disappearing in the greenbelt. There is a second greenbelt under construction now, but which will not succeed without reflection of the first one. The poster aims to answer the following questions: How was the first greenbelt of Beijing founded and developed? How about the current condition in this area? After series of document review and fieldwork, information from planning approach and policies, the implementation process, relevant actors and stakeholders will be presented. This poster might be interesting for researchers in relevant fields, as well as policy makers.

2. Natália S. Cunha, Res Centre Landscape Architecture "Prof. Caldeira Cabral" - LEAF, Inst Agr, Lisbon Univ; Manuela R. Magalhães, Coordinator of Green and Blue Infrastructures Research Line of LEAF, Inst Agr, Lisbon Univ, natcunha@isa.utl.pt, mrrm@ist.utl.pt, <http://www.isa.utl.pt/ceap/>

The Portuguese National Ecological Network - A mapping proposal

Green Infrastructure (GI) is a strategically planned and delivered network of high quality green spaces and other environmental features and defined by three major forms: ecological corridors, ecological networks (EN) and restoration areas [1]. This methodology has been tested in EU territory as a case study. However Portugal, in particular, the National Program for Land Planning Policy does not include any delimitation, and the regional and municipal levels have contradictory delimitations of the EN. In this TALK we intend to present an EN map for mainland Portugal held at FCT Project PTDC/AUR-URB/102578/2008. This NEN methodology was based on ecological criteria through a multi-level evaluation. This study will focus on two main systems: a) physical, including geology/lithology, soil, water and climate components, and their interactions, b) and biological, comprising habitat and vegetation, and their interactions with physical components. It also relates ecological components with ecosystem services that provide value to ecological functions [2]. This data is available on EPIC Webgis [<http://epic-webgis-portugal.isa.ulisboa.pt/>]. Within this framework the CEAP research group as an on-going project Potential Land Use Ecological Plan that aims the assessment of ecological suitability for agriculture, forestry, nature conservation and urban settlements for Portugal. The next challenge is to take a step forward in the implementation of the GI in Portugal and articulate the key ecological and cultural functions. It is expected that this Portuguese EN will be considered as a reference for a future Portuguese legal framework that can provide a major contribution to the GI Strategy. *References:* [1] EEA (2014). Spatial analysis of green infrastructure in Europe. Technical report No 2/2014. European Environment Agency; [2] Magalhães, M. R. *et al.* (2013). Estrutura Ecológica Nacional - uma proposta de delimitação e regulamentação. ISAPress, Lisboa. ISBN 978-972-8669-53-9; Theme: Green infrastructure and ecological network at national scale – the role in Portuguese planning

3. Justine Maréchal, Gembloux Agro-Bio Tech, Biodiversity & Landscape Unit, Univ Liège, justine.marechal@ulg.ac.be

About generalization of the spatial structure of green spaces among different cities

Spatial structure of green spaces is widely studied for the link between structure and ecological processes (or ecosystem services). The provision of ecosystem services may vary depending on the spatial structure of green spaces. Gradient analysis based on landscape metrics can help characterizing such a structure. The purpose of this study is to compare five cities of Flanders: Antwerp, Bruges, Ghent, Leuven and Mechelen. The aim is to determine whether the spatial structure of green spaces can be generalized for different cities in the same region. We tested hypothesis about the size, the shape, the number and the connectivity of green spaces along a urban-rural gradient. We used a existing green spaces map to calculate landscape indices. The results shows the differences in the green spaces amount between the five cities: it varies from 28% to 38%. It also shows the strong dominance of small-sized green spaces. Along the urban-rural gradient, the density of green spaces decreases while the surface of green spaces increases. The distance to the nearest green space decreases along the same gradient. This study could help predicting some spatial characteristics of green spaces *a priori*, without taking time to analyse the green spaces for each new city. By knowing the structure characteristics, it would be possible to make some conclusions about the ecosystem services or the ecological processes provided by the green spaces in order to develop the urban planning.

4. Ton de Nijs, Saskia Ras, Ton Breure, Martijn Thijssen, Ellen Brand, RIVM/Atlas Natural Capital, Ton.de.Nijs@rivm.nl

The Atlas Natural Capital: Supporting Nature-Based Solutions in Urban Environments

Recently the Atlas Natural Capital has been launched. The Atlas is the Dutch Implementation of Action 5 of the EU Biodiversity Strategy but primary aims at the sustainable use of the resources and services that nature provides us. Hereto, the Atlas provides its users with nature based solutions as well as the relevant knowledge and information for the implementation of these solutions. The Atlas distinguishes different types of users, urban and rural planners, water managers, farmers, managers of nature and urban areas, etc. For these users the Atlas presents action perspectives to the various social challenges they face. Urban designers and planners are provided with nature based solutions for the development of new residential and industrial areas including the relevant maps of natural resources and ecosystem services they will need. Managers of urban areas are supported with nature based action perspectives to handle heat stress, climate adaptation, improve the management of green and the design of healthy urban environment. The presentation will discuss the backgrounds of the Atlas and show how it can be used in the application of nature base solutions. In the coming years, the Atlas will be expanded with the tools, knowledge and information that the users need: planning and impact assessment tools, societal cost-benefit analysis, natural capital accounting. Ultimately, the users shaping our living environment should be supported in the sustainable use of the resources and services that nature provides us. For more information see: www.atlasnaturalcapital.nl

Poster theme 4/2: Community health in urban environments and activities

Moderator: Kate Irvine, James Hutton Institute, katherine.irvine@hutton.ac.uk

5. Margarita Triguero-Mas^{1,2,3}, Christopher J. Gidlow⁴, David Martínez^{1,2,3}, Jeroen de Bont^{1,2,3}, Glòria Carrasco-Turigas^{1,2,3}, Tania Martínez-Iñiguez^{1,2,3}, Gemma Hurst⁴, Daniel Masterson⁴, Edmund Seto⁵, Marc V. Jones⁴, Mark J. Nieuwenhuijsen^{1,2,3}; ¹Centre Res Environ Epidemiol (CREAL), Barcelona; ²Univ Pompeu Fabra, Barcelona; ³CIBER Epidemiol Salud Públ (CIBERESP), Barcelona; ⁴Centre Sport Health and Exercise Res, Staffordshire Univ, Stoke-on-Trent; ⁵Dept Environ Occupat Health Sci, Univ Washington, Seattle, mtriguero@creal.cat

The Effect of Different Types of Natural Outdoor Environments on People with Poor Mental Health in Catalonia

Background: Experimental studies have reported associations between short-term exposure to natural outdoor environments (NOE) and health benefits. However, they lack insight into mechanisms, often have low external and ecological validity, and have rarely focused on ill populations. *Objectives:* The objectives of this study were to investigate: (i) the effects of unconstrained exposure to real natural and urban environments on psycho-physiological indicators of people with poor mental health, (ii) the possible differential effects of 30 and 210-minute exposures, and (iii) the possible mechanisms explaining these effects. *Methods:* People with poor mental health were exposed to green, blue and urban environments in groups for a period of 210 minutes. During the exposure period, participants were instructed to do what they would usually do in that environment. Before, during (at 30 and 210 minutes) and after each exposure, several psycho-physiological measures were taken. *Results:* When compared with responses to urban environment, we found statistically significantly lower negative mood, and stress levels in the green exposure environment, and statistically significantly lower negative mood, and statistically significant favourable changes in HRV indicators in the blue exposure environment. Physical activity and restoration partially mediated the associations between NOE and mood. Physical activity and air pollution partially mediated the associations between NOE and HRV. *Conclusions:* Our study found that individuals exposed to NOE had better mood, lower stress levels, and higher physiological relaxation compared to those exposed to urban environments. Associations were partially mediated by physical activity, restoration, and/or air pollution. *Who it will be relevant to:* Our work could inform policy makers, urban planners, and medical professionals about the importance to take into account the natural outdoor environments when planning and when giving health recommendations to people.

6. Margarita Triguero-Mas, David Donaire-Gonzalez, Edmund Seto et al., CREAL-Barcelona, U Pompeu Fabra, CIBER Epidemiol Salud Públ, Ramon Llull Univ, Univ Washington-Seattle, Staffordshire Univ, VUMC, Vytauto Didžiojo U, UC-Berkeley, UCLA, RIVM

Natural Outdoor Environments and Physical Activity Engagement

7. Timo Assmuth, SYKE, timo.assmuth@ymparisto.fi

Children, pets and nature-based solutions: An eco-anthropological view of urban health

I explore the multiple roles of children and pets/domestic animals as challenges and opportunities for 'Nature-Based Solutions' (NBS) particularly for urban environmental health and well-being. I specifically address the interactions between generations and species, and mental and cultural aspects of NBS. My approach is multi-disciplinary and integrative, combining ecological and biomedical ('biophysical') considerations with socio-economic, cultural and generally anthropological perspectives based on

a reflexive methodology. This is focused on conceptual frameworks, yet coupled with real-world evidence. The work draws on research on children's environmental health and safety from risk analytical angles, including normal conditions and in conflicts (Assmuth, 2013), and on animal studies (Assmuth, 2015). I show how children, in addition to posing key socio-economic, eco-demographic and moral problems, are drivers and parts of solutions, both on higher levels of governance and locally e.g. in city planning. I discuss how children are not only burdens and victims, but also actors and beneficiaries of solutions. Likewise, I discuss how pets provide constraints for sustainability, but also efficient solutions e.g. through physical activity, animal therapy, awareness-raising and social networking for natural life-styles. However these aspects also point to the need to refine quality criteria for NBS to identify and avoid conflicts. Children and pets are at once pupils and teachers, and solutions aimed for them need to be developed organically with them. The indirect and subtle cultural roles of children for well-being, such as in providing a sense of coherence and meaning to communities, on the salutogenetic models of Antonovsky (1996), are emphasized, to complement risk factor based paradigms. Regarding pets, frameworks in animal studies and comparative anthropology are utilized, including biosemiotics. The resultant information and the perspectives applied are of interest to both researchers in the particular problems and solutions, as well as to practitioners, policy-makers and others engaged in discourses about nature-based solutions in urban settings and beyond. References: Antonovsky A. The salutogenic model as a theory to guide health promotion. *Health Promotion Int.* 1996;11(1):11-18; Assmuth T. War and Children's Environmental Health: Continuity and Change In the Last Century. Oral presentation (Ppt slides) and poster, 7th Conf. Children's Environmental Health, Jerusalem, Nov 20-22 2013.; Assmuth T. Humans and other animals, feelings and knowings. Abstract and slides of oral presentation at 1st Finnish meeting on social and cultural animal studies, Joensuu, April 19th-20th 2012.

8. Timo Assmuth, Jari Lyytimäki, Finnish Environ Inst (SYKE); Antti Simola, Government Inst Econ Res (VATT); Tarja Pitkänen, Natl Inst health & Wellbeing (THL), Timo Huttula, SYKE, timo.assmuth@ymparisto.fi

Combining green, blue and grey infra: Health risks and benefits of nature-based urban drinking water production

We analyze the risks and benefits in developing Nature-Based Solutions (NBS) for urban drinking water production, based on a case of managed aquifer recharge (MAR) utilizing river water and soil infiltration in an esker. The case exemplifies key issues in large-scale regional projects spanning urban and rural settings, several watersheds, environmental compartments, technologies from 'green' to 'grey', societal sectors, and types of impacts. We specifically address the integrated treatment of risks and benefits associated with such NBS. The human health risks from pathogens and chemicals may emerge anywhere from the watershed, MAR process or in drinking water distribution system, and they include and induce risks also in economic, political and systemic terms, such as with public and stakeholder perceptions. The benefits include improved water supply in a region that has previously been short of good-quality potable water, and adjacent indirect benefits. It is shown that solutions based on nature need to be augmented both by technologies in variable stage of maturity and by human institutions. A key challenge for preventing and alleviating risks and in securing benefits lies in developing and applying NBS in an integrated, long-term, reliable and socially acceptable way in such a complex system. Integrated management of green blue and grey infrastructure requires inclusive planning and adaptive implementation, including dynamic foresight and hindsight and social learning. We derive key lessons on the limits and opportunities of NBS, being also in this case a fusion of natural and artificial processes.

Poster theme 4/3: Social aspects and innovations of urban Nature-Based Solutions

Moderator: Dagmar Haase, UFZ, Dagmar.haase@ufz.de

9. Marion Mehring^{1,2}, Diana Hummel^{1,2}, Stefan Liehr^{1,2}, Alexandra Lux^{1,2}; ¹ISOE – Institute for Social-Ecological Research, ²BiK-F Biodiversity and Climate Research Center, mehring@isoe.de

Biodiversity and Urban Areas: How a Social-Ecological Perspective Makes a Difference

The global loss of biodiversity and the world population growth with urbanization as a ubiquitous phenomenon are among the great challenges for the 21st century. Urbanization draws on natural resources effecting biodiversity and ecosystem services. The nexus of green-blue infrastructure is a social-ecological process in this context where the interrelation between the social and the natural sphere and their dependency becomes real. In order to address this interrelation, we propose a shift away from the solely disciplinary perspective towards a transdisciplinary perspective which integrates scientific knowledge as well as practical knowledge. Within this transdisciplinary research process interdisciplinarity is an integral part combining both, natural and social sciences. But, this attitude is not implemented in biodiversity research yet. We claim a decisive turn in biodiversity research that considers the hybrid notions of biodiversity between science, politics and society. Referring to biodiversity research, we specifically present here characteristics of a social-ecological biodiversity research. Social-ecological biodiversity research is: 1) problem oriented: regulation and transformation constitute the research (*analytical characteristic*), 2) normatively focused on sustainable development (*normative characteristic*), and 3) conceptualized through social-ecological systems (*descriptive characteristic*). The poster presents our on-going work of social-ecological systems and ideas how to conceptualize green-blue infrastructure.

10. *Corina Basnou, Yolanda Melero, Joan Pino, CREAM, Barcelona, c.basnou@creaf.uab.es*

The Ecosystem Services provided by Green Infrastructure in urban and peri-urban areas: the case of Barcelona

11. *Timo Assmuth, Maija Faehnle, Leena Kopperoinen, Pekka Itkonen, SYKE; Maija Faehnle, Univ Helsinki, timo.assmuth@ymparisto.fi*

Mind-mapping environmental health (MIME): Perceptions, representations and knowledge in collaborative urban governance

Timo Assmuth, Leena Kopperoinen, Pekka Itkonen, Finnish Environment Institute (SYKE), We describe a project proposal based on multiple previous and ongoing activities and aimed to contribute to a revised conceptualization of environmental health in governance. This overall objective is translated to the following research questions: 1. What *kind of perceptions do people have of the health benefits and risks* in their living environment? What *kind of locations* do people attach these perceptions to? 2. How do *perceptions of environmental health and well-being vary* among different groups and settings, especially cultures and age groups? 3. What *valuations and world-views are reflected* in the perceptions of urban environmental health; specifically, how do people see the role of environmental qualities and place experiences for health? 4. How are *representations of environmental health and well-being produced and communicated* on, and what development opportunities can be discerned in these processes? 5. How are *perceptions and representations of environmental well-being shaped* by environmental qualities? Specifically, how are perceptions and measurable physical qualities related? 6. What *roles do different kinds and notions of knowledge play* in the context of urban planning and development? Specifically, what *kind of mental models help to conceptualize environmental health*? These questions are approached by the following methods: *Literature and document studies* using content and discourse analysis extended to meta-analysis; *Semi-structured interviews* with key actors representing the above diverse groups; *Interactive net surveys*; *Modifying a mobile application for Public Participatory GIS (PPGIS)*; *Analyzing qualities of the physical environment using GIS* and comparing with data on perceptions; *Communication experiments* with experts, regulators and stakeholders.

12. *Timo Assmuth, Finnish Environment Institute (SYKE), timo.assmuth@ymparisto.fi*

Nature-based solutions to societal challenges under the Czars: A gardener, health activist and serf liberator in 18th-Century Livonia

As an example of historical continua in 'Nature-Based Solutions' (NBS) to natural and societal problems, the 18th-Century priest Johann Georg Eisen (1717-1769) in Livonia and Curonia (present-day Estonia and Latvia) is instructive. A representative and a product of Enlightenment ideas and of the migration of German professionals in the Russian Empire, Eisen besides serving for 30 years as a pastor in Torma engaged in a variety of reformist activities. He became the first abolitionist in Russia criticizing serfdom on economic, social and humanitarian grounds, first backed by Catherine II but increasingly sidetracked by conservative overlords also in the Baltic region. He carried out successful immunization campaigns against small-pox, notably among the poor, promoted scurvy prevention by a novel method of vegetable drying which received international acclaim, and developed and advocated fruit tree cultivation. He wrote socio-economic and religious-ethical works linked with these projects. I highlight this early proponent of NBS to risks to and from humans from the following perspectives, illuminating key questions of relevance for both researchers and policy-makers and practitioners in environmental and health care, social and economic policy and related areas: 1) Relations between philanthropy and general biophilia underlying NBS; 2) Interaction of ideologically based enthusiasm and critical reflection on NBS, involving both macro-level influences and psychological traits of 'driven' persons; 3) Transmission and transformation of such ideas of modernity in socio-cultural contexts, and the limits to upscaling innovations and improvements by political and physical factors and by path dependencies; 4) Variable and uncertain outcomes, intended and unintended, of innovations in a contingent process of material and immaterial changes.

Poster theme 4/4: Designs, tools and innovative solutions

Moderator: Marcus Grant, UWE, marcus.grant@uwe.ac.uk

13. *OpenNESS and OPERAS projects/Hanneke Wijnja, ECNC et al., Wijnja@ecnc.org*

Oppla: Latest knowledge about natural capital and ecosystem services

14. *Marijke Wouters, Ecorem nv, Marijke.wouters@abo-group.eu*

Development of a practical guide and of a specific tool aimed at assessing the environmental capacity of the roads situated in the Brussels Region, Belgium

The mission consisted in addressing the ever increasing mobility issues that every big city faces. Although several studies have already apprehended mobility in terms of traffic load, there are few which have aimed at answering the following questions:

"What environmental issues are linked to transport and what can be done about them?" Bearing this in mind, the Brussels Institute for Environmental Management (IBGE) commissioned Ecorem to find a balance between urban activity and traffic, in compliance with accepted environmental criteria. The tool created needed to be able to solve existing issues between urban planning and road developments in Brussels. The interface created was developed around the concept of 'environmental road capacity'. In this approach, physical ability or technical criterion of a road (that is to say the volume of traffic likely to be channeled through a given profile and under conditions acceptable to users) are replaced by the concept of 'Traffic tolerability' or tolerance. The objective of the tool encourages developers to take into account early on in the planning process specific environmental themes, such as 'nature' and 'water'. In addition to being a valuable asset during any development phase, the tool can also be used to evaluate existing roads in urban areas, hence improving water and nature management within a given section of road. Ultimately, the tool generated can aid Brussels' authorities in developing a comprehensive strategy to improve and enhance biodiversity, green zones, water management and pollution management in the city.

15. *Anke Knapen, Pieter De Corte, Wim Andries Vlaamse Land Maatschappij/Regio Ost (Life + project), Anke.knapen@vlm.be, Pieter.decorte@vlm.be, Wim.andries@vlm.be*

'Green4Grey: Innovative design & development of multifunctional green & blue infrastructure in Flanders grey peri-urban Landscapes'

In Flanders, open space loss amounts to 7 hectares a day, one of the highest rates in The European Union. Grey landscape elements for housing, industry, infrastructure etc. have made Flanders the most fragmented and the second-most sealed EU region. Moreover, the importance of open space is undervalued. The Life+ project 'Green4Grey' aims to convert the scarce remaining open space fragments in a greying peri-urban context into ecological step stones with a multifunctional character. By upgrading and connecting natural and semi-natural landscape elements such as pools, orchards, natural grassland and watercourses, the so-called green-blue infrastructure, an ecological framework will be developed throughout build-up areas. These ecological step stones have a high social added value, as they fulfill multiple other functions, such as sustainable food production, natural water retention, recreation, green lung. The Flemish Land Agency (VLM) invests together with partners in the ecological upgrading of six pilot areas in the Flemish belt around Brussels and in De Wijers, a green ponds and valleys system under pressure of the peri-urban region Hasselt-Genk. To raise awareness and engage inhabitants, employees and visitors for the importance and maintenance of green-blue infrastructure, a development vision is designed for all pilot areas together with the different stakeholders. Through integrated planning, these vision plans are transformed into land development plans that aim multifunctional land use. With this innovative, integrated and multifunctional method of building green-blue infrastructure, the project aims to contribute to the implementation of the EU's Green Infrastructure Strategy in EU peri-urban areas. *This project is realized by support of the financial instrument LIFE of the European Union.*

16. *Xiaoying Liu, Natureherit Design & Consult, xyliu@natureherit.com, info@green-mp.com*

When Green Meets Magnets – GreenMagnets Plan, a revolutionary open source and research tool for World's Micro Environments

Wednesday May 20th

Session 7/1: Europe's urban health & equity challenge and the Sustainable Development Goals: Is there a nature-based solution?

(Augustinus Auditorium)

Proposers: CEM (Centre for Environ Mgmt, Univ Nottingham), Conor Kretsch, conor.kretsch@nottingham.ac.uk

Session organizers: Conor Kretsch^{1,2}, Jukka-Pekka Jappinen³, Eeva Furman³, Hans Keune⁴; ¹Centre for Environ Mgmt, Univ Nottingham; ²COHAB Initiative Secretariat, Galway; ³Finnish Environ Inst (SYKE); ⁴Res Inst for Nature & Forest (INBO)

Background: The proposed post-2015 Sustainable Development Goals, to be agreed at the UN General Assembly in September, include commitments to enhance “sustainable urbanisation” towards cities and settlements that are “inclusive, safe, resilient and sustainable”, and to reduce the adverse environmental impact of cities by 2030. For Europe’s urban areas - as net importers of ecosystem services – these challenges will be enormous. Recent assessments of global risks suggest that social unrest and instability - often associated with urban sprawl – and urban health issues associated with air pollution and non-communicable disease - represent the challenges which Europe is most vulnerable to, and least prepared to deal with. Fulfilling commitments toward sustainable settlements will therefore require integrated action involving stakeholders in planning, environment, health, energy, transport and social welfare. This session will discuss the interconnection of health, social stability and ecosystems in European urban areas. Presentations will outline recent research and practical experience of nature-based approaches to health and equity, and explore how integrated approaches based on the conservation and use of ecosystem services can assist EU members to address commitments to the SDGs in a transdisciplinary manner. Discussions will also explore how the concept of nature-based solutions can be used to address current gaps in knowledge, policy and practice.

Planned outcomes: The organizers will prepare a report on the session and related discussions, highlighting experience and evidence shared on these solutions to health and equity issues. This will inform a review paper to be prepared by the organizers, on how nature-based solutions for urban well-being might contribute to addressing the UN SDGs in Europe. This will also highlight linkages to other policy areas in Europe including urban and regional planning for sustainable development.

Further detail of questions to be addressed:

- How can both nature and human well-being be sustained when more and more people live in cities placing increasing demand on finite living resources?
- What conceptual frameworks should be used for nature-based solutions, to promote transdisciplinary approaches to urban nature conservation, health and equity?
- Can nature-based solutions include using existing tools – e.g. health impact assessment and strategic environmental assessment – to address urban social and environmental risks?
- Following from the experience of projects such as the MA and TEEB, and utilising the outputs of EU projects such as MAES, BESAFE, OPERAs and OpenNESS, to what extent are ecosystems integrated into urban planning in the EU?

The session will include a series of short presentations, followed by interactive discussions and working groups to assess key elements of NBS for urban health and equity, and to identify potential indicators and emerging research needs.

- Conor Kretsch, U Nottingham, UK & COHAB Initiative, Ireland, conor.kretsch@nottingham.ac.uk

Cities, nature and human well-being under the 2015 Sustainable Development Goals

- Jukka-Pekka Jäppinen, SYKE; Liisa Tyrväinen, Natural Resources Inst Finland, jukka-pekka.jappinen@ymparisto.fi, liisa.tyrvaainen@luke.fi

Nature for Health and Well-Being in Finland – results and recommendations from the Argumenta project Ecosystem Services and Human Health (2013-2014)

- Hans Keune, Belgian Biodiversity Platform – INBO; Katrin Goyvaerts, Flemish Agency for Nature & Forest; Benno Geertsma, Natuurpunt, hans.keune@inbo.be, katrin.goyvaerts@lne.vlaanderen.be

The science and policy of biodiversity, health and urbanisation: experience from establishing a community of practice in Belgium

- Liz O'Brien (Forestry Commission, UK)

Improving the well-being of diverse and excluded communities through Nature Based Solutions in Britain

- [Patrick ten Brink](#), *Inst Eur Environ Pol*, ptenbrink@ieep.eu
Health and Social Benefits of Nature and Biodiversity Protection

Session 7/2: Access to Nature: Environmental Justice and Socio-Economic Health Inequalities

(Room Hippo)

Conveners: [Sjerp de Vries](#), [Carmen Aalbers](#) and [Tia Hermans](#), *Alterra*, sjerp.devries@wur.nl

Organizers/moderators: [Sjerp de Vries](#) and [Carmen Aalbers](#), *Alterra*, sjerp.devries@wur.nl, carmen.aalbers@wur.nl

Nature-based contributions to the wellbeing of urbanites often focus on regulating ecosystem services, such as improving air quality or water management. Thus far, less attention has been paid to the contribution cultural ecosystem services might make. Several studies have shown that contact with nature is related to the wellbeing and health, with stress reduction being a likely mechanism. Continuing urbanisation is likely to make daily contact with nature less common. As are other life-style related risk factors, stress is already contributing significantly to the burden of disease in developed countries. Furthermore, socio-economically deprived neighbourhoods tend to offer less access to (high quality) green spaces to their inhabitants. This lack of easy access to nature may be partly responsible for the socio-economic differences in health, an issue that scores high on the agenda of the health sector. In this session we will briefly review the existing evidence and subsequently discuss what type of access to which type of green space may offer the strongest nature-based contribution to reduce socio-economic health inequalities. Possible issues are the importance of: biodiversity, scenic beauty, nearness/frequency of use, private gardens versus public parks, quality versus quantity. The purpose of the discussion is to identify issues on which the participants disagree most, as these are likely to make for relevant research questions. The outcomes of the discussion will be used as input for a research agenda that is being drafted.

- [Sjerp de Vries](#), *Alterra*, sjerp.devries@wur.nl

Access to nature, environmental justice and socio-economic health inequalities: exploring the issues

- [Grazia Zulian](#), *Joint Reseach Centre/Inst Enciron & Sust*, grazia.zulian@jrc.ec.europa.eu

ESTIMAP-recreation model: an approach for the potential provision of Nature-based recreation opportunities for urban dwellings

Nature-based Recreation opportunities play a crucial role for citizens from the physical and psychological point of view. Systematic approaches for the evaluation of opportunities can, potentially, support relevant and transversal issues related to social and ecological sustainability. “ESTIMAP-recreation model” is a spatially explicit approach for the evaluation of opportunities provided to people to enjoy the nature. The model is framed in three steps. 1. Assessment of the capacity of land and ecosystems to support recreational activities – (*Recreation Potential map*). 2. Analyses of the proximity to the available opportunities (*Recreation Opportunity Spectrum map*). 3. Analyses of the potential demand of service. The original and general configuration of the model has been modified to better fit key urban issues, such as: what is the relative amount of nature-based recreational opportunities available per capita? Is the local provision equally distributed? Is the local management of urban parks and play grounds and local transportation network fitting the citizen’s needs? We present the structure of the approach and examples of applications to large urban zones in Europe. This talk can support transversal issues related to the integration of ecosystem services concepts and assessment in policy and planning process.

- [Pekka Itkonen](#), [Leena Kopperoinen](#) and [Lasse Peltonen](#), *SYKE*, leena.kopperoinen@ymparisto.fi

Spatial assessment of distributional environmental justice of water-related cultural ecosystem services in Helsinki Metropolitan Area, Finland

Aquatic ecosystem services in the vicinity of cities face multiple pressures due to urbanization, urban population growth and the intensification of land use in urban areas. These changes have ecological, socio-economic and political implications, including impacts on the environmental justice issues of equity, recognition and participation in the context of cultural ecosystem services. To examine this topic we have used GIS analyses methods to assess the distributive environmental justice in relation to water-related cultural ecosystem services (CES) in Helsinki Metropolitan Region. First, the quality of blue structure i.e. water areas of the study area has been assessed - based on inter alia water quality, aesthetics, recreational facilities and restrictions on access to shoreline. Then, the proximity and accessibility to blue structure of varying quality has been studied against various socio-economic variables - such as income, educational level, age distribution, and mother tongue of the population. Our aim is to provide local and regional land use planners and decision makers with an insight to the inadequately explored issues: cultural ecosystem services, values related to various water areas, and their distributional environmental justice and equity. We will

present the latest research results from the spatial analyses carried out in the project *Environmental justice and ecosystem services: Access, equity and participation in the use and management of aquatic environments in the Helsinki region* (ENJUSTESS), funded by Academy of Finland.

- [Carmen Aalbers](#), [Tia Hermans](#), [Alterra](#)

Introduction to final discussion, including wrap-up, carmen.aalbers@wur.nl

Session 7/3: Improving urban health by nature

(Room Monica)

Organizer and chair: [Marcus Grant](#), [Univ West England, Bristol](#), marcus.grant@uwe.ac.uk

- [Ann Uustalu](#), [EC/DG-RTD Health](#), ann.uustalu@ec.europa.eu

Horizon 2020 – research on environment and health from a public health perspective

- [Marcus Grant](#), [Univ West England, Bristol](#), marcus.grant@uwe.ac.uk

These places are killing us / A systems view of nature's role in supporting human health and wellbeing in cities

Taking a Healthy Cities approach, the city is an essential habitat for human populations, especially now with over 50% of all humanity living in cities. It is imperative that we get the design and management of cities fit for health. However, cities can be the unhealthiest places to live; even in high and middle-income countries we are now seeing increases in non-communicable disease, compounded by health inequity, these problems are even threatening the viability of national health service provision. To this we can add the challenges and threats to health arising from the global footprint of poorly planned urbanization. This short presentation takes a systemic concept - the health map, and with internationally drawn case studies as examples, paints a picture of the missing links and the positive connection between urban planning for nature-based solutions and public health and wellbeing. Finally, based on the World Health Organization's goal of 'Health and Health Equity in all Policies', we must ask if new opportunities are afforded through implementing nature-based solutions and what key issues arise for city leaders and urban practitioners.

- [Mark Nieuwenhuijsen](#), [C. Gidlow](#), [G. Smith](#), [Hanneke Kruize](#), [J. Maas](#), [M. Jerrett](#), [Peter van den Hazel](#), [Roderick Lawrence](#), [R. Grazuleviciene](#), [Diane v Gent](#), [Centre Res Environ Epidemiol \(CREAL\)-Barcelona](#), mnieuwenhuijsen@creal.cat

Positive Health Effects of the Natural Outdoor environment (PHENOTYPE)

Introduction: Growing evidence suggests that close contact with nature brings benefits to human health and well-being, but the proposed mechanisms are still not well understood and the associations with health remain uncertain. The **Positive Health Effects of the Natural Outdoor environment in Typical Populations in different regions in Europe (PHENOTYPE)** project investigates the interconnections between natural outdoor environments and better human health and well-being. *Aims and methods:* The PHENOTYPE project explores the proposed underlying mechanisms at work (stress reduction/restorative function, physical activity, social interaction, exposure to environmental hazards) and examines the associations with health outcomes for different population groups. It implements conventional and new innovative high tech methods to characterize the natural environment in terms of quality and quantity and measures location and physical activity using smartphones. Preventive as well as therapeutic effects of contact with the natural environment are being covered. PHENOTYPE further addresses implications for land-use planning and green space management. *Results:* Initial results of the various studies show beneficial effects of green space on cardiovascular mortality and disease and mental health in adults, obesity, asthma and cognitive function and behavior in children and birth weight. Initial results of the smartphone studies show great mobility of the subjects and considerable differences in physical activity levels, sometimes but always related to the natural environment. *Conclusion:* The project provides further evidence on links between exposure to natural outdoor environment and human health and well-being, in addition to a better integration of human health needs into land use planning and green space management in rural as well as urban areas.

- [Tia Hermans](#), [Alterra](#); [Lidwien Lemmens](#), [RIVM](#); [Annette Postma](#), [Postma Advies](#), [The Netherlands](#), Tia.hermans@wur.nl

Implementation of green interventions in healthcare and public health: barriers and facilitators

Green space can improve physical and mental health by improving air quality, increasing physical activity, increasing social contacts and reducing stress. Despite this generally accepted belief that nature is good for health, it is rarely used in the everyday practice of professionals in public health and healthcare. Therefore a qualitative study was performed to investigate

what hinders and facilitates professionals to use green for health. A theoretical framework was built, interviews were held with representatives of professional health organizations and focus groups were held with health professionals. We will present the results of this qualitative study. The interviews and focus group results were analyzed using the theoretical framework. Four levels were defined on which barriers and facilitators for implementing innovations could be experienced: the intervention, the health professional, the social context of the health professional and the policy environment. Within each level facilitating and hindering factors were identified. Based on agreement between the researchers, different levels and factors were assigned to the answers of respondents. Barriers and facilitators were found within all four levels. (showing that action is needed on all levels to enhance the use of green in public health and healthcare. Our presentation will provide insight in what (local) policy makers, professional organizations and health professionals could do to enhance using green for health.

- *Katarina Ana Lestan, Mojca Golobič, Dept Landscape Architecture, Biotech Faculty, Univ Ljubljana, Slovenia; Ivan Eržen, Natl Inst Public Health & U Ljubljana, Slovenia, KatarinaAna.Lestan@bf.uni-lj.si, ivan.erzen@mf.uni-lj.si*

Healthy childhood and active ageing in contemporary cities

Living environment has an impact on human health and well-being. Health-related lifestyle of individuals is a result of the individual's choices but it also depends on the opportunities offered in physical and social environment to implement these decisions. The presentation addresses the relationship between quality of open space and health related lifestyle in post-transition urban residential areas in Ljubljana, Slovenia. Compared to the older neighbourhoods, the new ones are single-use residential areas, with small open spaces and poor landscape design. The objective of this study was to investigate the linkages between the outdoor space and the lifestyle adopted by the inhabitants. The research aimed to provide answers to the questions, such as: What is the residential area urban design like? What do people actually do in residential open spaces? How do the residents' perceive their living environment? The results revealed, that a lack of outdoor programs correlates with poor variety of outdoor activities, limited to transition type, less time spent outdoors and lower satisfaction with their home environment. People living in the environment, which does not stimulate everyday activity by spending time outdoors, walking accessibility to services, playing and socializing, are likely to develop a less healthy life style. This is especially relevant for children and the elderly, who are considered vulnerable groups in terms of active use of open space due to their dependency on proximity of their homes.

Session 7/4: Urban biodiversity for the delivery of ecosystem services

(Room Nicolaas)

Conveners: *Sonja Knapp*¹, *Nina Schwarz*². ¹UFZ - Helmholtz Centre for Environ Res, Dept Community Ecol; ²UFZ - Helmholtz Centre for Environ Res, Dept Computational Landscape Ecol; sonja.knapp@ufz.de, nina.schwarz@ufz.de

Urban areas are highly relevant to both biodiversity and ecosystem services as, on the one hand, urbanization often concentrates where biodiversity is high, and on the other hand, human wellbeing requires ecosystem services. Protecting biodiversity and promoting the delivery of ecosystem services are thus two key elements of sustainable land use, also for urban areas. However, high biodiversity does not always promote ecosystem services and vice versa. Rather, trade-offs between the two might be common. The identification of trade-offs and synergies between biodiversity and the delivery of ecosystem services is an emerging issue at the nexus of social and ecological research, but their quantification is seldom done, especially with respect to urban areas. The proposed session will gather researchers and practitioners who deal with either the state of biodiversity and its implications for ecosystem services or the delivery of ecosystem services with their trade-offs and synergies in urban areas. The aim is to highlight knowledge gaps and ways forward in merging the protection of biodiversity and the delivery of ecosystem services in urban areas as well as best-practice examples. We invite presentations that cover examples from research and practice as well as conceptual approaches. We will both chair the session and moderate a concluding discussion round about knowledge gaps and ways forward. Further, we aim at publishing key talks of the session in a Special Issue at an internationally renowned urban ecological journal. The session will highlight the contribution of biodiversity to nature-based solutions and conflict of goals.

- *Sonja Knapp, UFZ, sonja.knapp@ufz.de*

Overview of biodiversity in urban areas

- *Marco Moretti, Swiss Fed Res Inst (WSL), Community Ecol, marco.moretti@wsl.ch*

Providing insights into links between biodiversity and ecosystem functioning

- *Angela Hof*, Univ Salzburg, Research Group Urban & Landscape Ecol, angela.hof@sbg.ac.at
How links between biodiversity and ecosystem services can be implemented in municipalities

- *Dagmar Haase*, Humboldt Univ Berlin, Dagmar.haase@ufz.de

Highlighting gaps in biodiversity-ecosystem services research with insights from the URBES project

- *Karin Zaunberger*, EC/DG-ENV, Karin.Zaunberger@ec.europa.eu

EU's and global policy perspectives on urban biodiversity

Session 7/5. Urban designs and innovations for wellbeing

(Room Carthago)

Organizer: *Wolfgang Weisser*, Tech Univ Munich, wolfgang.weisser@tum.de

- *Wolfgang Weisser*, Chair for terrestrial Ecol, Dept Ecol & Ecosystem Mgmt, Tech Univ Munich; *Thomas Hauck*, Dept Open Space Planning, Univ Kassel, wolfgang.weisser@tum.de, thomas.hauck@asl.uni-kassel.de

Animal-Aided Design – Bridging the gap between urban planning and nature conservation

The concept of biodiversity underlies many of the ecosystem services demanded by humans. To maintain biodiversity and ecosystem services, the creation of a 'green infrastructure' has been proposed for metropolitan areas worldwide. It is unclear, however, how such a green infrastructure should be created. Urban open spaces are currently planned by landscape architects with a primary focus on aesthetic design and plants, or by city planners with little expertise in ecology. On the other hand, conservation often targets the few remaining areas with little influence of humans, also in cities. While this will conserve biodiversity and maintain certain ecosystem services, it does not represent a targeted planning process aimed at providing a green infrastructure also in places where there are no wilderness areas left. In fact, conservation and urban planning often work against one another rather than together, for example when a planning process is executed with little reference to biodiversity, and when nature protection laws interfere with this planning process by requiring adaptation of the design due to the occurrence of a protected species. We have developed ANIMAL-AIDED DESIGN® as a methodology for the design of open spaces that can help to overcome this difference between urban planning, landscape architecture and conservation. The basic idea of ANIMAL-AIDED DESIGN® (in short, AAD) is to include the presence of animals in the planning process, such that they are an integral part of the design. For AAD, the desired species are chosen at the beginning of a project. The requirements of the target species, i.e. their life-cycles, then set boundary conditions and serve as an inspiration for the design. The aim of AAD is to establish a stable population at the project site. In our Studio AAD, which is run by landscape architects and biologists, the method was tested on its practicability with designs for urban public spaces in London, Berlin and Munich. We would like to present the method of AAD, its relevance and practicability for planning and its potential to bridge the gap between urban planning and conservation – because this would be the precondition for green infrastructure that work.

- *Kristin Barbey*, Dept Archit, Inst Urban & Landscape Design, KIT Karlsruhe Inst Tech, kristin.barbey@berlin.de

The Project Nature: Content Basis for Nature-Orientated, Climate-Friendly Metropolis 2050

Climate change and climate impacts require in consequence of their anthropogenic causes a changed handling of space and nature. The objective of this research project is to develop a consistent INTEGRATIVE SPATIAL CONCEPT towards a NATURE-ORIENTATED, CLIMATE-FRIENDLY METROPOLITAN REGION 2050, looking for the best place to implement most efficiently the different measures of CLIMATE PROTECTION & ADAPTION in the urban and regional spatial context. THE CONCEPT OF INTERACTING STRATEGIES: NATURE DEVELOPMENT – URBAN RESTRUCTURING – ENERGY TRANSFORMATION presents the strategies of CLIMATE PROTECTION & ADAPTION as qualification processes, which can lead to an improvement of existing qualities. In connection and interaction of these strategies a path of spatial sustainability will be developed in an ecological, aesthetical and sociopolitical regard. The PROJECT NATURE is the theoretical background and content base of the INTEGRATED SPATIAL CONCEPT and signifies within the conceptual process the objective for the strategic spatial decision. The content basis of the spatial concept: the PROJECT NATURE, starts with the basis of the climate change problem: the way of handling nature. The anthropogenic (man-made) climate change causes beside natural effects imminent loss of genetic diversity, species and ecosystems based in a major part on the ignorant way to treat NATURE: The PROJECT NATURE has to take up a central position within the discourse and the conception of future spatial development perspectives. The fundamental philosophical and ethical basis for a changed handling in respect of nature is needed to give a contemporary societal orientation by a forward-looking explication of the human relation towards nature.

Presentation: results of the doctoral thesis, Metropolregion im Klimawandel – Räumliche Strategien Klimaschutz und Klimaanpassung. Karlsruhe: KIT Scientific Publishing, 2012 <http://digbib.ubka.uni-karlsruhe.de/volltexte/1000029071>, www.ksp.kit.edu/9783866448957 (Texts, maps (Metropolitan Region

Rhine–Neckar and City of Mannheim) and images) + some results of the conceptual studies of international Master students at KIT Karlsruhe, KIC InnoEnergy, creating in interdisciplinary teams an INTEGRATED CONCEPT CLIMATE PROTECTION & ADAPTATION: SMART QUARTER KARL in Karlsruhe. Concerning: urban planning, policy development, philosophy

- Egbert Roozen, VHG Association (*The Green City*), m.vanvelde@zeilstra-en-partners.nl

How Can We Build Green & Sustainable Cities?

It is Egbert's opinion that greenery contributes to the quality of our environment, the biodiversity and human's health. On national and European scale the interest in the societal benefits of greenery is growing. How can we build green and sustainable cities? Egbert, who is also representing The Green City Holland and is closely involved in the Floriade organisation, will explain his vision on the green city and show some good examples. For more details about Egbert Roozen see:

<http://thegreencity.com/three-green-questions-to-egbert-roozen/> Themes covered: *Education and information about nature-based solutions; Citizen engagement in Nature-Based Solutions; Nature-based culture and social diversity*

Session 7/6. Green space and green growth potential

(Room Amiticia)

Organizers and chairs: *Willem Laermans*, Natuurpunt Gent, and *Thomas Beery*, Kristianstad Univ, willem.laermans@gmail.com, thomas.beery@hkr.se

- *Stefanie Rößler*, *Juliane Mathey*, *Karsten Grunewald*, *Wolfgang Wende*, *Leibniz Inst Ecol Urban & Reg Dev (IOER)*, s.roessler@ioer.de

Multifunctional Urban Green Spaces – Benefits and Implementation Challenges

Urban green spaces provide manifold benefits in terms of ecosystem services to address current and future challenges of urban development. But, the implementation of green spaces as parts of urban green infrastructure is restricted by competing urban land use demands, limited areas for (new) green spaces, and limited financing resources. Multifunctional green spaces are solutions both to benefit from the manifold and overlapping benefits regarding urban wellbeing and addressing the restrictive framework. Nevertheless, their implementation is confronted with several barriers: missing assessment tools allowing integrated analysis of overlapping ecosystem services, lacking design principles, sector views on development and maintenance, traditional models of responsibilities and funding. To make use of the opportunities of multifunctional urban green spaces, new production schemes, operation and funding models are necessary to overcome tensions of land use conflicts, limited financial resources and societal requirements. Based on a brief overview of own research results on micro-climatic effects of different urban green spaces types, overlapping ecosystem services of green urban brownfields, and approaches to develop applicable and replicable indicators to measure the green space provision, experiences and ideas on suitable planning approaches will be discussed, derived from own applied research in the field of climate adaptation and planning for urban biodiversity. By addressing crucial issues as responsibilities for urban green spaces, costs and benefits of green space development, value chains of urban land use types and multi-stakeholder participation the talk is relevant for scientists and practitioners in the field of urban and green space planning. *Sources:* Bastian, O.; Haase, D.; Grunewald, K. (2012): Ecosystem properties, potentials and services – The EPPS conceptual framework and an urban application example. In: *Ecological Indicators*, (21), 7-16.; Lehmann, I.; Mathey, J.; Rößler, S.; Bräuer, A.; Goldberg, V. (2014): Urban vegetation structure types as a methodological approach for identifying ecosystems

- *Willem Laermans*, *Natuurpunt Gent*; *Mihai Costica*, *Naela Costica*, *Alexandru Ioan Cuza Univ Iasi*; *Teodora Koos-Morar*, *Kalliopi Ntanou*, *Ioan Ciomasu*, INTRAS, willem.laermans@gmail.com

People and urban parks: Searching the new *spiritus loci*

In our post-modern society of the developed countries, there is a timid come-back of ecological issues reflecting certain evolution of local priorities. However, the fundamental conflict between sustainability priorities (e.g., ecosystems' health) and public priorities (e.g., economics) is far from being solved. Hereby, we use the holistic concept of Urban Sustainability Nexus – the synergy and interdependency between energy, water, landscape and transport – to frame the functions of urban green areas within the wider urban metabolism, with consequences involving many other issues, e.g., demographics, climate, health and leisure. Using practice studies from mid-sized European cities, we show how urban green areas are key drivers of urban transformation towards eco-cities. In Ghent, Belgium, all political parties want to create a true central park and urban gardening emerges as a topic of dialogue and coordination between people of various cultures. In Iasi, Romania, recent conflicts on parks and urban vegetation has generated new governance mechanisms to conciliate experts, citizens and government. In Versailles, France, the public interest lies between the historical gardens of the Chateau and the new major projects of urban development like Versailles Chantiers train station, a transport hub. In all cases, urban parks integrate cultural landscapes and generate a new *spiritus loci* (spirit of the place) that is critical to developing a culture of collective decisions which can engage and maintain the city in the long and difficult transition to sustainability. This has consequences beyond cities, because cities are community-

scale laboratories where the relation between humanity and nature are re-defined. *Selected references & further readings:* Andersson E, 2006. Urban landscapes and sustainable cities. *Ecology and Society*, 11(1), 34, <http://www.ecologyandsociety.org/vol11/iss1/art34/>; Barlow Rogers E, 2001. *Landscape Design: A Cultural and Architectural History*. New York: Harry N. Abrams. <http://library.wur.nl/WebQuery/clc/1643923>

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Allotment gardens, a place to meet, walk and learn – Bergeonnerie/Tours case

Different kind of nature can be observed in urban settings: forest or semi-natural spaces, ornamental gardens and allotment gardens (community gardens). Our talk will focus on the last ones and will question some ecosystem services, which they offer. It comes in the framework of the research program SERVEUR, which is funded by the French region Centre and is interested in the services given by urban green spaces. Here we would like to present one case-study – the Bergeonnerie allotments in Tours (France). Allotments have more benefits for the population than expected but thus they also have fallouts for the municipalities. To identify the services offered by this green space, we have conducted: *in situ* observations and surveys of users of Bergeonnerie allotments; interviews of municipal stakeholders (technicians and heads of Green Spaces departments) and decision-makers (elected representatives) of several cities of the region Centre. The *in situ* study revealed that allotments offered not only provisioning services – according to the MEA (2005) ecosystem services list –, in this case food. They also provide cultural services, focus of our research program. Indeed, they're also a source of wellbeing, for the gardeners but not only. We could observe that some other people come in these green spaces, like in other ones, to walk. They're places of sociability and education. This point is underlined by municipal stakeholders and decision-makers: allotments are more than places used to cultivate vegetables. Thus the fallouts for the municipalities can be greater, at least in terms of image. Reference: MEA (Millennium Ecosystem Assessment), 2005. *Ecosystems and Human Well-being: Synthesis*, Island Press, Washington DC

- Thomas Beery, Kristianstad Univ, Man & Biosphere Health Res Group, thomas.beery@hkr.se

Inspiring the outdoor experience: Does the path through a nature center lead out the door?

This study investigates the visitor experience at a Swedish nature center within a UNESCO biosphere reserve. The question of whether this facility succeeds in motivating the visitor to get outdoors for a direct experience of nature is explored. Use of the environmental connectedness perspective and concerns about extinction of nature experience support the importance of this study. A number of qualitative methodologies are used to investigate the research questions, including thought listing, phenomenology, and field observation. Results will show that while this particular nature center generally succeeds in the goal of inspiring visitors out the door, it is not simply exhibitry alone that supports the outcome. The success in motivating visitors for a direct experience of nature appears to be a result of a number of key factors. One of these factors, access, is highlighted. Proximate access is presented as both nature center proximity to an urban area and access in regard to proximity to the experience of nature. Results are used to support the re-imagination of urban environments as vital ecosystems with the possibility to offer the quality experience of biodiversity, beauty, and outdoor recreation.

Session 7/7: Improving urban wellbeing through nature-based agriculture

(Library)

Conveners: Fanny Boeraeve (contact), AgricultureIsLife, Biodiv & Landscape Unit, Univ Liege, f.boeraeve@ulg.ac.be

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Nicolas Dendoncker, Dept Geogr, Univ Namur, nicolas.dendoncker@unamur.be

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Caroline Steel (1) refers to the term 'urban paradox' to define the fact that most of us live in cities, dwelling on the land and natural world to feed us, though failing to recognize it. This inextricable link between cities and rural areas must be taken into account when thinking about urban wellbeing. In fact, as urbanization rates keep increasing throughout the world, urban dwellers become more and more dependent on their agricultural counterparts. The sustainability of the agricultural sector is therefore of prime importance to ensure the future wellbeing of not only rural but also urban populations. In sum, to ensure future sustainable cities, it is essential to first assess the sustainability of agriculture. Taking agriculture as entry point, this session will seek to find avenues to improve human wellbeing. Thinking agriculture in terms of human wellbeing brings up the

concept of ecosystem services (ES) which illustrate how ecosystems provide benefits to human (2). Agroecology, using nature-based solutions, is often put forward as a model of agriculture enhancing ES, thus human wellbeing (3). Such model also promotes the development of short-circuit food systems, relinking rural with urban areas, decreasing rural exodus, and ultimately improving urban wellbeing (4). Thus, this session will focus on agricultural cases, taking the ES concept as a wellbeing indicator. Firstly, the interdependence of urban wellbeing with rural areas will be depicted and agroecology will be presented as a model increasing ES, hence human wellbeing (5). The introduction will be followed by successful case studies where alternative agricultural models or practices enhance ES. A broad range of cases, from fundamental to action-guiding research will be presented. The session will be wrapped up by a discussion putting forward how these innovative agricultural researches could, by contributing to developing new sustainable rural environments, indirectly and directly impact urban wellbeing. A participative format with short talks and time for discussion will be preferred. If time allows, a knowledge sharing activity under the form of 'World Café' could be set up.

- [Fanny Boeraeve](#), [Severin Hatt](#), [Sidonie Artru](#), [Univ Liège](#), f.boeraeve@ulg.ac.be

Introductory talk: The inextricable link between urban wellbeing and rural areas

- [Nicolas Dendoncker](#), [Univ Namur](#); [Rolinde Demeyer](#), [INBO](#), nicolas.dendoncker@unamur.be, rolinde.demeyer@inbo.be

Can ecosystem service optimization guide rural land consolidation schemes towards nature-based solutions and improved wellbeing?

- [Sander Jacobs](#), [INBO](#), sander.jacobs@inbo.be

A trade-off analysis of ecosystem services in Flanders: defining nature-based scenarios

- [Séverin Hatt](#), [Sidonie Artru](#), [AgricultureIsLife](#), [Univ Liege](#), Severin.Hatt@ulg.ac.be

Nature-based agricultural practices for healthier food and environment: the examples of agroforestry and wildflower strips

Session 8/1: Using nature based solutions to improve health and well-being for urban citizens

(Augustinus Auditorium)

Convener: *International Union for Conservation of Nature (IUCN)*

Organizer/moderator: *Chantal van Ham, EU Programme Manager Nature Based Solutions, IUCN EU Representative Office, Chantal.vanham@iucn.org*

Background

We need nature in our lives. According to the theory of biophilia humans have an “*innately emotional affiliation ... to other living organisms*” (Beatley, 2011¹). The potential consequence of living in increasingly urbanised, indoor-focused environments is a decline in ‘nature connectedness’ which can lead to alienation and in turn apathy towards the future protection and conservation of nature. Nature connectedness has been associated with improved well-being, suggesting that this may be an important consideration for creating a health-promoting urban environment. There is a growing body of research outlining nature’s positive influence on health and well-being. Coming into regular contact with nature has been found to reduce stress levels, increase concentration, stimulate exercise, promote social cohesion, and help to treat diseases and disorders. These positive influences on mental and physical well-being in turn lead to substantial economic benefits, by increasing economic productivity and reducing health-care costs. IUCN pioneered nature-based solutions at the UN climate negotiations, and continues to promote them as a way to mitigate and adapt to climate change, secure water, food and energy supplies, reduce poverty and drive economic growth. Around the world, IUCN works with governments, the private sector and communities to translate the latest science and knowledge into practice. In this session IUCN will draw on its expansive network to bring together relevant organizations, practitioners and experts in the field to share ideas, experiences and solutions to demonstrate how various nature-based approaches can be used to improve physical and mental health in the urban context.

¹ Biophilic Cities – Integrating Nature into Urban Design and Planning, Timothy Beatley (2011) - <http://biophiliccities.org/book.html>

Objectives

- Improve understanding of the interconnections between the protection and enhancement of biodiversity and the health and social benefits derived from natural areas within and around cities.
- Identify of the health and societal benefits obtained from biodiversity and the natural environment as well as potential opportunities for developing and increasing these benefits.
- Strengthen the cooperation between the nature conservation community, the public health sector and urban planners to create opportunities for deploying nature-based solutions to health and well-being challenges.

The session will link to a number of general themes of the conference, including:

- Nature-Based Solutions to diseases and pandemics
- Nature-Based Solutions for economy and employment
- Sustainable urban lifestyles and behaviours
- Green care and eco-therapy
- Traditional and new knowledge of nature for innovation

Linkages to EU Policy Developments

Policy recognition of the human health, wellbeing and nature/biodiversity nexus has grown globally and in Europe over the last decade amid 'natural capital', 'green economy' and 'sustainable growth' discussions. While the economic benefits of nature are more established within discourse, social and health benefits have been given increasingly more weight in decision-making. Integration of these aspects has taken place across a range of European policy fields, including:

- The **EU Biodiversity Strategy to 2020** in which Biodiversity is seen as essential to human well-being and economic prosperity, building on the concept of ecosystem services;
- the **EU Green Infrastructure strategy** which recognizes the role of green infrastructure and natural assets for human wellbeing and the generation of various health and social benefits;
- the **European Health Strategy** which recognizes the potential of green space for health promotion; and
- the **7th Environmental Action Programme to 2020** which highlights the need to protect natural capital for continued health and social benefits, as well as the adoption of integrative urban planning (including green spaces) to achieve sustainable cities.

Organisation of the workshop

The session will host speakers from a range of stakeholder groups including scientists, practitioners, governments and the private sector. The event will also be promoted widely among IUCN's European network of members, experts and partners to ensure an equally diverse audience. The session will be composed of 4 presentations lasting approximately 15 minutes each, followed by an interactive discussion with the audience (40mins) and final concluding remarks and perspectives towards future action (10-15 mins). The session will be moderated by Chantal van Ham from IUCN. The moderator's role will be to provide an introductory presentation, introduce the speakers and lead the interactive discussion with the speakers and the audience.

Questions to be addressed

- What are the benefits of nature in urban areas for health and well-being both in economic and non-economic terms?
- How can we best integrate nature in urban planning and management?
- How can linkages between the nature conservation community, public health sector and urban planning and management authorities be effectively promoted?
- What examples showcase the potential of investing in nature-based solutions for improved health and well-being in European and non-European cities?

Participants will:

- gain an enhanced understanding of the potential for nature to contribute to physical and mental well-being for urban citizens;
- learn about the opportunities and challenges to better incorporating nature within urban planning and policies;
- have the opportunity to exchange best practices, guidance and examples of successful use of NBS for human health and well-being;
- be able to connect with potential new partners active in the fields of nature conservation, public health and urban planning.

- *Pam Berry*, Environmental Change Inst, Univ Oxford, UK, pam.berry@eci.ox.ac.uk

Nature-based solutions: from concept to practice

Nature-based solutions" is a new term that was first used by the IUCN in 2012. There are, however, a number of other terms that have recently entered the vocabulary of ecologists and conservationists, including the ecosystem approach, ecosystem

services and ecosystem-based adaptation/mitigation. The theme of this talk will be what are nature-based solutions in both in theory and in practice? It will build on the work of the European Commission DG Research and Innovation's Expert Group on "Nature-based solutions and re-naturing cities. It will critique what is meant by the term nature-based solutions and show how it builds on these other terms, all of which acknowledge the fundamental importance of nature. Nature-based solutions, however, are more focused on approaches to addressing the environmental, social and economic challenges that stem from a failure to recognize the limits of nature and on providing sustainable answers and are, ideally, resilient to change, as well as being energy and resource efficient. Examples will be drawn from urban contexts whenever possible. This talk will be relevant to all involved in thinking about the future, from decision- and policy-makers, to conservation practitioners, and to researchers, as it will address how nature can most effectively help meet societal challenges, achieve multiple benefits and result in a more resilient future.

- [Joop van Hezik](#), Nature Assisted Health Foundation, The Netherlands, vanhezik@xs4all.nl

Nature assisted health for people with dementia and their caregivers

- [Tom Bosschaert](#) and [Elke Miedema](#), Except Integrated Sustainability, The Netherlands, tom@except.nl

Increasing health and wellbeing through effective city design and planning

- [Ladislav Miko](#), European Commission - DG-Health and Food Safety, ladislav.miko@ec.europa.eu

Integrating nature into policy-making to enhance human well-being

Session 8/2. Evaluation of recreation and revitalization potential

(Room Hippo)

Organizers and chairs: Grazia Zulian, JRC/IES, Ispra, Italy; Inge Liekens, VITO, grazia.zulian@jrc.ec.europa.eu

- [Grazia Zulian](#), JRC/IES et al., grazia.zulian@jrc.ec.europa.eu

ESTIMAP - framework for the assessment of Ecosystem services at EU level

- [Tristan Pett](#), Durrell Inst Conserv & Ecol, School of Anthropol & Conservation, Univ Kent, tp264@kent.ac.uk

Creating a buzz in the city: an experimental cross-city comparison of the public's preferences and values for conserving urban pollinators

Increasingly research is demonstrating that urban greenspaces (UGS) can provide important habitats and resources for biodiversity, as well as improving the health and well-being of people in cities. However, the role that biodiversity plays in delivering such ecosystem services within UGS is poorly understood. Wildflower meadows can support and augment pollinating insect populations and could also provide co-benefits to park users in terms of increasing the opportunity and quality of interactions with nearby nature. This study used experimental meadow plots planted in UGS across three UK cities, as part of a wider urban pollinators research project. Areas of UGS were assigned to one of three treatment groups: control sites constituting amenity grass, native perennial meadows and non-native annual meadows. Biodiversity surveys established the diversity and abundance of flowering plants and pollinators and responses to questionnaires were collected *in situ* across 17 sites. We used a suite of methods to assess public preferences and values including psychological scales of connection to the natural world, choice modelling and items establishing perceptions of species diversity and function. These results indicate that the public are generally positive about the creation of flower meadows but value and prefer meadows for different aesthetic and functional characteristics, depending on the social profile of individuals, perceptions of species richness and the ecological traits of the flower meadows (such as diversity, colour and nativeness). Our findings suggest that wildflower meadows in UGS, as well as providing key resources for pollinators, can enhance the value of UGS to park users.

- [Inge Liekens](#), VITO, inge.liekens@vito.be

Valuation of ecosystem services and revitalization potential

Nature based solutions can assist urban planners to meet the different challenges (health and wellbeing, biodiversity, climate change, air quality...) of today. Where to develop and preserve which type of green to establish solutions for many problems simultaneously is however not straightforward. The online Nature Value Explorer tool (www.natuurwaardeverkenner.be) is originally aimed to value the impact of larger scale nature restoration projects on ecosystem services, but is currently being extended with an urban version. Its aim is to support cities, administrations and urban planners in putting the right green on the

right place in urban environments, paying attention to the quality and the functions of the green infrastructure and the impact on ecosystem services. Cities can also estimate the effects of the existing and planned green infrastructure on reaching different sustainability ambitions. This urban version builds on a specific typology of urban green and requires other valuation methodologies specifically suited for urban environments. Ecosystem services which can be valued include urban farming, air quality, urban heat islands, carbon sequestration, water retention and health and wellbeing. The presentation will present the user requirements for such a system, the valuation methodologies and demonstrate results for a case. We will also discuss challenges that arise when developing such tools. A large challenge for practical tools is that they need to be rather simple, user-friendly, transparent and flexible to address future questions and include new insights. On the other hand, they also require a high accuracy and scientific reliability.

- *Irene Bouwma*, Alterra, Anne Gerdien Prins, Ed Dammers, PBL; Hans Farjon, WOT; Arjen van Hinsberg, Marijke Vonk, Jaap Wiertz Henk van Zeijts, PBL, The Netherlands, irene.bouwma@wur.nl

Nature based solutions in PBL's European Outlook - How will they change nature and landscape in Europe?

The European Nature Outlook, which is developed by the Netherlands Environmental Assessment Agency (PBL), elaborates four different views about nature in Europe in 2050, based on the underlying values of people. The four perspectives explore a desired future state of nature and its corresponding stakeholder coalitions to realize this. Each perspective consists of storylines, images, maps and figures. Nature based solutions, that provide socio-economic benefits for human society and sustainable future for wildlife, play an important role in one of the four perspectives. In different types of land use such as urban development, agriculture, river management and forestry nature and natural elements might be integrated in order to provide the 'nature based solutions'. During the presentation, the four perspectives will be briefly presented. The perspective using nature based solutions will be elaborated in more detail to show how the upscaling of the solutions will change the land use, landscapes and consequently nature in Europe. In addition the preliminary results of the assessment of how those perspectives might contribute to achieving the EU nature policy goals will be presented. The talk is relevant for researchers engaged in the debate about the effects the upscaling of nature based solutions for land use and nature in Europe as well as for policy makers who need to review the contribution of these solutions to achieving the EU nature policy targets. The PBL- European Nature Outlook will be published in the first half of 2016.

Session 8/3. Green infrastructure providing nature-based solutions in urban planning

(Room Monica)

Organizers: *Leena Kopperoinen*, Finnish Environ Inst SYKE; *Erik Stange*, Norwegian Inst Nature Res NINA, leena.kopperoinen@ymparisto.fi, erik.stange@nina.no

with support of all the researchers in the OpenNESS urban joint research activity (UAB; Technalia, Spain; Slovak Acad Sci; NINA; SYKE; VISTA Analyse A/S, Univ Helsinki)

European Commission has defined nature-based solutions (NBS) as planning and design strategies that are inspired by, continuously supported by and utilizing nature to address various societal challenges in a resource efficient and adaptable manner that provides economic, social and environmental benefits. Planning of urban green infrastructure and water areas offers numerous versatile opportunities for nature-based solutions. Storm water management is presently one of the most recognised applications for nature-based solutions, with strategies that are often related to climate change adaptation measures. Other less prominent examples include improving health by offering urban citizens closer contact with their local natural environment, offering natural classrooms and a living laboratories for several school subjects, enhancing aesthetic quality of urban environment, serving as places for social interaction creating cohesion, and further enhancing well-being of urban area residents. The objective of this session is to get a multifaceted view on the nature-based solutions that have been concretised in urban planning so far. The session would additionally address future perspectives on other possible ways to benefit from nature-based solutions provided by green infrastructure. Questions will relate to why, what, how, and in which situations urban planning can deploy green infrastructure to provide nature-based solutions. Also, what are the possible obstacles and how to tackle those are of interest. The session will consist of presentations addressing the questions above, as well as round-table discussion to outline the way forward. A draft OpenNESS policy brief related to nature-based solutions in urban planning will be discussed and developed further.

- *Erik Stange*, Norwegian Inst Nature Research NINA, erik.stange@nina.no

Oslo's Blue Green Factor: how planning based on a Nature-Based Solutions for storm water management can enhance other ecosystem services

- [Jakub Kronenberg](#), Univ Lodz, kronenbe@uni.lodz.pl

Why are nature-based solutions difficult to accept in a post-socialist city?

- [Linda Zardo](#), Davide Geneletti, Univ Trento, linda.zardo@gmail.com

Assessing the benefits of ecosystem-based climate adaptation in urban areas

This paper presents a methodology to optimize the provisioning of local climate regulation services through EbA measures and the expected benefits on different population groups. EbA measures are defined as the use of biodiversity and ecosystem services to help people to adapt to the adverse effects of climate change. The methodology is based on step-wise process for assessing and designing EbA measures focusing on their local climate regulation performance. Results provide a spatial explicit classification of green and blue areas according to their local ES provisioning, both within and outside green/blue areas. More specifically we assess and map the cooling effect of green/blue areas in the city and investigating the relationships between the attributes of an ecosystem and the spatial extent of the cooling effect. We investigated how changes in the ecosystem structure influence the ecosystem service provision in order to better meet human wellbeing. The structure of an ecosystem is defined by its attributes, such as soil cover or tree canopy coverage. Specifically, we address research questions such as i) which attributes of green/blue areas affect the provision of climate-related ecosystem services (ES) and ii) which combinations of attributes permit the best functioning performance. Additionally, iii) insights about the most promising planning solutions for upgrading the cooling performance of ecosystems are provided -for example on areas where specific interventions (e.g. on tree canopy or soil cover) are bound to be most effective. The hypothesis is that the best design for the higher cooling effect inside the green/blue area and the best design for a bigger buffer of cooling effect outside the green/blue area do not necessarily correspond. The analysis of this possible mismatch would provide insights for solving trade-offs, optimizing the number of beneficiaries reached by the ES and designing city's green areas in order to equally meet citizens' needs and wellbeing. The final step consists of matching the expected effects with the distribution of different population groups, characterized by different vulnerability levels, in order to estimate the overall contribution to their wellbeing. In particular, the analysis was broken down for different age group, income group, neighborhoods,... The methodology has been applied to different urban contexts in Europe.

- [Maaïke Breugelmans](#), City of Ghent, maaike.breugelmans@gent.be

Green-blue infrastructure to moderate the urban heat island effect in Ghent

- [Leena Kopperoinen](#), Finnish Environment Institute (SYKE), leena.kopperoinen@ymparisto.fi

Suggestions for the way forward in applying Nature-Based Solutions in urban planning based on OpenNESS urban case studies' joint research activity

Session 8/4: Nature-based urban health and wellbeing: 'Open Space' enquiries to identify future directions

(Room Nicolaas)

Conveners: Assoc. Prof. Marcus Grant, Advisor to WHO European Healthy Cities Network, Univ West England, UK; Dr. Katherine Irvine, ALTER-Net and James Hutton Inst, Aberdeen, marcus.grant@uwe.ac.uk; katherine.irvine@hutton.ac.uk

Organizers/facilitators: Kate Irvine, James Hutton Inst; Marcus Grant, Univ West England; Timo Assmuth, SYKE, marcus.grant@uwe.ac.uk; katherine.irvine@hutton.ac.uk

Aim/Goal: To identify new inroads to nature-based urban health and wellbeing.

Approach: All participants shape and contribute to the outcome through an innovative and open format for discussion. Building on the collective experience of those attending this session and of the conference as a whole, we seek to encourage an agenda that responds to emergent dominant conference discourses.

Process: (i) Introductory briefing; (ii) collectively set out an agenda to chart visions for and paths to future (including obstacles and opportunities). (iii) small group work to link knowledge - scientific and experiential - with practice; semi-structured expert opinion will complement free discourse.

Outcomes: (i) Better clarity for future direction for chose foci; and (ii) Provide material for further reflection.

Background: An extensive multi-faceted evidence base suggests that nature can support the health and wellbeing of urban populations. While many contested details and potentially conflicting factors continue to be investigated, the broad direction of travel is clear. To realize this support requires consideration of questions such as:

- Is there a more systemic paradigm to pull this field together?

- What role can we each play in developing the emerging policy agenda?
- How do we move from scientific insight to policy interventions for successful nature-based interventions?

Objectives: This session will provide a 'un-conference' space in which questions and ideas arising amongst conference participants can be aired and become the basis for informed discourse.

Details: Based on the novel 'Open Space Technology', this session uses a facilitated co-creation approach to allow multiple conversations between delegates on topics that have emerged as issues during the conference. An initial framing will be provided after which delegates are invited to put forward topics for further enquiry. Four to six issues will be chosen for discussion in small groups. Delegates then self-select into a group for work with others interested in the same topic or they may choose to move between groups carrying ideas to cross-fertilize discussions. Brief framing and instructions will be provided.

Outcome: Identified key points, agendas for action and research questions will be drawn together from across the small group discussions which are likely to have relevance to multiple conference themes.

Special requirements: A room big enough to hold four to six separate cluster groups, movable chairs and not fixed or raked seating required. Power-point and projection not required. This is to be a participatory session.

Session 8/5: Is there room for value integration over disciplines?

(Room Carthago)

Proposers: Kati Vierikko, Dept Environ Sci, Univ Helsinki, kati.vierikko@helsinki.fi; Sander Jacobs, Res Group Nature & Society, Inst Nature & Forest INBO, sander.jacobs@inbo.be

Organizers: Kati Vierikko, Univ Helsinki; the Value Integration thematic group of Ecosystem Service Partnership (ESP) <http://www.es-partnership.org/esp/81931/5/0/50> Dept Environ Sci, Univ Helsinki, Res Group Nature & Society, INBO

The session will discuss on how to improve human wellbeing and ecological sustainability in cities by transdisciplinary approach and by integrating multiple values of ecosystem services in sustainable urban planning through participative governance. Cities are facing several ecological, social and economic challenges caused by poverty, climate change, unplanned migration and densification. However, cities can also be seen as cultural and biological *rendez-vous* providing diverse associations within and between culture and the environment. We call not only for nature-based solutions but more likely for bio-cultural based initiatives to support sustainable urban planning through participative governance.

Session objectives and outcomes: The session focuses on innovative transdisciplinary approaches that consider nature-based solutions and value pluralism in ecosystem service approach. The panel will seek the answer into questions: How to integrate diverse values into nature-based planning and governance in practice? What kind of paradigm shift or methodological approaches is needed for transdisciplinary thinking in urban governance, planning or research? What new ways are possible to support research in this transition zone of disciplines. Main contributions of presentations and key messages of the panel discussion will be presented in a policy letter (2-3 pages).

For whom: The session is relevant for scientists, policy makers, decision-makers and urban planners who are struggling with the challenge of combining diverse values and needs of different citizens and stakeholders, while aiming at enhancing ecological sustainability and green economy in cities.

- Kati Vierikko, Univ Helsinki (chair), kati.vierikko@helsinki.fi;

Opening words

- Sander Jacobs, INBO, sander.jacobs@inbo.be

Value integration in ecosystem service approach

- Nicolas Dendoncker, Univ Namur

Integrating values of Ecosystem Services for sustainability – Evidence from the Belgium Ecosystem Services community (BEES) of practice

- *Marion Mehring*, *Diana Hummel*, *Alexandra Lux*, *Thomas Jahn*, *ISOE – Institute for Social-Ecological Research & BiK-F Biodiversity and Climate Res Center*, mehring@isoe.de

New Ways for Human Well-being in Urban Contexts? A framework of a trans-disciplinary research process

Urbanization as a social-ecological process covers adequately the hybrid notions of transformation, nested in society but at the same time depending and impacting on the natural environment. In this context, the known societal problems of e.g. ecological quality of cities or human well-being are called into question. Transdisciplinarity, as a critical and self-reflexive research approach relating societal with scientific problems contributes to approach this challenge in terms of producing new knowledge by integrating different scientific and extra-scientific insights. This oral contribution presents our framework of a transdisciplinary research process. Focusing on societal problems, three types of knowledge will be explained which must be addressed in research on nature and urban well-being: system knowledge, orientation knowledge, and transformation knowledge. Furthermore, aspects for quality assurance in transdisciplinary research will be shown. With this presentation we seek to contribute to the present debate on how to address urban well-being, the apparently conflict of human well-being in an urban environment. From a conceptual perspective, we will show how a transdisciplinary research process makes a difference.

- *Birgit Elands*, *Wageningen Univ*, birgit.elands@wur.nl

Towards diverse and sustainable governance of cities – Biocultural diversity in 20 European cities