BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T9b

Healthy ecosystems for healthy people: Evidence-based benefits of nature exposure to human health

Hosts:

	Name	Organisation	E-mail
Host:	Sarai Pouso	AZTI, Marine Research, Basque Research and Technology Alliance (BRITA)	spouso@azti.es
Co-host(s):	María C. Uyarra	AZTI, Marine Research, Basque Research and Technology Alliance (BRITA)	mcuyarra@azti.es
	Rachel Oh	Helmholtz Centre for Integrative Biodiversity Research (iDiv)	r.oh@uq.edu.au
	Angel Burov	RESEARCH INSTITUTE AT MEDICAL UNIVERSITY OF PLOVDIV	angel.burov@mu-plovdiv.bg

Abstract:

The 'One Planet, One Health' theme of the ESP Conference emphasizes the interdependence of human health, animal health, ecosystem health, and environmental health, underscoring the pivotal role of nature in promoting human wellbeing. One of the ways in which nature can contribute to human wellbeing is by being exposed to nature whether intentionally (e.g. nature-based recreational activities), or unintentionally (e.g. commuting to work through parks).

The concept of nature spaces as restorative environments offering numerous health benefits for various medical conditions, represents a growing research interest. Historically, the impacts of nature exposure on human health were predominantly studied from a medical perspective, emphasizing aspects related to public health and environmental psychology. More, recent efforts have extended this perspective to encompass environmental sciences, particularly through the framework of 'ecosystem services' or *'nature's contribution to people'.*

Nature exposure and its associated health benefits are classified as cultural ecosystem services and defined as the "*biotic and abiotic characteristics that enable activities promoting health, recuperation or enjoyment though active and passive interactions*" (adapted from Haines-Young & Potschin (2018)).

While medical studies primarily focus on the direct health and well-being outcomes of exposure to nature (e.g. improved physical health, reduced risk of disease), environmental studies delve into the underlying environmental characteristics, functions and processes that enable humans to obtain benefits from nature (Pouso et al. 2023). However, both psychological and medical studies into nature's health-promoting effect, alongside environmental and economic studies that explore human benefits from cultural ecosystem services, represent complementary bodies of knowledge exploring the same concept through distinct disciplinary lenses (Bratman et al., 2019; Sandifer et al., 2015).

Goals and objectives of the session:

In this session, we aim to synthesis key findings and evidence regarding the role of ecosystem services in enhancing human physical and mental health and wellbeing through direct and indirect exposure to healthy ecosystems. Direct exposure encompasses activities such as sports or recreational pursuits in natural settings, participation in environmental volunteering, and engagement in nature-based therapies. Indirect exposure includes activities like watching nature documentaries or enjoying views of natural landscapes from indoors. We seek contributions that elucidate how exposure to diverse ecosystems—such as urban parks, protected areas, coastal and marine environments, blue inland spaces, and agricultural landscapes—contributes to physical and mental health benefits. These benefits may include improvements in physical conditions, reductions in anxiety and depression, and the cultivation of positive emotions.

We welcome contributions that explore the environmental requirements needed to optimize nature's impact on human health outcomes. This includes investigations into variations between ecosystem types, role of environmental quality, and contributions from environmental restoration. We are especially interested in health studies that include an environmental conservation angle - to assess tradeoffs and synergies between benefits to nature and humans. We also invite studies that examine the synergistic benefits of increased nature exposure for the natural environment. These benefits may manifest as heightened environmental awareness, strengthened pro-environmental behaviors and greater commitment to conservation efforts.

Through this session, we aim to understand the critical role of ecosystem services research in advancing our understanding of the benefits of nature exposure for human wellbeing and environmental conservation. By fostering interdisciplinary dialogue and synthesizing empirical data, we seek to strengthen the evidence base supporting the integration of nature-based solutions into public health and environmental policies.

Planned output / Deliverables:

Depending on the contributions received, we will prepare a collaborative review paper for publication, focusing on the differences and synergies between the approaches used in different research disciplines (e.g., psychology, medical, environmental research) working in the field of ecosystem benefits for human health. Contributions to the sessions will be used as means to provide case studies and examples in the paper.

Session format:

Between 2 and 3 hours: Standard session (presentations) with a time at the end for discussion

II. SESSION PROGRAM

Room: Expert Street 5

Date of session: 21st of November 2024
Time of session: 13:30 – 15:30

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
13:30	**Introduction to the Session**			
13:35	Yuanyuan	Mao	Institute of Environmental Sciences (CML), Leiden University	Not Your Typical Treatment: Quantifying the Influence of Urban Nature Types on Mental Health
13:48	Sjerp	De Vries	Wageningen University & Research, the Netherlands	Domestic gardens, private green space, and human health: associations for 21 types of health conditions
14:01	Marta	Melon		Are parks sufficient to implement nature-based recreation in urban spaces?
14:14	Tomasz	Grzyb	Faculty of Geography and Regional Studies, University of Warsaw	Cultural ecosystem services and ecosystem disservices as well-being agents: linkages and drivers in the urban riverscape context
14:27	Sarai	Pouso	AZTI,	How marine recreational activities affect human health and wellbeing?

Time	First name	Surname	Organization	Title of presentation
14:40	Uta	Schirpke	Eurac Research, Institute for Alpine Environment, Bozen/Bolzano, Italy	Benefits to people of mountain soundscapes
14:53	Chiara-Charlotte	Iodice	ILS Research gGmbH, Dortmund, Germany	A healthier planet for all – green and blue spaces and their benefits for mental health: Co-creation approaches of the GreenME project
15:06	Rachel	Oh	Helmholtz Centre for Environmental Research (UFZ); German Centre for Biodiversity Research (iDiv)	Assessing the prevalence and bias of study designs in nature and mental-health studies.
15:19	**Time for Discussion**			

III.ABSTRACTS

The first author is the presenting author unless indicated otherwise.

1. Domestic gardens, private green space, and human health: associations for 21 types of health conditions

First authors(s): Sjerp de Vries
Other author(s): Christos Baliatsas, Robert Verheij, Michel Dückers
Affiliation: Wageningen University & Research
Contact: sjerp.devries@wur.nl

Research on nature and human health has shown that the amount of green space in the residential environment is protectively associated with a wide range of health outcomes. A common assumption behind the focus on the residential environment is that, besides its amount, the nearness of the green space is a proxy for the amount of contact with it, with the latter assumed to be instrumental in at least some of the pathways by which nature is thought to positively affect human health. Contact with own garden greenery is likely to be extensive. Nevertheless, there has been little research on the health benefits of private green space. In a environmental epidemiological study (N ~ 800 000), we looked at associations between the

amount of garden greenery and the prevalence of 21 types of health conditions, correcting for socioeconomic status at the individual and at the neighbourhood level. Results show that the amount of garden greenery is protectively associated with 16 of the health conditions, i.e., when comparing having a domestic garden with at least 50 m2 of greenery with no garden being present at all. Including the amount of greenery in the wider residential environment, i.e. within 125m from one's home, did not noticeably change the outcomes. As a partial check on reversed causality, analyses were re-run with only people living at least five years at their present address. This selection hardly attenuated results either. Associations were strongest for stroke, heart disease, and intestinal tract infections, with an over 20% lower prevalence for the latter. Sex was an important moderator, with associations generally being stronger for women. Implications of the results are discussed, also with regard to potential pathways and the importance of the biodiversity of the garden greenery in such pathways.

Keywords: ecosystem services, garden greenery, morbidity, disease, disorder

2. Not Your Typical Treatment: Quantifying the Influence of Urban Nature Types on Mental Health

First authors(s): Yuanyuan Mao

Other author(s): Yingjie Li, Lisa Mandle, Anne Guerry, Lingli Hou, Tong Wu, Rita de Sousa-Silva, Peter van Bodegom

Affiliation: Institute of Environmental Sciences (CML), Leiden University

Contact: y.mao@cml.leidenuniv.nl

Growing evidence suggests that urban nature provides human health many benefits, with mental health being of significant importance. However, a quantitative overview of the relationship between types of urban nature and mental health is still missing, while such information is crucial for urban planning in relation to public health. We evaluate the impact of different urban nature types on mental health. A systematic review with meta-analysis is conducted to synthesize the evidence on urban nature types and mental health. We searched three main electronic databases (Web of Science, Scopus, and PubMed) and included studies that are limited to peer-reviewed original work published in English from inception until 11 January 2023. Information on urban nature type, quantity, exposure, as well as mental health indicators and measurement tools was extracted from each study. 446 studies were included in our final dataset. We conducted a preliminary analysis, focusing on a specific outcome, namely mental well-being, based on a subset of 21 studies (101 cases). This analysis showed a positive increase in mental wellbeing for each increment of overall urban nature. Both general

greenspace and grassland were significantly associated with mental well-being, with the former being beneficial and the latter being negatively related. Particularly, NDVI (Normalized Difference Vegetation Index) and street-view greenery affected mental well-being positively. Open water, general bluespace, and forests/tree types were not substantially associated with mental well-being. Our findings suggest increasing the amount of greenspace in urban residential areas within a 500-meter buffer contributes to promoting mental well-being. More consistency between studies is needed to understand the effects of specific urban nature types. Our analysis will be expanded to other mental health outcomes, such as depression, anxiety, and mood for a more encompassing assessment.

Keywords: Urban nature type, Mental health, Nature exposure, Residential buffer, Quantity

3. Assessing the prevalence and bias of study designs in nature and mental-health studies.

First authors(s): Rachel R. Y. Oh
Affiliation: Helmholtz Centre for Environmental Research (UFZ); German Centre for Biodiversity Research (iDiv)
Contact: r.oh@uq.edu.au

The potential of contact with nature as a health intervention has gained significant momentum. However, the credibility of supporting evidence is contingent upon the quality of study designs, which differ in their biases and capacity to accurately assess the true effect of nature exposure on health outcomes. In this study, we empirically assessed the prevalence of various study designs used to assess relationships between nature exposure and mental health outcomes. We examined geographical, temporal and disciplinary variations in the definitions of “nature exposure” and “mental health”, as well as the diverse methods used to track changes in these factors. Our initial findings indicated that while the number of uncontrolled and observational study designs from North America was relatively small, these studies had a substantially larger combined sample size compared to others. We also identified a tradeoff between the spatial resolution of nature exposure measures and health outcomes. Crucially, complex designs (that arguably yield more credible results) varied in their control for confounders. We conclude with a discussion on the implications for evidence synthesis, and provide recommendations to broaden the portfolio of emerging research needs, emphasizing the importance of improving study design quality to enhance the credibility of findings in this field.

Keywords: nature-based health intervention; exposure; nature dose; causality; public health; evidence synthesis

4. How marine recreational activities affect human health and wellbeing?

First authors(s): Sarai Pouso

Other author(s): María C. UYARRA, Natalia MONTERO Claudia, ESCUDERO Izaskun, ZORITA, Iratxe MENCHACA, Oihana SOLAUN, Ainhize URIARTE

Affiliation: AZTI, Marine Research, Basque Research and Technology Alliance (BRTA), Herrera Kaia, Portualdea z/g, Pasaia 20110, Spain

Contact: spouso@azti.es

From the many benefits obtained from marine ecosystem services, opportunities for recreation are one of the most popular and valued by people. However, few studies have studied in detail the diversity of marine recreational activities (MRAs) and the manyfold ways in which each of them contributes to wellbeing. Using the Atlantic coast of Spain as case study, we analysed the contribution of coastal areas, through the practice of MRAs, to human health and wellbeing. A survey was designed to get insights into MRAs and i) motives to practice them, ii) feelings and emotions associated to their practice, and iii) their contribution to psychological restoration. Two psychometric scales were adapted and used, the Positive and Negative Affect Schedule (PANAS) scale and Restoration Outcome Scale (ROS). The survey was filled in during summer 2023 by more than 800 people. The most popular MRAs were bathing, surfing, open water swimming, SCUBA diving, rowing, seaside walking, fishing from land, and sailing. Overall, respondents had high level of experience in their specific MRA. The three main motivations to practice MRAs were to find relaxation, being in contact with the ocean and practicing sports. All MRAs highly contributed to positive emotions, with different type of emotions between MRAs and with only few cases reporting negative feelings. The ROS scale showed that MRAs positively contribute to increasing relaxation and calmness, attention restoration and clearing one´s thoughts. This study suggests that the ocean, through MRAs, contributes to different aspects of human wellbeing. While this study found that all MRA had positive outcomes, each MRA contributes to different aspects of wellbeing. Also, that MRA benefits are influenced by environmental conditions, environmental status and crowdedness. In conclusion, coastal areas and MRAs need to be adequately managed, to ensure the good environmental quality that supports human health benefits.

Keywords: marine ecosystem services, cultural ecosystem services, recreational activities, human health, mental health

5. Benefits to people of mountain soundscapes

First authors(s): Uta Schirpke
Other author(s): Manuel Ebner
Affiliation: Eurac Research
Contact: uta.schirpke@eurac.edu

Mountain landscapes provide a wide of opportunities for human-nature interactions, which contribute to physical and mental health through multisensory experiences. While research has mostly focused on visual landscape qualities, the characteristics of the soundscape are less understood. In this study, we explore the sound composition of different mountain habitats through soundscape measurements and relate these to people's perceived qualities and well-being benefits. We found differences in acoustic characteristics along elevational gradients in terms of sound diversity and composition. Human inference on natural soundscape qualities occurred across all sites but differed in terms of sources and sounds. Quietness, natural sounds, and sounds originating from cultural activities such as cow bells were ranked higher than traffic noise and sounds related to human activities and facilities. Most important benefits included auditory pleasant experiences, restorativeness, and sense of place. Our findings contribute to a better understanding of the auditory dimension of experiential interactions, relating environmental characteristics to people's perceptions and benefits. Thus, measuring acoustic and perceived soundscape components supports integrating soundscape characteristics into ecosystem services assessments and conservation efforts.

Keywords: Restorativeness; Soundscape quality; Human-nature interactions

6. Cultural ecosystem services and ecosystem disservices as well-being agents: linkages and drivers in the urban riverscape context

First authors(s): Tomasz Grzyb
Affiliation: University of Warsaw
Contact: t.grzyb@uw.edu.pl

Direct human-nature interactions have a pivotal role in shaping the well-being of urban societies. Recreational opportunities within urban green and blue spaces may beneficially contribute to various aspects of the physical and mental health of their visitors. These positive agents of well-being—often analysed under the cultural ecosystem services framework—are,

however, one side of the coin. To fully understand how intentional exposure to urban nature affects the residents, disturbing or unpleasant natural phenomena (ecosystem disservices) need to be taken into account, along with the negative effects of other visitors and shortages of amenities. Understanding synergies and/or trade-offs among positive and negative agents of well-being, along with revealing their environmental drivers, may foster the sustainable management of urban natural spaces.

This study employs the results of a representative survey with the residents of Warsaw, Poland, to identify linkages and associations among positive and negative well-being agents related to their visits along the Vistula River. A set of statements describing cultural ecosystem services and disservices was assessed by the survey participants according to their recalled memories (the citywide scale). Then, up to five most significant well-being agents were mapped by the participants and enriched with information on their preferences towards these places (the local scale). Although the results of factor analysis clearly distinguished positive and negative agents in the citywide scale, local-scale associations turned out to be not that straightforward, with principal components centred around (1) emotional attachment to the river and both positive and negative outputs of interaction with riverine nature; (2) nature-led discomfort agents and shortages of amenities; (3) sport and creativity opportunities and safety concerns, and (4) pros and cons of social life. Multinomial logistic regression was then used to identify to what extent visitation preferences affect the relationships between urban riverscape characteristics and well-being agents.

Keywords: well-being, cultural ecosystem services, ecosystem disservices, urban riverscape

7. Are parks sufficient to implement nature-based recreation in urban spaces?

First authors(s): Marta Melon

Other author(s): Piotr Sikorski, Piotr Archiciński, Edyta Łaszkiewicz, Adrian Hoppa, Daria Sikorska

Affiliation: Warsaw University of Life Sciences – SGGW, Institute of Environmental Engineering, Nowoursynowska 159, 02-776 Warsaw, Poland

Contact: marta_melon@sggw.edu.pl

Our research in Warsaw aimed to verify the hypothesis that areas selected for nature-based recreation are characterised by increased biodiversity and diversity, with formal green spaces like parks playing an important role. This was achieved by integrating social and environmental

parameters, taking into account both objective indicators (including the presence of rare species) and a subjective perspective. Extensive geotagging surveys were conducted among 401 working-age Warsaw residents, together with field analyses, to discern subtle differences between the points indicated in the survey and to classify these areas. Four different types of chosen natural areas were identified, but notably urban parks were key locations for contact with nature, even though objective measures of biodiversity were often low. This study highlights the need for a comprehensive understanding of how urban residents interact with and value nature, emphasising the importance of categorising areas for recreation with nature in a localised way (e.g. in one facility) and recognising the significant role of urban parks.

Keywords: biodiversity, urban green spaces, vegetation structure, urban planning, nature-based recreation