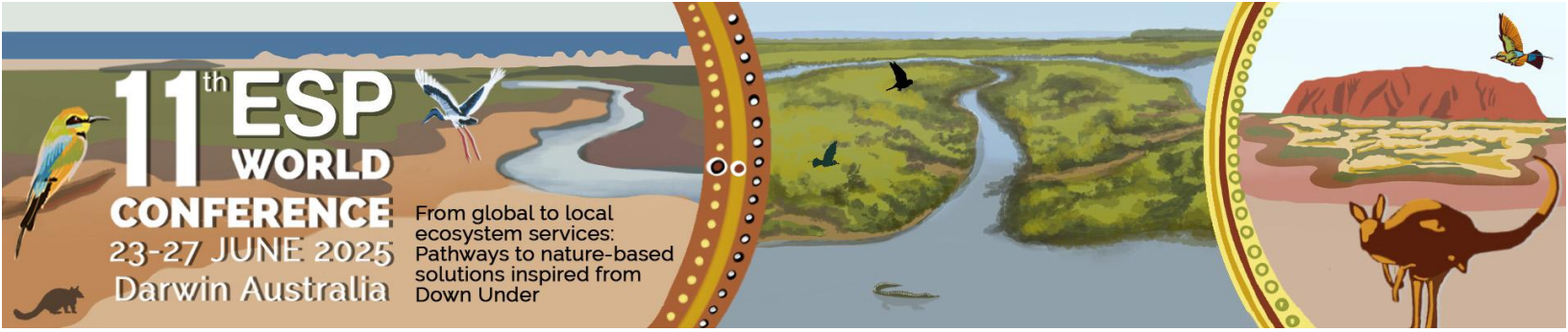


BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T9

Urban ecosystems services and public health in a time of global warming

	Name	Organisation	E-mail
Host:	Sining Zhang	Associated Professor. Landscape Architecture Department, School of Architecture, Southwest Jiaotong University, Chengdu, China	zsning@swjtu.edu.cn
Co-host(s):	Prof. Bo Hong	Professor, College of Landscape Architecture and Arts, Northwest Agriculture and Forestry University, Yangling, China	hongbo@nwsuaf.edu.cn
	Dr. Jing Xie	Postdoc, Graduate School of Horticulture, Chiba University, Chiba, Japan. Associate Professor, Landscape Architecture Department, Sichuan Agricultural University, Chengdu, China	601644520xj@gmail.com

Abstract:

As global warming spreads, extreme urban heat and climate events become more frequent and stronger. With the continuous intensification of urbanization, cities have become the main living environment for humans worldwide. Urbanization not only strengthens the urban heat island effect, but also increases the risk of disease transmission, exposing more and more people to the threat of climate change, and seriously threatening public health and human well-being. In addition, the sensitivity and vulnerability of different groups of people to the environment will vary due to changes in their socioeconomic background (such as income level). Studies have shown that urban blue-green spaces (such as parks, forests, lakes and other natural environments) can provide many ecosystem services and are considered an important urban heat intervention measurement. Although people are extremely dependent on blue-green spaces that provide them with climate shelter and ecosystem services, the aesthetic and recreational values of these spaces (cultural ecosystem services) are currently more appreciated. In the context of global warming, their indirect benefits (regulatory services, such as heat island effect mitigation or thermal comfort

improvement) are not always perceived and valued, resulting in the current lack of active planning and design interventions based on "microclimate adaptation and mitigation" and "health promotion". The relationship between urban public health and ecosystem services regarding urban heat has not been effectively incorporated into urban planning and design, and landscape planning and design, nor has active health intervention been carried out from the perspective of comprehensively improving the capacity of urban ecosystem services to reduce heat exposure and improve urban heat adaptation. Therefore, the questions to be discussed at this session are: What is the relationship between urban ecosystem services and public health in the context of global warming? Does the relationship between urban ecosystem services and public health change at different spatial and temporal scales? What is the relationship between urban ecosystem services and the health of residents with different natural and social attributes? How to develop urban ecosystem services to help improve public health?

Goals and objectives of the session:

It has great practical significance and far-reaching social and ecological value considering the study of the relationship between urban ecosystem services and public health considering global warming, which is beneficial to human health and urban sustainable development. The main goal of this conference is to collect various advances and the latest research findings, aiming to comprehensively analyze the above relationship to reflect the intrinsic meaning, drive impactors, and mechanisms of urban ecosystem services and public health considering urban heat.

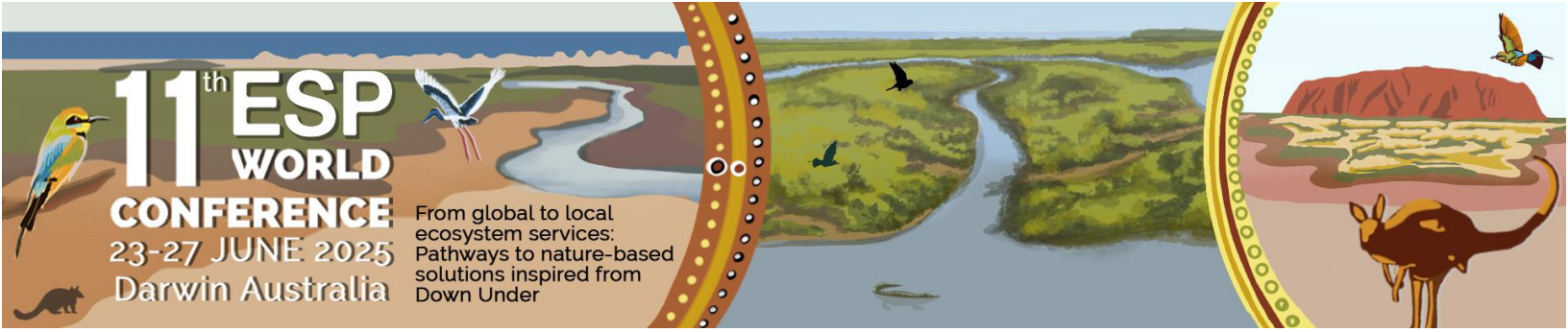
Planned output / Deliverables:

This Session wants to collect manuscripts and studies investigating the relationship between public health, urban heat environment, urban blue-green spaces, and ecosystem services using an innovative and integrated perspective. Besides, inter-and transdisciplinary concepts and approaches among urban planners and designers, urban scientists, ecologists, geographers and other related scientists are warmly welcome. Meanwhile, some excellent manuscripts may be invited for publication in journals, such as Urban Climate, Architectural Science Review (AHCI), Journal of Parks, etc.

II. SESSION PROGRAM

Room: Damibila 1
Date of session: Tuesday 24 June
Time of session: 15:30-18:00

Timetable speakers:



Time	First name	Surname	Organization	Title of presentation
15:30 – 15:35	Session hosts: Zhang Sining, Associate Professor, Southwest Jiaotong University, China Xie Jing, Associate Professor, Sichuan Agricultural University, China			Introduction
15:35–15:50	Xiaoli Gongming Yuqi Yichen	Han Song Ge Zhou	College of Architecture, Xi'an University of Architecture and Technology, China	Study on River Landscape Mode of Waterfront City with High Density Based on Ecological Restoration --- Taking an example of Yan'an
15:50–16:05	Maya	Kocian	Earth Economics	Quantifying the Public Health and Economic Benefits of Blue-Green Infrastructure in Cities Across the United States
16:05–16:20	Sining	Zhang	Landscape Architecture Department, School of Architecture, Southwest Jiaotong University, China	Analysis of the Characteristics of Urban Heat Island Intensity of Old and New Urban Communities in Chengdu, China
16:20–16:35	Daniele	La Rosa	University of Catania, Department of Civil Engineering and Architecture, Italy	Spatially explicit scenarios of urban climate regulation to maximise social benefits
16:35–16:50	Alessio	Russo	School of Architecture and Built Environment, Faculty of Engineering, Queensland University of Technology, Brisbane, Australia	Bringing Nature Back to Cities: Distinctions and Synergies in Regreening, Renaturing, and Rewilding for Ecosystem Services and the Nature–Health–Climate Nexus
16:50–17:05	Dehuan L. Roman	Li Carrasco	Department of Biological Sciences, National University of Singapore, Singapore	Global matching of supply and demand of urban heat mitigation by green and blue spaces under climate change
17:05–17:20	Kan	Chen	Tsinghua University, China	Urban Diagnosis and Healing Based on Micro Water Systems from a Holistic Health Perspective: A Case Study of the Yulin Area in Chengdu

Time	First name	Surname	Organization	Title of presentation
17:20–17:35	Sneha Subrata Gautam	Pandey Nandy Talukdar	Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand Indian Institute of Remote Sensing, Kalidas Road Uttarakhand	Beyond the Concrete Jungle: A Satellite-based Approach to Mapping Urban Green Spaces and Urban Heat Islands
17:35–18:00	Session hosts			Question and Discussion
18:00	The End			

III. LIST OF ABSTRACTS

The first author is the presenting author unless indicated otherwise.

1. Study on River Landscape Mode of Waterfront City with High Density Based on Ecological Restoration – Taking an example of Yan'an

First authors(s): Xiaoli Han Song Gongming

Other author(s): Gongming Song

First author affiliation: Xi'an Univ. of Arch. and Tech.

Contact: songjingchen001@126.com

Keywords: River Landscape Mode, Ecological Restoration, waterfront city, High density, Yan 'an

With rapid urbanization the amount of urban population and land is increasing constantly, phenomena appear frequently such as encroaching on river space, weakening river ecological functions, hardening river embarkment, blocking the water cycle between underground, surface and air, polluting river, and reducing biodiversity, etc. Tremendous pressure on river ecology plague urban development.

Yan'an as a typical waterfront city which has always been plagued by floods, landslides, debris flows and other disasters on the Loess Plateau. Research on its river restoration clarified the interdependence between organisms and habitats by understanding of the natural conditions such as topographic slope, vegetation biodiversity and river runoff grade, etc. Aiming at problems such as periodic and drastic changes of rainfall, high sediment of river water, unstable habitat and soil erosion in Yan 'an, the implantation method of landscape elements and reasonable spatial-temporal allocation to improve the originally damaged river habitat and create an environment more suitable for biological growth is explored by comparing the data of animal and plant species before and after river landscape construction.

Habitat restoration strategy of waterfront cities on the Loess Plateau including implanted plaques, introduced corridor and intervened matrix is summarized, multilayer three-dimensional pattern of river landscape in Yan ‘an is helpful to conservate ecology, restore habitat, improve water system, prevent disaster and flood.

2. Quantifying the Public Health and Economic Benefits of Blue-Green Infrastructure in Cities Across the United States

First authors(s): Maya Kocian

Other author(s): No

First author affiliation: Earth Economics

Contact: mkocian@eartheconomics.org

Keywords: Urban Heat Mitigation, Green Infrastructure, Public Health, Economic Valuation, Climate Justice

As global temperatures rise and urbanization accelerates, cities across the United States face intensified heat island effects that threaten public health, particularly in low-income and marginalized communities. Urban blue-green infrastructure (BGI)—including parks, wetlands, tree canopies, and green roofs—provides vital cooling, stormwater absorption, and air quality

benefits, yet these regulating ecosystem services remain undervalued in planning and investment decisions.

This presentation will showcase how Earth Economics' suite of analytical tools helps cities quantify the public health and economic benefits of BGI, strengthening the case for nature-based solutions (NBS) in urban planning. The Urban Heat Mitigation Mapper identifies high-risk areas and assesses cooling impacts of tree planting and green space expansion. The Stormwater Valuation Tool measures the flood protection benefits of wetlands and permeable infrastructure. The Physical Activity Tool links access to green spaces with improved health outcomes, reinforcing the case for urban greening as a public health intervention.

Using examples from cities across the country—including South Bronx (New York City), San Diego (CA), Cincinnati (OH), Los Angeles (CA), Tacoma (WA), and Washington, D.C.—this session will highlight how economic valuation supports climate justice and public health-driven urban planning. By integrating economic analysis, public health data, and climate adaptation strategies, these tools provide a practical framework for decision-makers.

This session will demonstrate how cities and agencies can leverage ecosystem service valuation to secure funding, inform policy, and design equitable, climate-resilient urban spaces across the United States.

3. Analysis of the Characteristics of Urban Heat Island Intensity of Old and New Urban Communities in Chengdu, China

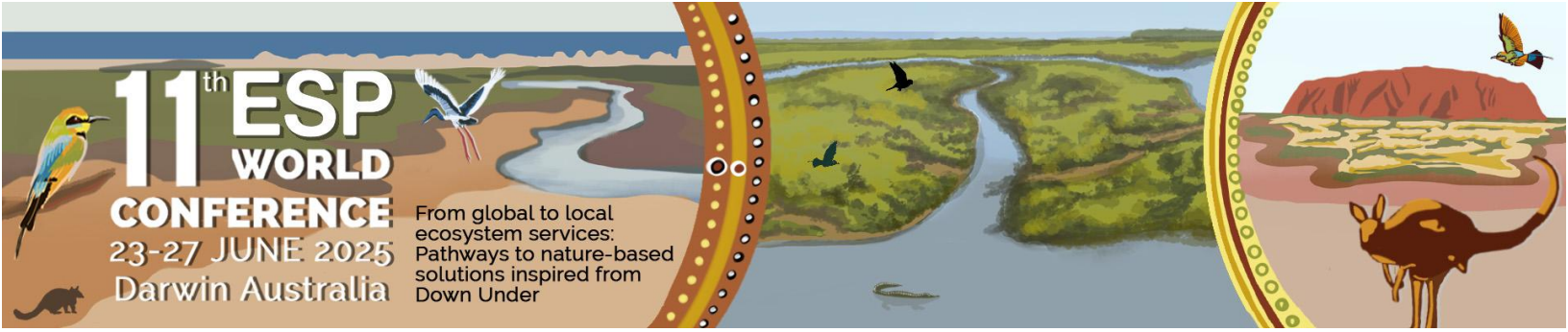
First authors(s): Sining Zhang

Other author(s): No

First author affiliation: Southwest Jiaotong University

Contact: zhangsining0720@hotmail.com

Keywords: urban heat island effect, urban heat island intensity in community, local climate zone (LCZ), field measurement, air temperature



Abstract: The urban heat island (UHI) effect increasingly threatens the health of urban residents and urban sustainable development. Most current research focuses on the urban scale, with little attention on the urban community scale. Based on the method of local climate zones, this study selected a typical old community and a new community in Chengdu as examples, and set up a field observation experiment to measure the temperature data using fixed-point measurements during 65 days. This paper analyzes UHI characteristics in summer urban between the old and new communities, and conducts a comparative study on the changes in heat island intensity under different weather conditions, such as sunny days, ideal days, and high temperature days. The results show that during the study period, the average daily temperature in the old community was about 1°C higher than that in the new community. Moreover, the average heat island intensity of the old community is higher than that of the new community throughout the day, day and night, and hourly. High building density, high impervious surface coverage, and low vegetation coverage are the main reasons for the high heat island intensity in old community. The heat island intensity in old and new communities has a large difference between day and night, reaching its peak at night. Different meteorological conditions have a significant impact on UHI, especially on precipitation days. The results can enrich the research on the community-scale characteristics of UHI, and can provide a scientific reference for refined management and control of community heat risks and precise planning and design of heat mitigation in the future.

4. Spatially explicit scenarios of urban climate regulation to maximise social benefits

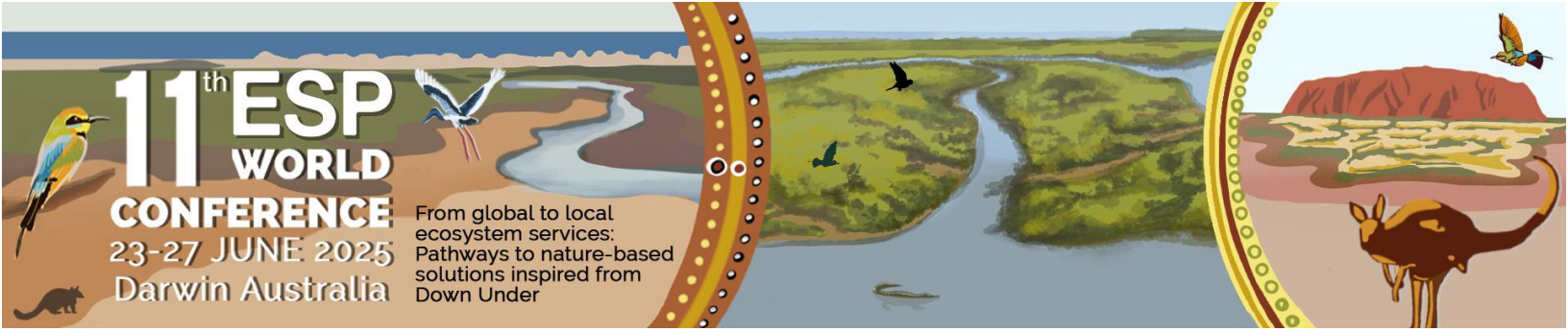
First authors(s): Daniele La Rosa

Other author(s): No

First author affiliation: University of Catania

Contact: dlarosa@darc.unict.it

Keywords: Urban planning; urban simulations; climate regulation; residents; UMEP



Urban ecosystems are vital providers of ecosystem services in cities, playing an essential role in regulating the urban microclimate and mitigating the Urban Heat Island effect. The quantity, location, and spatial arrangement of vegetation (such as urban trees) are crucial factors for planners and designers aiming to maximize the climate regulation potential, thereby extending these benefits to a larger number of residents and city users.

Various factors and constraints influence the cooling effects of vegetation and the extent to which these effects can benefit both urban spaces (e.g., streets, sidewalks, squares, parks) and the people who regularly use them. This contribution explores these factors by identifying high-resolution scenarios of new urban greenery that maximize cooling benefits for residents and users. In the case study of Mediterranean metropolitan areas like Catania (Italy), scenarios are developed by modeling physical and socio-economic factors as spatial constraints for placing new urban vegetation, using the UMEP model and GIS spatial analysis.

To better quantify the positive impacts on the social dimension, these scenarios are further analyzed in terms of the number of people who could benefit from their physical implementation. Based on the findings from this case study, general planning guidelines for locating new urban greenery are proposed, which can be applied to other urban contexts globally.

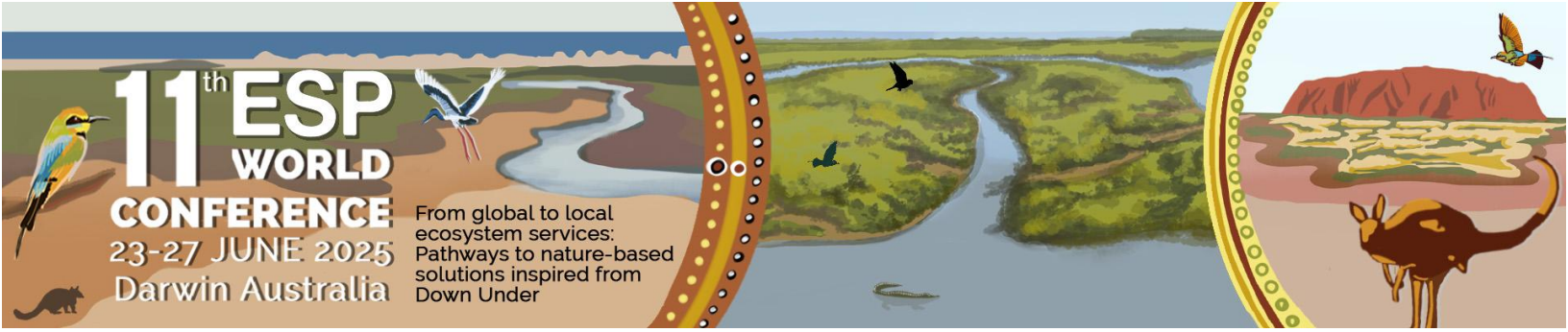
5. Bringing Nature Back to Cities: Distinctions and Synergies in Regreening, Renaturing, and Rewilding for Ecosystem Services and the Nature-Health-Climate Nexus

First authors(s): Alessio Russo

Other author(s): No

First author affiliation: School of Architecture and Built Environment, Faculty of Engineering, Queensland University of Technology, Brisbane, Australia

Contact: alessio.russo@qut.edu.au



Keywords: Urban nature, ecosystem services, Nature-Health-Climate Nexus, Nature-based Solutions, climate resilience, urban health, nature-positive cities

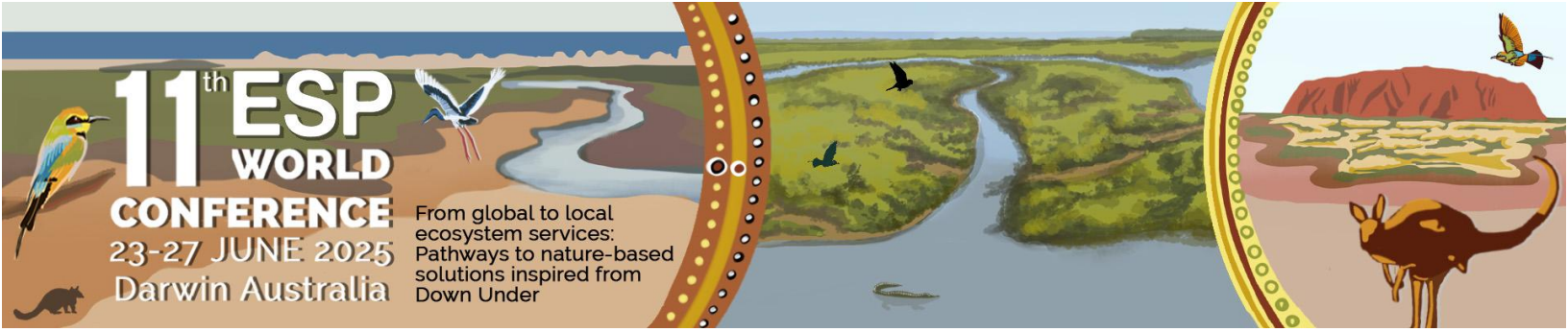
Urban environments are increasingly adopting nature-based approaches to address the interlinked challenges of climate change, biodiversity loss, and public health. Among these, regreening, renaturing, and rewilding—although frequently used interchangeably—represent distinct yet complementary strategies for restoring urban ecosystems and enhancing the provision of ecosystem services. This paper critically examines these approaches through the lens of the Nature-Health-Climate Nexus, highlighting their potential to advance multiple global and local objectives, including climate resilience, human health, decarbonisation, food security, biodiversity conservation, and the revitalisation of Indigenous knowledge systems.

By reintegrating natural elements into the urban fabric, these strategies support a broad spectrum of ecosystem services, such as microclimate regulation, stormwater management, pollination, and psychological well-being. Empirical evidence indicates that access to biodiverse, high-quality green spaces is associated with reduced risks of depression, hypertension, and cardiovascular disease, while also promoting physical activity, social cohesion, and overall life satisfaction.

These approaches also play a critical role in the transition towards nature-positive cities, contributing to the achievement of global biodiversity targets and the goals of the Kunming-Montreal Global Biodiversity Framework. Nevertheless, implementation is not without challenges. This paper explores potential disservices and socio-spatial inequalities, including the risks of green gentrification and unequal access to green infrastructure. Emphasis is placed on the necessity of inclusive, context-sensitive planning that incorporates Indigenous and local ecological knowledge. Such integration is essential for fostering equitable, sustainable, and nature-positive urban futures in which human and ecological systems are mutually reinforcing.

6. Global matching of supply and demand of urban heat mitigation by green and blue spaces under climate change

First authors(s): Dehuan Li



Other author(s): Carrasco Torrecilla, Luis Roman

First author affiliation: Department of Biological Sciences, National University of Singapore

Contact: e0983512@u.nus.edu

Keywords: Urban cooling model, heat mitigation, temperature reduction, urban heat island, ecosystem services

Nearly half of the global population are exposed to heat stress. Understanding the capacity of urban green and blue spaces for heat mitigation globally as climate change unfolds is essential for climate change adaptation. However, spatially explicit studies quantifying global cooling capacity by green and blue spaces are still lacking. To fill in this gap, we mapped the global spatial matching of supply and demand of heat mitigation by green and blue spaces in 2020 and under three Shared Socioeconomic Pathways (SSPs) by 2050.

Our results show a marked mismatch between heat mitigation supply and urban residents' needs: Over 360 million people are estimated to have been exposed to heat stress in 2020, a level that will increase by more than 347% under all the three SSPs in 2050. Green and blue spaces play an essential role in keeping these mismatches from widening, as more than 9 million people are protected from heat stress through urban cooling. The top four countries where most people would become exposed to heat stress without urban cooling are Pakistan, United States, India, and China. Based on these results, we suggest different strategies for constructing and managing green and blue spaces for countries with distinct matching patterns.

7. Urban Diagnosis and Healing Based on Micro Water Systems from a Holistic Health Perspective: A Case Study of the Yulin Area in Chengdu

First authors(s): Kan Chen

Other author(s): No

First author affiliation: School of Architecture, Tsinghua University

Contact: chenkan21@mails.tsinghua.edu.cn

Keywords: health, water system, blue-green space, ecological service, infrastructure

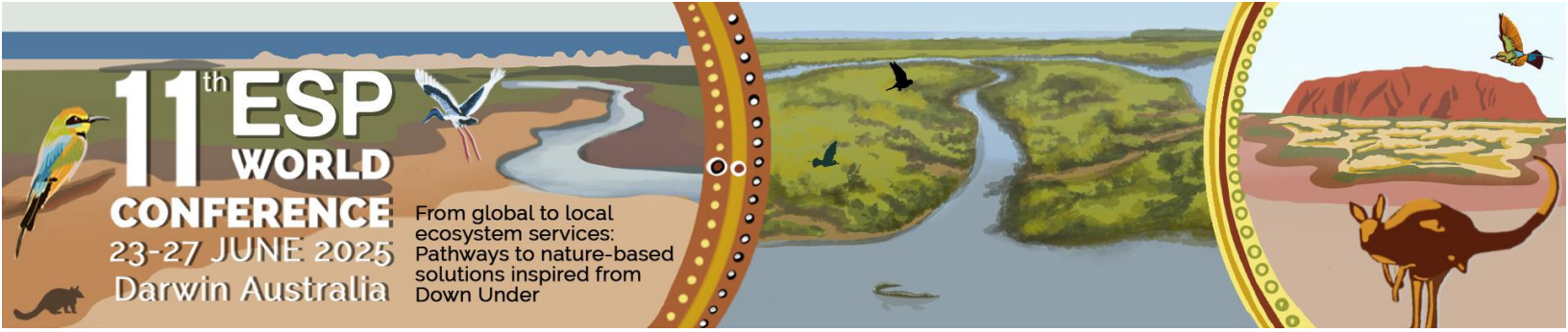
Many modern cities have generally transitioned from water-centric to land-centric urban forms. The multifunctional roles of micro water systems have received insufficient attention and are gradually being eroded by urbanization. The rise in urban health issues has spurred ongoing discussions about the impact of urban environments on health. In the post-pandemic era, the vital role of blue-green spaces calls for an enhanced understanding of holistic health. Traditional Chinese medicine posits that humans and their environments are interconnected— a perspective that aligns with the Fourth Ecology theory to offer a novel approach to understanding the holistic health of both humans and their surroundings.

This study focuses on the Yulin area in Chengdu and employs micro water systems as a structural element for diagnosing and healing urban challenges. A diachronic analysis employing typology and spatial anthropology is conducted to examine the evolution of micro water systems over nearly fifty years. The study reveals that as urbanization progresses, micro water systems have transitioned from being conspicuous to becoming concealed. Although they have been gradually disciplined by artificial networks, they remain latent structures that organize social life and sustain natural ecology, serving as key indicators of holistic urban health.

The study argues that micro water systems, as ecological infrastructures facilitating material and energy flows, can deliver integrated cultural-natural ecological services. They should thus be regarded as a crucial pathway for healing modern cities. It envisions an organic integration between the human-nature network, represented by water systems, and the mechanical-technical network, represented by road systems, together forming a harmonious water-land symbiosis.

8. Beyond the Concrete Jungle: A Satellite-based Approach to Mapping Urban Green Spaces and Urban Heat Islands

First authors(s): Sneha Pandey



Other author(s): Subrata Nandy, Gautam Talukdar

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Contact: snehapandey695@gmail.com

Keywords: Urban Green Spaces, Urban Heat Islands, Urban Heat Spots

Mapping Urban Green Spaces (UGS) is essential for environmental protection, urban planning, and ecosystem management. Recognizing the ecosystem services these spaces offer has become key to achieving UN Sustainable Development Goal 11.7. Therefore, it is important to map and update urban green space maps periodically as urban green spaces can change quickly over time due to development. Cities often experience Urban Heat Island (UHI) effects, a phenomenon by virtue of which urban areas experiences higher temperatures than its surroundings. Limited studies in India, especially in Himalayan states have addressed the implications of UHI effect and its mitigation strategies. Studying UGS and UHI together enables strategic integration of green spaces to mitigate the UHI effect.

In this study, we mapped Urban Green Spaces and Urban Heat Islands in Dehradun, Uttarakhand. UGS was mapped using a Random Forest algorithm in Google Earth Engine with Sentinel-2 images from 2024. UHI was mapped by deriving Land Surface Temperature (LST) from Landsat thermal infrared data. Mono-window (Landsat4-5) and Split-window (landsat-8) algorithms were used to assess LST and UHI variations, analyzing approximately 350 cloud-free images from 1998 to 2024.

Results reveal that, despite Dehradun city having 51.44% of its total area covered by urban green spaces, the city still experiences notable UHIs and localized heat hotspots (4-6°C higher than the surroundings). The ward-wise statistics and analysis suggests that while a substantial portion of Dehradun is covered by vegetation, certain areas—particularly those with high-density development and insufficient vegetation— acts as heat spots and experience UHI effects. The results revealed that LST variations and UHIs have drastically increased since 2000, the year when Dehradun was declared the capital of Uttarakhand State in India, highlighting implications of urbanization. These findings provide comprehensive understanding of how green spaces influence urban temperatures and its role in ecosystem services.