Image credits: Darwin Aerial. Credit: Darwin Convention Center

Detailed Posters Program

The main poster session will be held on **Monday, June 23rd, from 17:30-19:30.** On **Wednesday, June 25th, from 14:00-15:30** there will be another poster session. Participants are invited to walk around and ask questions about the posters in the traditional format. This document contains the poster list and further on each poster's description.

1. POSTER LIST

Biome Working Group Posters (B)

B1a - Blue carbon ecosystems – accounting and advocating for nature-based solutions for sustainable coasts, K. Burkhard, et al.

ID	Author Name	Poster Title
B1a-1	Mei-Hua Yuan	Ecosystem Services of Coral Reefs in 30 Years

Sectoral Working Group Posters (S)

S9a - Breaking Down Barriers - Incorporating Indigenous Knowledge on Ecosystem Services into Natural Resource Management, Policy, Planning, S. Maynard, et al.

ID	Author Name	Poster Title
S9a-1	Chen Ly	Environmental Defenders and Global Environmental Governance: A feminist political ecology analysis
S9a-2	Samy Andres Leyton-Flor	Beyond Ecological Recovery: Embedding Indigenous Knowledge in Mine Rehabilitation for Sustainable Futures
S9a-3	Noah Chongo	Recognising indigenous and local community conservation territories and areas (ICCAs): cornerstone for bio-cultural conservation and ecosystem services restoration in Zambia

S9b - Developing Nature-based Solutions (NbS) incorporating Indigenous peoples and local communities' perspectives, K. K. Sangha

ID	Author Name	Poster Title
S9b-1	Oyebola Adebola Elemide	African local and Indigenous peoples' pathways leading to sustainable ecosystems, nature, and a positive future
S9b-2	Nicole Boyd	Centring on a Biocultural Framework: A Case for Utopia Eastern Anmatyerr and Alyawarr determined Desert Habitat Method benefits

Image credits: Darwin Aerial. Credit: Darwin Convention Center

Thematic Working Group Posters (T)

T2a – Harnessing Ecosystem Services for Climate-Resilient Agriculture and Inclusive Development, S. Zaddem & I. A. Houedji

ID	Author Name	Poster Title
T2a-1	Olivia Crowe	Scaling Equitable Nature-based Solutions: Procedural Equity and Engagement in a Rangeland Management and Restoration Model

T2d - Challenges on monitoring biodiversity and nature's contributions to people, A. P. Turetta & A. Vári

ID	Author Name	Poster Title
T2d-1	Pike Stahlmann-Brown	Nature Relatedness and Wellbeing across the urban-rural gradient
T2d-2	Fernando Almeida Costa	Biomater - Payment Scheme for Biodiversity Conservation and Increased Availability of Native Cerrado Seeds

T4 – From outer space to local ecosystem service mapping - harnessing state-of-the-art data, methods and tools on various spatio-temporal scales, B. Burkhard, et al.

ID	Author Name	Poster Title
T4-1	Paulo Pereira	Land use impacts on nutrient regulation in urban lakes located in Vilnius (Lithuania)
T4-2	Paulo Pereira	Mapping recreation and heritage cultural ecosystem services clusters and spatial outliers in Lithuania
T4-3	Qiyin Yu	Forest Resource Quality and Human Activity Intensity Change and Spatial Autocorrelation Analysis in Yulin City, China
T4-4	Kiichiro Hayashi	Ecosystem Service Modelling with ARIES and k.LAB: Global Innovation and Local Applications in Japan

T5a - Modeling ecosystem services flows and implications for nature-based solutions, K. Burkhard, et al.

ID	Author Name	Poster Title
T5a-1	Yosuke Horie	Case Study of Quantification of Ecosystem Services for Urban Resilience
T5a-2	Stephanie Vaz	Adaptation to Extreme Hydrological Events Through Nature-Based Solutions

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T6 - Future scenario analysis and planning of biodiversity and ecosystem services by using the Nature Futures Framework from local to national scales, O. Saito

ID	Author Name	Poster Title
T6-1	Luiz Conrado-Silva	Integrating Climate Change and Ecosystem Services into Ecological Restoration Efforts: A Systematic Review

T7b – Making Nature Count: Global and local applications of monetary valuation for transformation to nature-inclusive decision-making, V. van 't Hoff, et al

ID	Author Name	Poster Title
T7b-1	Gail Sucharitakul	Win-wins and trade-offs in nature credit markets: A systematic map of the evidence.

T9 – Urban ecosystems services and public health in a time of global warming, S. Zhang, et al.

ID	Author Name	Poster Title
T9-1	Yilan Xie	Visitation Patterns, Social Demographics, and Satisfaction in Japanese Pocket Parks: A Study of Nonlinear Relationships

T13 –From Interaction to Restoration: Pathways to Nature-Based Solutions through Cultural Ecosystem Service (CES) in the Carbon Era, Y. Dou, et al.

ID	Author Name	Poster Title
T13-1	Mengyun Chen	Can the Environmental Features of Urban Green Spaces Predict Cultural Ecosystem Benefits？ Development of a Bayesian Network-Based Tool
T13-2	Jakub Jehlicka	Perception of traditional forest management practices reintroduced in the Czech Republic
T13-3	Pamela McElwee	The Handbook of Cultural Ecosystem Services: New Approaches to CES for Policy and Management

Image credits: Darwin Aerial. Credit: Darwin Convention Center

Regional Chapter sessions (R)

R1 - Implementing ecosystem services into multi-scale practices: from assessment to the realization of ecological product value, X. Sun, et al.

ID	Author Name	Poster Title
R1-1	Malgorzata Blicharska	Bridging Science and Policy: Integrating Ecosystems into the Water-Energy-Food Nexus for Sustainable Resource Management
R1-2	Janghwan Jo	Differentiated Management System for Enhancing the Sustainability of Ecosystem Services in Forests on Inhabited and Uninhabited Islands
R1-3	Yaru Chen	Constructing a Model of Government Purchasing of Ecological Services: Evidence from China's Northeast Tiger and Leopard National Park
R1-4	Agnieszka Sosnowska	The Index of Urban Areas Vulnerability to Impacts Of Climate Change

Image credits: Darwin Aerial. Credit: Darwin Convention Center

Other sessions (O)

O1 - Ecosystem Services Derived from Protected Areas - revealing their hidden value, S. Maynard, et al.

ID	Author Name	Poster Title
O1-1	Tauqeer Nawaz	Developing strategies for Carbon Neutrality Through Restoration of Ecological Spatial Networks in the Thal Desert, Punjab

O4 - Importance of Nature-based Solutions (NbS) in forest sustainable development of rural communities: livelihoods, biodiversity conservation, and nonmaterial values, I. J. Diaz-Maroto

ID	Author Name	Poster Title
O4-1	Anulisa Claire	Agroforestry in the Savannas: A Plausible Nature-based Solution for Climate Change Adaptation and Livelihood Improvement

O6 - Local food as a carrier of ecosystem services: from local to global flows, M. Derek, et al.

ID	Author Name	Poster Title
O6-1	Chin-Chung Yu	Cooperation with nature and local community: An ecotourism and local food dining initiative

O7 - Adaptive solutions to enhance positive synergies between forest and water ecosystems, Z. Lībiete, et al.

ID	Author Name	Poster Title
O7-1	Zane Libiete	Ecosystem service provision in forested riparian protection zones along small and medium-size rivers in Latvia

Image credits: Darwin Aerial. Credit: Darwin Convention Center

2. POSTER DESCRIPTIONS

The first author is the presenting author unless indicated otherwise.

Biome Working Group Posters (B)

B1a-1 Ecosystem Services of Coral Reefs in 30 Years

First authors(s): Mei-Hua Yuan

First author affiliation: Research Center for Environmental Changes, Academia Sinica

Other author(s): Kuan-Ting Lin

Contact: mhyuan@gmail.com

Keywords: coastal ecosystems, marine conservation, blue economy, challenges, sustainable development

Coral reefs are among the most biologically diverse and economically valuable ecosystems on Earth, providing essential benefits such as fisheries, coastal protection, and biodiversity conservation. Understanding the value of these ecosystem services is crucial for effective management and conservation. The System of Environmental-Economic Accounting (SEEA) framework presents a structured approach to quantifying these services, facilitating the assessment of natural environmental values. While SEEA has been increasingly applied to various marine ecosystems, its application to coral reefs remains limited, particularly in evaluating their spatial extent, condition, and the development of physical, monetary, and asset accounts. This study addresses this gap by exploring how SEEA can be applied to assess coral reef ecosystem services. The findings indicate that remote sensing is a valuable tool for mapping coral reef distribution, while advancements in data analysis, monitoring techniques, and modeling approaches improve the ability to track environmental changes and extreme events affecting reefs. Assessing coral reef conditions requires an integrated framework that examines the interactions between pressure, state, and response dynamics. Furthermore, coral reef ecosystems provide a range of services, including coastal protection, fisheries, tourism, and cultural value. The economic valuation of coral reefs involves assessing provisioning, regulating, maintenance, and cultural services through various methodological approaches. While text mining has identified key SEEA components in coral reef research, further efforts are needed to establish meaningful

Image credits: Darwin Aerial. Credit: Darwin Convention Center

connections between these elements for a more comprehensive evaluation of coral reef ecosystem services.

Sectoral Working Group Posters (S)

S9a-1 Environmental Defenders and Global Environmental Governance: A feminist political ecology analysis

First authors(s): Chen Ly

First author affiliation: Imperial College London

Other author(s): Caroline Howe

Contact: c.ly23@imperial.ac.uk

Keywords: gender, justice, environmental defenders, governance

Environmental defenders – those who protect land, biodiversity, and natural resources – play a crucial role in conservation efforts, yet they often face disproportionate risks, particularly women, Indigenous Peoples, and other marginalised groups. Female environmental defenders frequently experience gendered violence, legal threats, and socio-political exclusion, limiting their ability to participate in environmental decision-making. Recognising their importance, the UN Human Rights Council unanimously acknowledged environmental defenders as vital actors in global environmental governance in 2019. Yet despite this recognition, there is a lack of research on how environmental defenders and environmental governance structures interact and significant barriers remain in ensuring their equitable participation in international conservation efforts.

Using a feminist political ecology lens, this study fills this gap by conducting semi-structured interviews with environmental defenders and social network analysis to map their interactions with international institutions, focussing largely on the UN Environment Programme and the Convention for Biological Diversity. It explores the barriers female and Indigenous defenders face in influencing global conservation policies, including security threats, limited funding, and exclusion from high-level decision-making processes. The research also investigates how gender shapes these experiences and the extent to which UN-led conservation initiatives, including nature-based solutions, integrate the knowledge and priorities of grassroots activists.


Image credits: Darwin Aerial. Credit: Darwin Convention Center

The findings will provide insights into how global governance mechanisms can better support and protect environmental defenders, ensuring that conservation policies are not only effective but also equitable and inclusive. This study contributes to ongoing discussions on gender justice in biodiversity conservation and offers recommendations for strengthening the role of environmental defenders in shaping sustainable and just environmental futures.

S9a-2 Beyond Ecological Recovery: Embedding Indigenous Knowledge in Mine Rehabilitation for Sustainable Futures

First authors(s): Samy Leyton-Flor

First author affiliation: Research Institute for the Environment and Livelihoods, Charles Darwin University

Other author(s): Kamaljit Sangha

Contact: samy.leyton@cdu.edu.au

Keywords: Mine rehabilitation, Indigenous knowledge, ecosystem services, environmental governance, cultural heritage

Mine site rehabilitation is often framed through a technical and ecological lens, with limited consideration of the cultural and social values that landscapes hold for Indigenous peoples. In northern Australia, large-scale mining has disrupted key ecosystem services (ES) that sustain Indigenous livelihoods and well-being. Using the McArthur River Mine (MRM) as a case study, this research explores how mine rehabilitation can better integrate Indigenous perspectives by restoring provisioning and cultural ES critical to local Indigenous groups.

Through focus group discussions with traditional owners from four Indigenous groups in the Gulf of Carpentaria, we identified 14 essential ES before mining that have since been degraded or lost. Participants emphasised that effective rehabilitation must go beyond ecological restoration, including access to sacred sites, bush tucker, water sources, and cultural landscapes necessary for knowledge transmission, ceremonies, and community cohesion. Key concerns included ongoing pollution, restricted access to Country, and a lack of Indigenous involvement in rehabilitation planning.

We argue for a more inclusive approach to mine closure and rehabilitation that prioritises Indigenous values and perspectives. This includes co-designing rehabilitation

Image credits: Darwin Aerial. Credit: Darwin Convention Center

plans with traditional owners, ensuring long-term access to rehabilitated lands, and incorporating Indigenous-led ecological and cultural restoration practices, such as cultural burning and landscape monitoring. By embedding Indigenous governance and ES frameworks into rehabilitation strategies, mine closure can contribute to environmental and cultural healing, ensuring sustainable post-mining futures for Indigenous communities.

S9a-3 Recognising indigenous and local community conservation territories and areas (ICCAs): cornerstone for bio-cultural conservation and ecosystem services restoration in Zambia.

First authors(s): Noah Chongo

First author affiliation: Climate Protection Zambia

Other author(s): Alimakio Zulu

Contact: ncnoahchongo@gmail.com

Keywords: Indigenous, peoples, conservation, restoration, opportunities.

Indigenous local community conserved territories and areas hold unique restoration knowledge of production systems, which if recognised, protected, promoted and valued can become real assets to national economies, as well as addressing global restoration challenges. Indigenous communities manage at least a quarter of the world's land surface. Despite many restoration interventions undertaken in Zambia, there has been insufficient recognition of ICCAs. It is evident that only about 10% of land is legally owned by them and the wisdom and knowledge of these communities is still not fully incorporated into conservation, ecosystem services and restoration agendas despite the greater part of Zambia includes a myriad of territories and areas customarily governed, managed and conserved by its indigenous communities. Threats such as reduced rainfall caused by climate change, land grabbing for mining, unsustainable natural resources harvesting and limited information on the need to conserve and restore ecosystems and the services they provide, are leading to increased biodiversity loss and degradation of ecosystems. Therefore, at the heart of the recent conservation and restoration efforts, this case study discusses collaborative landscape design efforts in an attempt to promote the national level recognition of the ICCAs. Through appreciative inquiry and self-strengthening processes, the study findings highlight on the existing national policy environment, lessons learned and opportunities to advance

Image credits: Darwin Aerial. Credit: Darwin Convention Center

recognition of these territories for bio-cultural conservation and ecosystem services restoration. The case further shares key emerging indigenous perspectives for supportingrestoration science, practice and policy framework in Zambia and across borders.

S9b-1 African local and Indigenous peoples' pathways leading to sustainable ecosystems, nature, and a positive future

First authors(s): Oyebola Elemide

First author affiliation: Federal College of Agriculture Akure Ondo State Nigeria

Other author(s): Olatunji Omoniyi

Contact: bolafebi@gmail.com

Keywords: local people, beliefs, Africa, indigenous

As scientists working in areas where Indigenous or local knowledge has an important role, we are increasingly aware of the need to learn how best to contribute to inclusive and equitable research and decision-making and how collaboration between multiple knowledge systems can lead to a richer, more effective knowledge base to inform decision-making.

There are many reasons for Indigenous and local knowledge holders and scientists to work together, and it should, in theory, be an enriching win–win situation from multiple perspectives. To get to this point, however, we need to develop appropriate methodological toolboxes to gain insights from multiple knowledge systems and create situations that maximize the chances that those insights are used appropriately to inform management and decision-making.

Emerging methods demonstrate new perspectives on why interdisciplinary research is needed across these difficult knowledge differences and differences in worldviews and on how to do it.

We hope through this Special Feature, we can continue to learn from the breadth of approaches that are have been applied and are emerging for Indigenous and local knowledge holders and scientists working together, and identify some of the needs and expectations of Indigenous and local knowledge holders when collaborating with scientists to develop research methods and to inform decision-making.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

This paper concludes that, therefore, there is no unified definition for Indigenous and local knowledge beyond the knowledge of Indigenous and local people, which often pertains to social–ecological systems. Despite the diversity within Indigenous and local knowledge systems among peoples and cultures, there are some common characteristics, such as that knowledge emerges from a close association with the land, is passed down through generations, and often integrates culture, practice, and beliefs

S9b-2 Centring on a Biocultural Framework: A Case for Utopia Eastern Anmatyerr and Alyawarr determined Desert Habitat Method benefits.

First authors(s): Nicole Andrea Boyd

First author affiliation: Charles Darwin University

Other author(s): Kamaljit, Sangha

Contact: nicole.boyd@students.cdu.edu.au

Keywords: Desert Habitat Method, Biocultural Framework, Indigenous Research Principles, Indigenous Peoples and Local Communities, Well-being.

Self-determination within Central Australian Aboriginal communities such as Utopia, has long existed. Aboriginal Community Controlled Health Organisations (ACCHO) have created savings to health care systems for people living in remote outstations in Utopia. The success of ACCHOs such as Urapuntja Health Service in providing health care prevention is associated with a range of social and cultural factors (Rowley et al., 2008). Participation in activities such as art, bushfood collection, and land management are associated with savings to health care systems (Altman et al., 2006). This research seeks to answer the following broad research question: How do strategies for burning Country contribute to the well-being of Indigenous Peoples and Local Communities?

The study will undertake a mixed methods approach underpinned by Indigenous Research Principles (Rigney, 1999; Smith, 1999). As a pilot of the Biocultural Framework (Sangha et al., 2025) the study will privilege the voices and experiences of Utopia Eastern Anmatyerr and Alyawarr community members. The research aims to determine the priorities and strategies of a new Desert Habitat Method (DHM) for the emerging Nature Repair market in Australia. The study will draw from the Biocultural Framework which was codesigned with Northern Australian Indigenous Peoples and Local Communities (IPLC) (Sangha et al, 2025).

Image credits: Darwin Aerial. Credit: Darwin Convention Center

The authors will design a mixed methods survey focusing on cultural and socio-economic indicators that could advantage investors and IPLC. For instance, in yarning circles (Bessarb & Ng'andu, 2010) the IPLC could focus on the condition of a semi-permanent soakage, specific bushfoods and bush medicines in desert ecosystems; and support "peoples' capabilities, functioning and wellbeing" (Sangha et al., 2025, p. 9). The study will examine the appropriateness of biocultural indicators such as number of rangers employed (Sangha et al., 2025) rather than focus on rates of participation in the broader labour workforce as socioeconomic indicators of health (Rowley et al., 2008).

Image credits: Darwin Aerial. Credit: Darwin Convention Center

Thematic Working Group Posters (T)

T2a-1 Scaling Equitable Nature-based Solutions: Procedural Equity and Engagement in a Rangeland Management and Restoration Model

First authors(s): Olivia Crowe

First author affiliation: Imperial College London

Other author(s): Dr. Thomas Pienkowski, Dr. Morena Mills, Dr. Arundhati Jagadish

Contact: o.crowe23@imperial.ac.uk

Keywords: procedural equity, participation, scaling strategies, rangeland management and restoration

Understanding how to scale Nature-based Solutions (NbS) without reinforcing inequities is critical to achieving both social justice and global environmental goals. While NbS aim to deliver both ecological and social benefits, many have 'gone-to-scale' without doing so – or actively causing harm. For example, community-based NbS governance approaches are often framed as more socially-just, yet evidence suggests that inequitable benefit distribution, exclusion, and human rights violations persist. In turn, social inequities may undermine NbS effectiveness and durability by contributing to local resistance.

This study examines procedural equity and its role in shaping engagement in Herding for Health (H4H), a rapidly expanding rangeland stewardship model in Southern Africa. H4H incentivizes rangeland stewardship agreements in communal areas by developing value chains linked to livestock and carbon sequestration, integrating One Health and Nature-based Solutions to restore degraded rangelands.

The study draws on 50 key-informant interviews and focus groups from two sites in South Africa. A reflexive thematic analysis using the Trinity of Voice framework identifies 5 dominant themes: women and youth capacities, information flows, legitimacy of devolved governance structures, inclusion in benefit distribution decisions, and trust in leadership. By mapping feedback loops, the study indicates how procedural inequities may reinforce lower participation in rangeland stewardship, leading to governance challenges and barriers to the delivery of rangeland restoration. It also identifies stabilising mechanisms – such as elections and conflict mediation – that may help disrupt negative cycles and restore engagement.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

The study aims to inform scaling strategies that go beyond area-based expansion of NbS to also achieve equitable participation, aligning with Target 3 of the Global Biodiversity Framework. Through collaborations with Conservation International and Meat Naturally, the findings also inform the ongoing development of payment for ecosystem service arrangements.

T2d-1 Nature Relatedness and Wellbeing across the urban-rural gradient

First authors(s): Danielle Shanahan

First author affiliation: Zealandia Te Māra a Tāne

Other author(s): No

Presenting author: Pike Stahmann-Brown

Presenting author affiliation: Manaaki Whenua – Landcare Research

Presenting author contact: brownp@landcareresearch.co.nz

Keywords: Ecosystem services, Nature Relatedness, wellbeing, life-satisfaction

There is compelling evidence that both connection to nature itself and engagement with nature-based activities promote positive physical, mental, and social wellbeing outcomes. Most of this evidence comes from studies on urban residents, overlooking the importance—and opportunity—of nature-based interventions for rural communities. We used two large-scale surveys of New Zealanders to analyse differences in Nature Relatedness across the urban-rural gradient. We then assess the relationship between Nature Relatedness and subjective wellbeing (as measured by both the WHO-5 inventory of mental wellbeing and the present and future Cantril Ladder measures of life satisfaction) in both urban and rural areas. We find that higher Nature Relatedness is associated with higher current wellbeing (reflected in both measures) in both urban and rural areas. Moreover, while people are on average optimistic about their future life satisfaction, those with higher Nature Relatedness are disproportionately optimistic. This research suggests that promoting a connection to nature may be a viable strategy for enhancing wellbeing outcomes for individuals regardless of where they live. We discuss the implications of these findings and the importance of considering context in the development of interventions that are suitable for urban and rural communities.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T2d-2 Biomater - Payment Scheme for Biodiversity Conservation and Increased Availability of Native Cerrado Seeds

First authors(s): Fernando Costa

First author affiliation: Governo do Distrito Federal, Brasil

Other author(s): Diego Moreira Carvalho

Contact: fcosta.agro@gmail.com

Keywords: Biodiversity conservation; Payment for Ecosystem services; Native Cerrado seeds; Sustainable supply; Blockchain traceability

The BioMater project aims to promote biodiversity conservation and increase the sustainable supply of native Cerrado seeds, by implementing a payment scheme and a digital register system for the germplasm matrices in rural regions of the Cerrado [Brazil's Savannah]. Farmland owners are compensated for conserving seed source areas and the germplasm of native Cerrado species. The initiative involves the voluntary registration of specimens and areas with seed supply potential, which are evaluated and validated through technical assessments. Data and photographic records are georeferenced via instant messaging applications (WhatsApp, Telegram, or similar), enabling the creation of a phenological calendar and an accurate, dynamic geodatabase. The project aims to monitors seed source areas and specimens, offering annual payments for each conserved seed matrix (area/tree), with monetary values varying on the ecological importance or scarcity of each native species. Additionally, it supports the registration of seed collectors, plant nurseries companies and services providers for native revegetation activities, beside the integration within databases of degraded land and ilegal deforested areas. A matchmaking webplatform/application facilitates connections between matrix holders and seed collectors, promoting transactions through value-added mechanisms that provide cash or farm inputs and materials to landowners, seed collectors and other native vegetation supply chain agents. Blockchain technology ensures traceability of seed batches, from origin to planting destinations, and also records seed quality metrics. The project further monitors plantations, documenting genetic variability, seed quality parameters, and phenotypic development as influenced by environmental conditions and planting methods, such as direct sowing. Other conservation efforts may include support for fire prevention, fencing, enrichment planting, revegetation, and soil and water conservation. This comprehensive framework aims to address the scarcity of germplasm for

Image credits: Darwin Aerial. Credit: Darwin Convention Center

ecosystem restoration and mitigate the risk of jeopardizing the sustainable management of native Cerrado biodiversity.

T4-1 Land use impacts on nutrient regulation in urban lakes located in Vilnius (Lithuania)

First authors(s): Paulo Pereira

First author affiliation: Mykolas Romeris Univeristy

Other author(s): Egle Baltranaitė, Marija Meišutovič-Akhtarieva, Miguel Inácio

Contact: pereiraub@gmail.com

Keywords: Land use, Season, Urban lakes, Nutrient regulation, Overland flow

Nutrient regulation is a critical ecosystem service (ES). Land use has an important impact on the amount of nutrients reaching water bodies. This is especially important in urban environments where a high amount of pollutants are released. Therefore, to assess the effect of land use on nutrient dynamics, we studied the seasonal impact of two urban lakes with different characteristics on nutrient regulation using nitrogen (N), phosphorous (P) and potassium (K) as a proxy. One is surrounded by forest (forest lake) and the other by urbanization (urban lake). Data was collected in two campaigns in June (Summer) and November (Autumn) of 2024. Twenty sample points were randomly distributed and established in the surroundings of both lakes. The results showed significant differences ($p < 0,05$) between land use, season and land use * season in N, P and K. The nutrient concentrations were significantly higher in the summer and in urban lakes in summer and autumn. The differences were significant in summer. The urban lake has a much higher concentration of nutrients. The correlation between N, P and K was very high (N vs P: 0.97, $p<0.001$; N vs P: 0.97, $p<0.001$; N vs K: 0.98, $p<0.001$). Overall, as expected, the vegetation around the forest lake had a higher capacity for nutrient regulation than the urban fabric that covered the surroundings of the urban lake. However, a high seasonal difference may be related to the higher discharge into the urban lake related to overland flow from paved or garden surfaces. All the variables had a high correlation, meaning that using one as a proxy can be sufficient to understand the capacity of land use nutrient regulation in these lakes. Efforts from the local authorities are needed to reduce the nutrient load in the urban lake and the threats for user's health.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T4-2 Mapping recreation and heritage cultural ecosystem services clusters and spatial outliers in Lithuania

First authors(s): Paulo Pereira

First author affiliation: Environmental Management Laboratory, Mykolas Romeris Univeristy, Lithuania

Other author(s): Katarzyna Bogdziewicz, Miguel Inacio

Contact: pereiraub@gmail.com

Keywords: Cultural ecosystem services, Spatial Statistics, Points of Interest, Recreation, Heritage

Cultural ecosystem services (CES) are the non-material intangible benefits the ecosystems supply. They are essential to full-field human life. Mapping CES supply is essential because they can summarize spatially the areas that have a high/low offer. It is also important to know if the CES location is scattered or clustered and where this is located. This info is essential for local authorities to plan infrastructures to make these areas more attractive. For instance, the areas where CES supply is clustered have a high supply capacity. This work uses the Open Street Map (OSM) database to identify points of interest (POI). We aim to identify areas with spatial clusters and outliers of two CES, recreation and heritage in Lithuania. We used two spatial statistics methods: density-based cluster and spatial outlier detection. The results showed that in recreation, most of the POI were clustered (11212). Only 394 were not. On average, the reachability was 2225 m between each point. Regarding spatial outlier detection, we observed that most recreation sites were inliers (10048) rather than outliers (1560). The average neighbour distance was 470 m. Concerning heritage, all the POI were clustered (1914), and the reachability distance was 6859 m between each point. The spatial outlier detection results showed that 1833 points were inliers and 81 outliers. The average neighbour distance was 1887 m. Overall, the heritage POI were less than the recreation because the number of dots was low. This analysis showed that recreation and heritage points are mostly clustered, and there are fewer outliers since they are mainly concentrated in the urban areas. This analysis can support local authorities in creating routes to improve recreational and heritage experiences. This will improve CES supply.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T4-3 Forest Resource Quality and Human Activity Intensity Change and Spatial Autocorrelation Analysis in Yulin City, China

First authors(s): Qiyin Yu

First author affiliation: National Forestry and Grassland Administration, Development Research Center

Other author(s): Chao S, Kun Jin

Contact: tzey@qq.com

Keywords: forest resource quality; human activity intensity; sub-compartment data; Moran's I; Yulin City

With the rapid development of society and the economy, human activities are increasing, which often brings potential threats such as decline in forest resource quality and ecological function. In order to investigate the change in forest resource quality and human activity intensity, this study constructed a model for a forest resource quality index and a human activity intensity index, and conducted a quantitative analysis of the temporal and spatial changes in their in Yulin City based on sub-compartment data in 2017 and 2020. By combining spatial autocorrelation analysis, the changes in human activity intensity and spatial forest resource quality were explored, and key areas such as the prominent contradictions between humans and the land were superimposed and coupled as areas of concern. The results show: From 2017 to 2020, the forest resource quality in Yulin City improved as a whole, especially in Zizhou County, but there were variations in other regions. Human activity intensity increased as a whole, and the most obvious increase was in Hengshan District. Both the forest resource quality and human activity intensity indexes had spatial aggregation, differences in forest resource quality between regions were reduced, and human activity intensity showed a trend towards development. The high–high cluster area for human activity intensity showed a decreasing trend, but it expanded outward in urban areas and other areas, such as the surrounding area of Yulin City, Jingbian County, and Shenmu City. The high–high cluster area for forest resource quality showed a shrinking trend. Four specific regions were identified through spatial coupled superposition analysis to reveal the dynamic relationship between forest resource quality and human activity intensity. The most obvious region was Yuyang District, where the forest resource quality improved because of a reduction in human activities on the natural environment.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T4-4 Ecosystem Service Modelling with ARIES and k.LAB: Global Innovation and Local Applications in Japan

First authors(s): Kiichiro Hayashi

First author affiliation: Nagoya University

Other author(s): Ferdinando Villa, Stefano Balbi, Hiromu Okazawa, Takashi Machimura, Yuri Yamazaki, Satoru Sugita, Phub Dem

Contact: maruhaya98--@nagoya-u.jp

Keywords: ARIES, k.LAB Japan, ecosystem services, renewable energy, NCA, GIS, sustainability modelling

ARIES (Artificial Intelligence for Environment & Sustainability), led by the Basque Centre for Climate Change (BC3), is an open-source and open-access platform advancing Ecosystem Services (ES) Modelling and Natural Capital Accounting (NCA). In 2024, ARIES played a central role in the 8th International Conference on Big Data and Data Science for Official Statistics, hosted in Bilbao. The event underscored the importance of integrated modelling and big data in official statistics for sustainability policies. ARIES also contributed to global assessments such as the World Bank's Changing Wealth of Nations 2024 (Carbon Chapter) of the World Bank and developed risk models for climate hazards in collaboration with institutions like the IMF. The platform now serves over 6,000 registered users across five continents. Building on this global framework, k.LAB Japan—a collaborative initiative among Japanese universities—has been applying the k.LAB platform locally to model ecosystem services and support environmental planning. Using the k.Modeler tool, several models have been developed or are under development: (i)Carbon stock model: Designed for simple application using forest canopy data, this model was applied in a case study in Aichi Prefecture to assess terrestrial carbon stocks; (ii) Agricultural biomass model: A simplified adaptation of the FAO AquaCrop model was used to estimate biomass in agricultural zones, incorporating land cover and evapotranspiration data; (iii) Ecosystem service models: Additional simple models are being created to address local sustainability priorities. Furthermore, renewable energy site selection models for wind, solar PV, and mini-hydro have been developed. These models identify suitable locations while excluding environmentally sensitive areas, supporting sustainable energy transitions. Some are now being extended for global applicability. This poster highlights Japan's progress in leveraging semantic AI tools for integrated, transparent, and flexible modelling to support national sustainability goals in line with global NCA efforts.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T5a-1 Case Study of Quantification of Ecosystem Services for Urban Resilience

First author(s): Yosuke Horie

First author affiliation: NIPPON KOEI CO.,LTD.

Other author(s): Nathalia Silva Schmuziger, Keisuke Yanehashi

Contact: a6988@n-koei.co.jp

Keywords: urban ecosystem services, InVEST, resilience

Importance of ecosystem services in an urban area has rapidly increased and its quantitative evaluation has also been focused in terms of urban resilience. However, there are many difficulties on assessment on urban ecosystem services. Therefore, this study aims at locational comparison of urban ecosystem services.This study makes quantitative evaluation on changes of urban ecosystem services for fifty years in order to illustrate resilient status in Sendai city in Japan from 1974 to 2022 and Sao Paulo from 1990 to 2023 in Brazil. Six urban ecosystem serivices, urban cooling, stormwater retention, nature access, carbon sequestration, biodiversity and crop production are evaluated by InVEST®, which is developed by Natural Capital Project. As the result, this study illustrates total loss of function, which is sometimes called “resilience triangle”, of its urban ecosystem services by compare quantification of ecosystem service of each year with 1974, which is assumed as resilient status. The result of each city shows that all of six ecosystem services have been declined for 50 or 30 years according to landuse change of urbanization.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T5a-2 Adaptation to Extreme Hydrological Events Through Nature-Based Solutions

First authors(s): Stephanie Vaz

First author affiliation: University of São Paulo

Other author(s): Aliny Pires, Luiz Conrado-Silva, Luciana Schwandner Ferreira, Gabriela Di Giulio, Jean Paul Metzger

Contact: anievaz@gmail.com

Keywords: vulnerability, climate adaptation, extreme hydrological events, nature-based solutions, urban areas

Sao Paulo, Latin America's largest metropolis, is an economic, cultural, and innovation hub. As Brazil's financial powerhouse, it is committed to sustainability, investing in urban green spaces, reforestation, and climate adaptation initiatives. Efforts to mitigate extreme hydrological events reinforce its leadership in sustainable urban planning. Despite challenges, Sao Paulo integrates environmental sustainability into its development agenda, shaping a greener and more resilient future.

Climate projections suggest Sao Paulo will face shifting precipitation patterns and more extreme weather events. A trend toward a drier climate with reduced annual rainfall could worsen environmental and urban challenges, increasing risks, especially for vulnerable communities. This research analyzes the role of natural vegetation and nature-based solutions (NbS) in Sao Paulo's adaptation to extreme hydrological events, focusing on urban and peri-urban areas. Stormwater retention modeling was performed using the Urban Stormwater Retention model within the Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) framework. The primary focus was on how natural vegetation enhances soil permeability, mitigating flood risks through its water absorption capacity and retention in urban and peri-urban areas. The model generated retention volume data, facilitating a climate vulnerability analysis of the region. Our findings indicate that vegetation in peri-urban areas reduces urban runoff by retaining precipitated water. Thus, future urban planning interventions that incorporate nature-based solutions (NbS) in both urban and peri-urban areas are crucial, as they could further enhance the adaptive capacity of cities in response to extreme hydrological events, which are expected to occur more frequently in the context of climate change. These interventions would also promote resilience for the population, which is primarily concentrated in urban centers, such as the Sao Paulo metropolitan area.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T6-1 Integrating Climate Change and Ecosystem Services into Ecological Restoration Efforts: A Systematic Review

First authors(s): Luiz Conrado-Silva

First author affiliation: UERJ: Universidade do Estado do Rio de Janeiro

Other author(s): Paula, Andrea Casas-Cortes, Tauany, Rodrigues, Helena, Alves Prado, Stephanie, Vaz, Aline, Gaglia, Aliny, P. F. Pires

Contact: silva.luiconz@gmail.com

Keywords: Ecological Restoration, Climate Change, Ecosystem Services, Scientometric Analysis, Adaptive Strategie

Ecological restoration has emerged as a critical strategy to combat environmental degradation and biodiversity loss while ensuring the provision of essential ecosystem services. However, climate change significantly complicates restoration efforts, affecting biodiversity, ecological interactions, and the resilience of restored ecosystems. This review evaluates the intersection of ecological restoration, climate change, and ecosystem services through a scientometric analysis of 3,033 studies. Most research highlights the role of restoration in climate mitigation; however, critical gaps remain in understanding how climate change directly affects restoration outcomes and the ecosystem services they provide. The predominance of modeling studies (54%) contrasts with the limited empirical investigations (13%), leaving uncertainties regarding the real-world effectiveness of restoration under changing climate conditions. Geographically, the research is unevenly distributed, with Asia, Europe, and North America leading while vast regions, particularly in the Global South, remain underrepresented. Brazil stands out in South America, demonstrating significant advancements in restoration practices. Key findings highlight the need for integrated, climate-informed approaches that prioritize adaptive strategies, such as selecting climate-resilient species and optimizing the delivery of ecosystem services. Addressing these gaps is crucial for maximizing the socio-ecological benefits of restoration and ensuring its long-term success in mitigating the impacts of climate change. This study advocates for a comprehensive research agenda that bridges existing knowledge gaps and enhances the scalability and resilience of restoration efforts globally.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T7b-1 Win-wins and trade-offs in nature credit markets: A systematic map of the evidence.

First authors(s): Gail Sucharitakul

First author affiliation: Imperial College London

Other author(s): Caroline Howe

Contact: gail.sucharitakul@imperial.ac.uk

Keywords: Nature credits, biodiversity finance, carbon markets, market-based instruments, ecosystem service trade-offs, values

Nature-based Solutions (NbS) by definition should deliver positive outcomes for biodiversity and human well-being. The links between NbS and outcomes can be understood through the lens of ecosystem services, and the complex relationships and governance structures that underpin them. These relationships can be positive (win-wins), negative (trade-offs), or neutral. To achieve win-win outcomes, proponents of NbS often advocate for nature credits (e.g., voluntary carbon credits) as a financing tool for NbS implementation. However, nature credits are contentious as critics of NbS highlight the potential risks due to the prioritisation of financial viability over other outcomes, therefore resulting in trade-offs. For example, nature credits have been associated with planting monocultures and human rights issues. Therefore, the key question this research addresses is: How effective are NbS that are funded by nature credits at delivering win-win outcomes?

Proponents and critics can be biased as they often draw on specific examples to support their perspectives due to a lack of an unbiased summary of the evidence. This study addresses this gap by using a systematic map to identify the causes of win-wins and trade-offs in historical nature credit projects. Evidence is screened from 2,922 unique results from Web of Science, SCOPUS, and Google Scholar to identify over 100 case studies for analysis. Given the common criticism that nature credits prioritise instrumental values such as financial viability, win-wins and trade-offs are coded through (i) co-benefits based on the IUCN Global Standard for NbS, and (ii) values using the IPBES Values Assessment typology.

By identifying the trends from these case studies, this research collates insights to inform how to better design NbS to deliver more effective and equitable outcomes. This can increase the credibility of NbS and therefore attract the much-needed finance to meet Target 19 of the Global Biodiversity Framework.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T9-1 Visitation Patterns, Social Demographics, and Satisfaction in Japanese Pocket Parks: A Study of Nonlinear Relationships

First authors(s): Yilan Xie

First author affiliation: Chiba University

Other author(s): Huixin Wang, Katsunori Furuya

Contact: xyz103hbkk@gmail.com

Keywords: Visitation Patterns, Social Demographics, and Satisfaction in Japanese Pocket Parks: A Study of Nonlinear Relationships

With global warming and rapid urbanization, urban green spaces have become a key area of research due to their impact on human well-being. Pocket parks, with their high accessibility and low construction costs, help address the gaps left by larger urban parks in densely populated areas and play a crucial role in enhancing both physical and mental health. This study, based on residents in the Tokyo metropolitan area of Japan, uses gradient boosting decision trees to determine the relative importance of factors influencing park satisfaction and their nonlinear effects. The results show that social demographics and visitation patterns significantly impact overall satisfaction. The most important factor affecting park satisfaction is satisfaction with the landscape, followed by the visitor's age, satisfaction with guiding & signage, satisfaction with plant landscapes, and satisfaction with temperature and humidity. Additionally, guiding & signage, as well as service facilities, only enhance park satisfaction when they perform well. These nonlinear relationships provide valuable insights for the design of small parks in densely populated urban areas.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T13-1 Can the Environmental Features of Urban Green Spaces Predict Cultural Ecosystem Benefits？ Development of a Bayesian Network-Based Tool

First authors(s): Mengyun Chen

First author affiliation: South China University of Technology

Other author(s): Guangsi Lin

Contact: cmyla@scut.edu.cn

Keywords: Cultural Ecosystem Benefits， Cultural Ecosystem Services， Urban Green Space， Subjective Well-being， Evidence-Based Design Tools

Urban green spaces (UGS) deliver diverse cultural ecosystem benefits essential for residents' well-being, particularly since the COVID-19 pandemic. With increasing urbanization and growing demand for non-material well-being, predicting cultural ecosystem benefits (CEB) has become critical for scientific design decision-making. However, existing predictive tools like InVEST, ARIES, and SolVES inadequately capture the intangible and subjective nature of cultural ecosystem benefits, especially at site-specific scales. These tools often adopt monetary valuation approaches that simplify the complex interplay between green spaces and their diverse benefits, overlooking cultural benefits that require subjective perceptions from recreationists.

This study develops an innovative predictive framework through a three-stage methodological approach. First, a comprehensive training dataset is constructed by dividing Haizhu National Wetland Park in Guangzhou into 265 minimal spatial units. Data collection combines Public Participation Geographic Information Systems (PPGIS) for gathering self-reported perceptions of cultural ecosystem benefits and field research for quantifying environmental physical characteristics. This integrated dataset serves as the foundation for training the prediction tools. Second, Structural Equation Modeling (SEM) is employed to reveal the factors and pathways influencing CEB levels, constructing a cascade model with the influence path "environmental physical characteristics → environment perceived character → recreational behavior characteristics → cultural ecosystem benefits," while controlling for activity types and socio-demographic characteristics. Third, a Bayesian Network (BN) is developed based on the structural relationships identified by the SEM, creating an isomorphic prediction network that maintains the same conceptual structure but leverages probabilistic inference capabilities. This integration enables the prediction tool to visualize cultural

Image credits: Darwin Aerial. Credit: Darwin Convention Center

ecosystem benefits under different environmental scenarios through the Plotly visualization tool.

The study reveals the complex mechanisms underlying cultural ecosystem benefits in urban green spaces through four key hypotheses: (1) environmental physical characteristics significantly impact cultural ecosystem benefits; (2) environment perceived characteristics mediate the relationship between physical characteristics and CEB; (3) UGS usage mediates the relationship between physical characteristics and CEB; and (4) physical characteristics influence perceived characteristics, which affect usage patterns and ultimately CEB levels. The integration of SEM findings with Bayesian Networks creates a predictive tool that visualizes cultural benefits under different environmental scenarios.

By providing a scientific foundation for evidence-based UGS design, this research bridges the gap between theoretical ecosystem service research and practical design applications. The findings enable urban planners and designers to make more informed decisions that maximize the cultural ecosystem benefits of urban green spaces at the site scale. This approach moves beyond traditional experience-based design to evidence-based design, enhancing residents' quality of life and subjective well-being in increasingly urbanized environments. The predictive tool offers practical guidance for optimizing urban green space configurations to deliver targeted cultural ecosystem benefits.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T13-2 Perception of traditional forest management practices reintroduced in the Czech Republic

First authors(s): Jakub Jehlicka

First author affiliation: Charles University Environment Centre

Other author(s): No

Contact: jakub.jehlicka@czp.cuni.cz

Keywords: sustainable forest management, traditional forest management, environmental perception, cultural identity, historical values

Recently, attempts to reintroduce traditional management practices in broadleaf forests, such as coppicing or silvopasture, have been made in the Czech Republic. These practices, long abandoned in favor of high forest management, represent sustainable ways of forest management beneficial for biodiversity conservation and restoration.

From the perspective of the public, however, these managements may appear unusual and less attractive than more typical forms of broadleaf forest.

This poster presents the interim results of a study focusing on how contextual information influences the perception of forests shaped by coppicing, forest grazing (silvopasture) and deadwood management. This experimental study focuses on whether providing historical context (for traditional methods such as coppicing and grazing) and ecological context (for all three practices) can increase the positive public perception of these practices.

The design of the experiment involves presenting visual stimuli of forest environments along with contextual information. Participants then rate various characteristics of the forests and their overall attractiveness. To address individual variation, we collect subjective measures (environmental and cultural identity) that may predict attitudes toward the cultural, historical, and ecological value of forest management.

The outcomes of this study may inform the nature conservation practitioners about possible communication strategies regarding the reintroduction of the practices in focus – strategies that would take into account the diverse public attitudes towards environmental protection and conservation as well as the role of the (regional) cultural heritage.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

T13-3 The Handbook of Cultural Ecosystem Services: New Approaches to CES for Policy and Management

First authors(s): Pamela McElwee

First author affiliation: Rutgers University, US

Other author(s): Karen Allen, Rachelle Gould, Minna Hsu, Jun He

Contact: pamela.mcelwee@rutgers.edu

Keywords: cultural ecosystem services, methods, recreation, health, values

Ongoing crises of climate change, biodiversity loss and ecosystem degradation, and unsustainable consumption and pollution all challenge human wellbeing. Better understanding of people's relationships with the environment can bring attention to the important interconnections between nature and culture that might help to bridge these divides. Cultural perspectives play a profound role in how people see, use and benefit from nature, and the multifaceted benefits that humans receive from ecosystems sustain our identities, cultures, sense of security and wellbeing, and psychological health. These Cultural Ecosystem Services (CES), or the intangible benefits humans derive from ecosystems, encompass spiritual connection, sense of place, cultural heritage, and recreational opportunities, among many others. A robust understanding and recognition of CES can thus help bolster many current approaches to conservation and management of ecosystems.

This poster will introduce the multifaceted nature of CES, drawing on the recent publication (April 2025) of The Routledge Handbook of Cultural Ecosystem Services (available open-access for attendees, and which will be accessible via a QR code on the poster). The Handbook presents a broad and global overview of the latest research on CES, innovative methodologies for how to assess and value CES, and the challenges of integrating CES into policy and management. Through 34 chapters, the Handbook introduces philosophical approaches to CES, typologies and classifications of types of CES, and case studies of places, people, policies and projects engaging CES. Our examples are drawn from diverse environments ranging from urban parks, marine and terrestrial ecosystems, wildlife hotspots, and agricultural landscapes, among others, demonstrating the widespread appeal and importance of CES. The poster will showcase several visual case studies demonstrating how incorporating CES can lead to more effective and equitable conservation outcomes, fostering stronger community engagement and promoting social justice.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

Regional Chapter sessions (R)

R1-1 Bridging Science and Policy: Integrating Ecosystems into the Water-Energy-Food Nexus for Sustainable Resource Management

First authors(s): Malgorzata Blicharska

First author affiliation: Natural Resources and Sustainable Development, Department of Earth Sciences, Uppsala University

Other author(s): Gin Dupont, Claudia Teutschbein, Jayne Glass

Contact: malgorzata.blicharska@geo.uu.se

Keywords: ecosystem assessment, integration, WEFE nexus

Integrated approaches to managing natural resources aim to meet the increasing demand for water, energy, and food while maintaining ecosystem integrity and ensuring equitable access to resources. The Water-Energy-Food (WEF) Nexus has been proposed as a cross-sectoral approach to balance trade-offs and exploit synergies among these sectors. Although nature was not initially included as a core component of the Nexus, its role in sustaining the water, energy, and food sectors and in regulating their interrelationships is increasingly recognized. This has led to the expansion of the framework into a Water-Energy-Food-Ecosystem (WEFE) Nexus.

Despite this growing recognition, there is limited research on how ecosystems are conceptualized, assessed, and incorporated into the WEF Nexus framework. Understanding and integrating ecosystems and their services into this framework could help ensure that nature's contributions to resource security and sustainability are fully recognized, valued, and incorporated into decision-making processes.

In our study, we explore how ecosystems are integrated within the WEFE Nexus across five case studies that aimed at modelling the Nexus and incorporating Nexus considerations into policy development. Specifically, we examine the methods used to assess and quantify ecosystems and their services within the Nexus framework and how these assessments may inform decision-making processes. Our research highlights challenges related to data standardization, ecosystem valuation, and policy integration and contributes to bridging science and policy, demonstrating how ecosystem services can be effectively incorporated into multi-scale governance and policy frameworks to promote sustainability and resilience in natural resource management.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

R1-2 Differentiated Management System for Enhancing the Sustainability of Ecosystem Services in Forests on Inhabited and Uninhabited Islands

First authors(s): Jang-Hwan Jo

First author affiliation: Department of Forest Sciences and Landscape Architecture, Institute of Environmental Science, Wonkwang University, Iksan 54538, South Korea

Other author(s): Moongi Choi, Chae-Jun Lim

Contact: osmanthusfvam007@wku.ac.kr

Keywords: ecosystem services, island forests, sustainability assessment, differentiated management, priority ranking, South Korea

Island forests provide critical ecosystem services (ES), including carbon sequestration, biodiversity conservation, and socio-economic benefits. However, their sustainability is challenged by geographic isolation, limited resources, and environmental degradation. This study develops a differentiated management framework to enhance the sustainability of ecosystem services in island forests, considering both ecological and socio-economic aspects. Using a dataset of 936 islands in South Korea (492 inhabited and 444 uninhabited), we assessed ES supply across four major categories: provisioning, regulating (subdivided into water management, disaster prevention, and urban environment), cultural, and supporting services. The sustainability of each island was further evaluated based on socio-economic and ecological criteria. To prioritize management efforts, we applied a multi-criteria decision-making approach using the Analytic Hierarchy Process (AHP) and the Ranking Method (RM), determining the relative importance of ES and sustainability indicators. Cluster analysis was conducted to classify islands based on ES scores, enabling a systematic comparison of management needs. Our findings reveal distinct management needs for inhabited and uninhabited islands. Inhabited islands require enhanced water management and disaster prevention strategies, while uninhabited islands demand stronger biodiversity conservation efforts. The prioritization framework identified islands requiring immediate restoration, improvement, or maintenance, balancing ecological preservation with socio-economic development. This study contributes to a refined island forest management strategy by integrating ES assessment with sustainability potential, providing a scalable approach for policymakers and conservationists managing diverse island landscapes.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

R1-3 Constructing a Model of Government Purchasing of Ecological Services: Evidence from China's Northeast Tiger and Leopard National Park

First authors(s): Yaru Chen

First author affiliation: Development Research Center of National Forestry and Grassland Administration of China

Other author(s): Hongge Zhu, Yutong Zhang

Contact: chenyaru09@126.com

Keywords: Government purchases ecological services; Payment for ecosystem services (PES); Northeast Tiger and Leopard National Park (NTLNP); State-owned forestry enterprises(SOFEs)

Payment for ecosystem services (PES) and ecological compensation (EC) have mature research paradigms in solving the problems of efficiency and fairness, but government purchasing of ecological services is a more appropriate policy tool in terms of arranging rights and responsibilities. Creating an ecological service supply model that takes into account the efficiency of ecological services, the fairness of residents' livelihoods, and the reasonable distribution of rights and responsibilities is an important issue. This study attempts to construct a model of government purchasing of ecological services in order to provide a useful reference for national parks with state-owned land as the main body. China's Northeast Tiger and Leopard National Park (NTLNP) is a typical national park with state-owned forest land as the main body. Before the establishment of the national park, state-owned forest enterprises (SOFEs) and local government forest departments (LGFDs) were always the undertakers of ecological services. Issues such as the distribution of rights and responsibilities between the NTLNP Administration, SOFEs, and LGFDs and the livelihood of forest workers need to be resolved urgently. This study takes the NTLNP as the study area and constructs a model of government purchasing of ecological services. The main results show the following: (1) The driving factors of the government purchasing of ecological services are increasing the workload of ecological services, the need for workforce transfer, and the optimization of subsidy standards. (2) In the construction of the responsibility system, the NTLNP Administration is the purchaser, SOFEs and Protection Stations are the undertakers, and groups such as third-party institutions and the public are the Supervisors and Evaluators. (3) Setting the purchase price in 2022 at CNY 47,654.44 per

Image credits: Darwin Aerial. Credit: Darwin Convention Center

person while maintaining an average annual growth rate of 6.10% will match the per capita wage income level of urban workers nationwide in 2035.

R1-4 The Index of Urban Areas Vulnerability to Impacts Of Climate Change

First authors(s): Joanna Adamczyk

First author affiliation: Department of Landscape Architecture, Institute of Environmental Engineering, Warsaw University of Life Sciences, Poland

Other author(s): Agnieszka Sosnowska, Agata Cieszewska, Magdalena Kuchcik, Dorota Pusłowska-Tyszewska, Renata Giedych, Joanna Dudek-Klimiuk, Gabriela Maksymiuk

Contact: agnieszka_sosnowska@sggw.edu.pl

Keywords: climate change adaptation, ecosystem services, urban vulnerability

Contemporary environmental challenges require solutions to create a sustainable city environment. Studies have shown that while large cities have often implemented Climate Change Adaptation Plans, small and medium-sized cities are still at an early stage in preparing appropriate policies.

To support policy decisions, it is essential to develop tools to identify problem areas related to their vulnerability to environmental threats caused by climate change. Quantitative tools, such as indicators justifying the actions taken and their communication to stakeholders in specific locations, are especially needed.

The aim of this study was to develop an Urban Area Vulnerability Index to the impacts of climate change, which would effectively fulfill the above tasks. The Index is based on the concept of regulatory ecosystem services, incorporating detailed parameters related to individual components of the environment.

The case study was conducted for a medium-sized city, Mińsk Mazowiecki. First, an identification and mapping of regulatory ecosystem services were carried out based on land use/land cover and the share of impermeable surfaces within them. Subsequently, the analysis of environmental characteristics affecting ecosystem services was expanded to include data such as relief, soil type and substrate at various depths, climatic parameters, and water aspects.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

The analysis for the entire city was performed at the local scale, at the level of individual plots, to facilitate later decisions on the potential implementation of climate change adaptation solutions as well as planning decisions. The Urban Area Vulnerability Index enables for the quick identification of problem areas based on publicly available environmental data. Identified problems at the level of individual plots also allow for the designation of zones with varying levels of constraints on the provision of regulatory ecosystem services. As a result, optimal nature-based solutions can be proposed in these city zones to improve the quality of life for residents.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

Other sessions (O)

O1-1 Developing strategies for Carbon Neutrality Through Restoration of Ecological Spatial Networks in the Thal Desert, Punjab

First authors(s): Tauqeer Nawaz

First author affiliation: Beijing Forestry University

Other author(s): Muhammad Gohar Ismail Ansari, Qiang Yu, Buyanbaatar Avirmed, Farhan Iftikhar, Wang Yu, Jikai Zhao

Contact: tauqeernawaz2022@bjfu.edu.cn

Keywords: Ecological Spatial Network (ESN), Optimization, EFCT-Model, Topological indicator, Carbon neutrality

Carbon neutrality is an important goal for addressing global warming. It can be achieved by Increasing carbon storage and reduce carbon emission. Vegetation plays key role in storing carbon but it is often lost or damaged, especially in affected areas by desertification. Therefore, restoring vegetation in this area is crucial. Using advanced techniques to improve ecosystem structure can support ecological process and enhance soil and environmental conditions, encourage vegetation growth and boost carbon storage effectively. This study focuses on optimizing Ecological Spatial Networks (ESN) for revitalization and regional development, employing advanced techniques such as the MCR model for corridor construction, spatial analysis, and Gephi for mapping topological attributes. Various ecological and topological metrics were used to evaluate network performance, while the EFCT model was applied to optimize the ESN and maximize carbon sinks. In the Thal Desert, ecological source patches (ESP) were divided into four modularity levels (15.6% to 49.54%) and five communities. The northeastern and southwestern regions showed higher ecological functionality but lower connectivity, while the central region exhibited the reverse. To enhance the ESN structure, 27 patches and 51 corridors were added to 76 existing patches, including 56 forest and 20 water/wetland patches, using the EFCT model. The optimized ESN resulted in a 14.97% improvement in carbon sink capacity compared to the unoptimized structure, primarily due to better functioning of forest and wetland areas. Enhanced connectivity between components contributed to a more resilient and stable ESN, supporting both ecological sustainability and carbon sequestration.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

O4-1 Agroforestry in the Savannas: A Plausible Nature-based Solution for Climate Change Adaptation and Livelihood Improvement

First authors(s): Claire Anulisa Okinyi

First author affiliation: International Centre for Research in agroforestry (ICRAF)

Other author(s): No

Contact: anulisaclaire@gmail.com

Keywords: climate change adaptation, agroforestry, Tana River

As Kenya grapples with the consequences of climate change, there is a pressing need for adaptive strategies and sustainable conservation efforts to preserve the unique biodiversity of the savannahs.Tana River County, located in the savanna region of Kenya, is an arid and semi-arid land prone to degradation and climate change impacts. With limited income opportunities and few livelihood alternatives, the coping capacity of the local communities, especially farmers, is constrained. The County government of Tana River intends to promote agroforestry and a green economy to address food insecurity, contribute to national reforestation efforts, and ensure sustainable agriculture as part of its Third County Integrated Development Plan. However, it is not considered part of the climate change action plan. This study aimed to understand how farmers in Tana River County perceive the impacts of climate change on their livelihoods and to document how sustainable agroforestry systems can serve as a viable coping strategy for dealing with the effects of climate change while providing additional livelihood benefits. Quantitative and qualitative data were collected through household surveys, key informant interviews, focus group discussions, and geospatial analysis of land cover, temperature, and rainfall. The major climate change manifestations reported were droughts, floods, strong winds, and extreme temperatures. About 73% of respondents in Tana River Sub-County were well aware of climate change manifestations and their impacts. Analysis revealed increasing temperature trends and variable precipitation patterns over time. Common agroforestry systems practised in Tana River Sub-County were Agrisilvopastoral at 56.7%, followed closely by Agrisilvicultural systems at 40%, and Silvopastoral systems at 3.3%, incorporating fruit, fodder, and timber trees. The practice of Agroforestry provides multifaceted benefits that improve livelihoods and climate change adaptation.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

O6-1 Cooperation with nature and local community: An ecotourism and local food dining initiative

First authors(s): Chin-Chung Yu

First author affiliation: Department of Horticulture, Hungkuo Delin University of Technology

Other author(s): Lin Bau-Show

Contact: hort5888@mail.hdut.edu.tw

Keywords: Cultural ecosystem services, Place attachment, University social responsibility

The Yinhe Community in Xindian District, New Taipei City, is rich in natural resources and cultural heritage but faces a decline in vitality due to urban migration. This study explores ways to strengthen residents' sense of place by integrating ecotourism with local culinary culture and leveraging natural and historical assets to foster community identity and sustainable development. In the initial phase, community residents participated in searching to identify key natural and cultural features. Findings were incorporated into an ecotourism itinerary centered around an outdoor communal kitchen and dining area. Eight residents, six teachers, and sixteen students contributed to the design process. During construction, a work holiday initiative utilizing traditional building techniques attracted 160 volunteers over three months. The study revealed that while residents take pride in local nature, their cultural recognition is relatively weak. However, the communal kitchen project successfully increased interest and engagement. As construction progressed, more residents participated and engaged in discussions about wild vegetables and traditional cooking, demonstrating growing cultural awareness. This hands-on approach showed that integrating ecotourism with culinary traditions enhances community identity, participation, and cohesion. The communal kitchen raised awareness of environmental and cultural issues and became a focal point for strengthening social ties and revitalizing local engagement.

Image credits: Darwin Aerial. Credit: Darwin Convention Center

O7-1 Ecosystem service provision in forested riparian protection zones along small and medium-size rivers in Latvia

First authors(s): Jānis Donis

First author affiliation: Latvian State Forest Research Institute “Silava”

Other author(s): Edgars Jūrmalis

Presenting author: Zane Lībiete

Presenting author affiliation: Latvian State Forest Research Institute “Silava”

Presenting author contact: zane.libiete@silava.lv

Keywords: Forested catchments, riparian buffers, protection zones, ecosystem services

Riparian zones perform significant ecological functions and provide a wide range of ecosystem services, including erosion protection, pollution and sediment filtering, habitat provision and recreation opportunities. To preserve these functions and services, protection zones are often delineated. While the main establishment principles differ among countries, the typical width of a riparian protection zone varies between 10 and 30 m. In Latvia, 10-100 m protection zones are most common, with some largest rivers having protection zones of 300-500 m, the exact width depending on the length of the river. This leads to a monolith approach for all rivers and streams, without explicitly taking into account the local terrain and ecosystem contexts. Understanding the beneficial functions of riparian buffer zones is crucial to identify nuances and options for improving the flexibility of buffer zone implementation and management.

We evaluated provisioning, regulating and cultural ecosystem services in the protection zones of six small and medium size rivers in predominantly forested areas in Latvia, according to a methodology based on the matrix model and biophysical indicators (Saklaurs et al. 2022, Jūrmalis et al 2023). Following ecosystem service indicators were used: timber and energy wood volume, carbon stock in above-ground and below-ground biomass, recreational value, visual quality and erosion control by vegetation. We compared the values of ecosystem services in the protection zone and in the catchment, and identified hotspots of ES provision using GIS data and analysis. Information about the ES hotspots may serve as a criterion for a better planning and implementation of protection zones.