

## BOOK OF ABSTRACTS

This Book of Abstracts provides a comprehensive overview of the session content and is structured into three main sections:

- I. **Session Description** – an introduction to each session, including its objectives and expected outputs
- II. **Session Program** – a detailed schedule for each session, including speakers and timing
- III. **List of Abstracts** – a complete compilation of all accepted abstracts

### I. SESSION DESCRIPTION

ID: T7a

#### Value transfer for relevant ecosystem & service valuation: scientific challenges, recent developments and innovative applications

Hosts:

	Name	Organisation	E-mail
Host (s):	Peter Roebeling	University of Aveiro	<a href="mailto:peter.roebeling@ua.pt">peter.roebeling@ua.pt</a>
Co-host(s):	Luke Brander	Brander Environmental Economics	<a href="mailto:lukebrander@gmail.com">lukebrander@gmail.com</a>
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#### Abstract:

With the increase in available primary valuation studies and databases (such as the ESVD and EVRI), value transfer is increasingly used to estimate the monetary value of ecosystems & services. These monetary ecosystem & service values are important for sustainable natural resources management (by internalizing the value of nature; aligned with e.g. the EU Nature Restoration Law and the Roadmap towards Nature Credits) and natural capital accounting (by recognizing the value of nature in national accounts; aligned with e.g. the SEEA-EA). Value transfer provides opportunities as well as adversities and, hence, it is important to critically explore methodological considerations, assess recent developments and discuss applications of value transfer – in particular in relation to their potential role to inform decision making, underpin natural capital accounting, and facilitate transformative change towards sustainable natural resources management.

This session focuses on the scientific challenges, recent developments and innovative applications of value transfer techniques (such as unit value transfer, adjusted unit value transfer, value function transfer and meta-analytic function transfer) to produce relevant, robust and contextual ecosystem & service value estimates that support sustainable natural resources management and natural capital accounting. The session will address scientific challenges and recent developments in value transfer methods, such as those related to unit standardization, dependence between observations, spatial, temporal and socio-economic heterogeneity, and transfer and aggregation errors. Also, the session will address innovations and challenges in value transfer applications, such as those related to double counting between interdependent ecosystem services, extrapolations beyond the underlying data, gaps in contextual information, and interpretation and communication of uncertainties.

The goal of this session is to enhance the scientific rigor and practical application of value transfer methods, with the aim to improve its policy relevance, decision support and social legitimacy – contributing to sustainable, inclusive and transparent natural resources management decisions in the context of Europe's green and just transitions.

#### Goals and objectives of the session:

Researchers are invited to present their scientific challenges, recent developments and innovative applications in value transfer for relevant ecosystem & service valuation, underpinning natural capital accounting and facilitating transformative change towards sustainable natural resources management.

#### Planned output / Deliverables:

Journal Special Issue about scientific challenges, recent developments and innovative applications of value transfer for relevant ecosystem & service valuation.

#### Session format:

10-minute presentations + 5 minutes discussion per presentation.

#### Related to ESP Working Group:

TWG 7 – Economic & Monetary valuation

## II. SESSION PROGRAM

**Room: C2**

**Date of session: Wednesday, 20 May 2026**

**Time of session: 15:00 – 18:15**

For presenters: **15 mins (10 mins of presentation + 5 mins for one/two follow-up questions)**

#### Timetable speakers:

Time	First name	Surname	Organization	Title of presentation
15:00-15:05	Peter	Roebeling	University of Aveiro	Introduction
15:05-15:20	Peter	Roebeling	University of Aveiro	Estimating ecosystem service values across Europe: a comparative value transfer methods approach
15:20-15:35	Arianna	Accomo	Università degli Studi di Torino	Assessing the impacts of EU-wide footprint reduction policies on ecosystem services and values in Europe
15:35-15:50	Luiz	Magalhães Filho	University of Aveiro	Coastal ecosystem service values under contrasting socioeconomic pathways
15:50-16:05	Nalini	Rao	Electric Power Research Institute	Evaluating and Operationalizing Natural Capital Accounting in Utility Decision-Making
16:05-16:20	Adrian	Lüdtke	University of Hohenheim	Valuing Biodiversity-Linked Ecosystem Services in Agricultural Landscapes: A Systematic Review and Meta-Analytic Approach for Farm-Level Decision Support
16:20-16:30	Victoria & Luiz	Guisado-Goñi & Magalhães-Filho	FSD & University of Aveiro	Plenary questions, discussion & observations

16:30-16:45	Break			
16:45-17:00	Vittoria	Reas	University of Siena	Water-related Ecosystem Services for Accounting and Policy making: A Meta-Analytical and Value Transfer Perspective
17:00-17:15	Ken	Cousins	Earth Economics	Spatial Value Function Transfers: Modeling Ecosystem Benefits Across Landscapes
17:15-17:30	Victoria	Yavorskaya	University of Graz	Value transfer under real-world constraints: Lessons from an Interreg Alpine Space "Forest EcoValue" project
17:30-17:45	Liangfeng	Wu	Politecnico di Torino	Multidimensional Impact Assessment of Water Sports Tourism on Coastal Urban Development: A Comparative Study of Genoa and Aveiro
17:45-18:00	Carlotta	Quagliolo	University of Aveiro	Integrated spatially explicit assessment of multiple cultural ecosystem services values from nature-based solutions: the case of Aveiro (Portugal)
18:00-18:10	Luke & Vince	Brander & van 't Hoff	BEE & FSD	Plenary questions, discussion & observations
18:10-18:15	Peter	Roebeling	University of Aveiro	Final thoughts, next steps & closure

### III. LIST OF ABSTRACTS

*The first author is the presenting author unless indicated otherwise*

#### 1. Assessing the impacts of EU-wide footprint reduction policies on ecosystem services and values in Europe


**First author:** Arianna Accomo

**Other author(s):** Peter Roebeling, Carlotta Quagliolo, Nico Polman, Hatem Chouchane, Willem-Jan van Zeist, Adam Walker, Chloë de Vries, Allard Jellema

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The European Union's (EU) commitment to climate neutrality by 2050 stresses the need for policies balancing economic development with environmental conservation. Given the critical role of land use in biodiversity trends and ecosystem services (ES) provision, this study aims to investigate how nature conservation influences ecosystem service values (ESV). To date, studies focus mainly on footprint and socio-economic impacts of EU policies – ignoring the relationship between land use, biodiversity, ES and ESV. Hence, this study seeks to develop an ecosystem service values assessment (ESVA) approach to evaluate the ecosystem service benefits from EU-wide policies targeting a 50% reduction in consumption footprint by 2050. The approach integrates global meta-analytic valuation function transfer with land use (from iCLUE), socio-economic (from MAGNET) and habitat quality data, focussing on key biomes (cultivated; grassland; forest; woodland; fresh water; inland wetland; coastal wetland; desert) and ES-types (provisioning; regulating & maintenance; cultural). The policy scenario (GreenEU\_2050) entails reduced animal-based protein consumption (-50%), efficient resource use (conform SSP1), due diligence (100% import tax on selected products), CO<sub>2</sub>-tax (50 US\$/ton), increase in protected areas (to 30% target) and reduced food waste (-50%), and is compared to the business-as-usual SSP2 scenario (BAU\_2050). Results show that for BAU\_2050, total ESV in Europe are estimated at ~212 billion Euro/year. Compared to BAU\_2050, GreenEU\_2050 results in a ~2% increase in total ESV in Europe, due to increases in income and consumption, land-use change (decrease in cultivated and grassland areas in favour of wetland and forest areas) and increases in protected areas. The largest increases in total ESV occur for



provisioning and cultural ES in Ireland, Sweden and Finland. Hence, it is shown that nature conservation, sustainable production and changed consumption effectively increase ecosystem services and values. Further research is needed to determine the net global effect of a reduction in the consumption footprint.

**Keywords:** Ecosystem services; Monetary valuation; Value transfer methods; EU-policies

## 2. Coastal ecosystem service values under contrasting socioeconomic pathways

**First author:** Luiz Magalhães Filho

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The future of coastal ecosystem services is strongly shaped by socioeconomic uncertainties embedded in alternative development narratives. Different Shared Socioeconomic Pathways (SSPs) may lead to substantial changes in ecosystem service values (ESV). Recent geopolitical changes may lead to socioeconomic developments that deviate from the business-as-usual SSP2 scenario. This study assesses how contrasting socioeconomic trajectories throughout the 21st century may influence coastal ESV in the Atlantic Coastal Zone (ACZ) by 2100. Country-level ESV estimates were derived using meta-analytic value function transfer under three SSP scenarios: SSP1 (Sustainability – Green Road), SSP2 (Middle of the Road), and SSP3 (Regional Rivalry – Rocky Road). Land cover and socioeconomic data were compiled for 63 countries across Africa, Europe and the Americas, using 2020 as a baseline and projections for 2100 based on the SSP public database. SSP1 reflects strong environmental improvements, characterized by low agricultural expansion, reduced deforestation (with forest gains in northern ACZs), high income growth (especially in central and southern ACZs) and moderate population growth. SSP2 exhibits moderate environmental improvement, characterized by some agricultural expansion, low deforestation (notably in Latin America), medium to high income growth and population increase. SSP3 represents environmental deterioration, marked by widespread agricultural expansion, significant deforestation (particularly in Africa), low-income growth and high population growth (except in European ACZs). Results indicate a substantial increase in coastal ESV from ~1.0 trillion Euro in 2020 to ~4.2 trillion Euro by 2100 under SSP2. More sustainable pathways under SSP1 further enhance ESV to ~5 trillion Euro (+20% compared to SSP2), whereas regional rivalry under SSP3 reduces ESV to ~2.3 trillion Euro (-43% compared to SSP2) by 2100. Hence, recent geopolitical changes may lead to severe ESV losses along the ACZ. These findings highlight the critical role of socioeconomic narratives in shaping environmental conditions and socioeconomic drivers, ultimately influencing future coastal ecosystem service values.

**Keywords:** Shared Socioeconomic Pathways (SSPs); Natural capital; Scenario-based assessment; Value transfer; Environmental policy and planning.

## 3. Evaluating and Operationalizing Natural Capital Accounting in Utility Decision-Making

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We explore a rigorous decision-support framework for quantifying and integrating environmental externalities into utility planning and investment strategies. The framework operationalizes natural capital accounting principles and ecosystem service valuation within the context of large-scale energy system transitions, including electrification, transmission expansion, and renewable energy deployment. By embedding environmental metrics into economic analyses, it enables utilities to internalize ecological costs and benefits, thereby advancing both regulatory compliance and sustainability objectives. The methodology combines biophysical impact assessment with economic valuation techniques—such as avoided cost, contingent valuation, and benefit transfer—tailored to utility-relevant services. These approaches facilitate monetization of environmental risks and benefits, supporting probabilistic risk-weighted cost structures and return on investment estimation for nature-positive interventions. The framework is designed to accommodate heterogeneity in spatial and temporal impacts, ensuring applicability across diverse ecological and regulatory contexts. Our methodology is focused on (1) a global landscape scan of current practices and gaps; (2) a

standardized inventory of natural capital assets and ecosystem services; (3) development of valuation protocols aligned with guidelines; (4) pilot applications to real-world utility projects for empirical validation; and (5) a prototype decision-support interface for scenario analysis and ESG-aligned reporting. Collectively, these outputs advance the integration of ecological economics into utility decision-making, bridging the gap between environmental science and infrastructure planning. Examples from the United States as well as global applications from the electric power sector will be described.

By initiating this work now, the utility sector can proactively address emerging environmental constraints, mitigate systemic risks, and optimize long-term social welfare under decarbonization, development, and decommissioning pathways. This research contributes to the evolving discourse on operationalizing ecosystem service analysis and sustainability metrics within capital-intensive industries, offering a scalable model for embedding environmental economics into strategic energy planning.

**Keywords:** Natural capital accounting; ecosystem services valuation; decision-support systems; energy system transition; landscape management strategies.

#### 4. Valuing Biodiversity-Linked Ecosystem Services in Agricultural Landscapes: A Systematic Review and Meta-Analytic Approach for Farm-Level Decision Support

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Biodiversity-linked ecosystem services (ES) sustain agricultural productivity, yet their economic valuation remains uneven and fragmented. This study integrates global and regional evidence through a systematic review of farm-level assessments of pollination, natural pest control, and soil biodiversity, complemented by a Europe-focused meta-regression on water purification. Studies linking ecological indicators to monetary outcomes were identified in Scopus and Web of Science. The review followed PRISMA 2020 guidelines, included 92 studies, and assessed study-level bias narratively. Quantitative syntheses employed robust standard errors with sensitivity analyses.

The meta-regression (50 observations) shows that ES values increase with GDP per capita but decline with organic land share, average farm size, and publication year, while population density has no significant effect. Model fit is satisfactory (adjusted  $R^2 \approx 0.37$ ), and results are robust across specifications. Methodological patterns reveal that production-function approaches dominate for market-linked services, whereas cost-based and stated-preference methods prevail for public-good services. Findings highlight that incorporating socioeconomic covariates enhances the reliability of benefit transfer and supports cost-effective targeting of agri-environmental measures. At the farm level, biodiversity-supportive practices yield both private and public benefits, creating opportunities for co-investment. At the policy level, integrating service-specific ecological indicators into the Common Agricultural Policy (CAP) framework could improve its efficiency and ecological impact.

**Keywords:** agriculture, ecosystem services, economic valuation, meta-regression, benefit transfer

#### 5. Water-related Ecosystem Services for Accounting and Policy making: A Meta-Analytical and Value Transfer Perspective


**First author:** Vittoria Reas

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Water-related ecosystems play a fundamental role in sustaining ecological processes and delivering a wide range of economic benefits to society. Despite their importance, empirical evidence on the value of water-related ecosystem services (WES) remains fragmented and difficult to operationalise for environmental accounting and policy analysis. This study addresses this gap by compiling a harmonised global dataset of 299 exchange-value estimates derived from 75 primary valuation studies covering freshwater bodies, wetlands, and groundwater systems.

Using this dataset, the study applies a linear mixed-effects meta-regression to identify the key ecological, socio-economic, and methodological drivers shaping observed valuation outcomes, while explicitly



accounting for unobserved heterogeneity across primary studies. The resulting value function is consistent with exchange value principles, in line with the requirements of ecosystem accounting frameworks such as the System of Environmental-Economic Accounting – Ecosystem Accounting (SEEA EA).

The reliability of the estimated value transfer function is evaluated through out-of-sample validation using a leave-one-observation-out procedure, yielding an average transfer error of approximately 50%, consistent with the degree of variability observed across the underlying valuation evidence.

To explore the policy relevance of the estimated value function, the study illustrates how the meta-analytic results can be combined with spatial information on ecosystem extent and context to support large-scale value transfer exercises. This application highlights the importance of accounting for scale effects and spatial heterogeneity when transferring values beyond individual study sites.

Overall, the findings suggest that the proposed harmonised exchange-value dataset and meta-analytic framework provide a robust empirical basis for ecosystem accounting and can support policy-oriented assessments of WES, while also highlighting remaining sources of uncertainty and avenues for future methodological refinement.

**Keywords:** Water ecosystem services, Meta-regression, Exchange values, Value transfer, Environmental-economic accounting

## 6. Spatial Value Function Transfers: Modeling Ecosystem Benefits Across Landscapes

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Centering nature in problem-solving can improve long-term wellbeing and promote more resilient, equitable societies. Economic valuation is one approach to communicating such benefits that translates them to a common metric used in decision making. While primary research on ecosystem services is critical and necessary, it often proves too expensive and time consuming to be required of every environmental decision. Benefit Transfer Method (BTM) approaches generalize dynamics observed in primary research to enable us to assess the magnitude of a broader range of benefits—more quickly and with less effort—than is practicable via primary research alone. For more than two decades, Earth Economics has focused on improving the validity and precision of the estimates we generate through BTM, carefully matching site contexts, developing meta-analyses, and applying value function transfers. We recently implemented the latter to estimate the value of wetlands at regional scales (the US state of Ohio, and the Everglades of southern Florida), with models that integrate landscape-scale factors that economic theory tells us influence value: scale, scarcity, and beneficiary populations. Geospatial software allows us to identify and characterize contiguous wetland patches; we developed R scripts to apply meta-analytic value functions to each patch individually, allowing us to generate unique estimates for each wetland in-context. To expand on this approach, we are developing meta-analytical models from our extensive internal repository of ecosystem value estimates. We are currently fine-tuning these models (e.g., modeling multiple services across one ecosystem type, or multiple ecosystems for a single service) and collecting spatial data on primary study sites. Greater specificity in how primary research is reported would help immensely, including careful definition of site boundaries and site history (e.g., ecosystem maturity, health).

**Keywords:** meta-analyses, benefit-transfer, value function transfer, spatial modeling


## 7. Value transfer under real-world constraints: Lessons from an Interreg Alpine Space “Forest EcoValue” project

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Monetary valuation of ecosystem services (ES) is increasingly institutionalized in public and private decision-making. Yet, primary valuation remains infeasible in many applied contexts due to data, time, and resource constraints. Value transfer, therefore, plays a key role in enabling broad, rapid, and low-cost valuation, particularly in practice-oriented projects. At the same time, detaching monetary values from their welfare-economic meaning, together with the limited stakeholder interaction inherent to the desktop-based valuation approaches, may amplify the risk of misvaluation and misinterpretation, especially when values are used to inform local innovation strategies and business models.

This study critically examines the role of value transfer in real-world decision-making by assessing whether increasing methodological sophistication meaningfully improves decision support. We compare an adjusted unit value transfer with a meta-analytic value transfer function newly developed for European forest ecosystem services (FES), applied to Grand Annecy (France), one of the pilot areas of the Interreg Alpine Space "Forest EcoValue" project. The project aimed to develop and test FES-based business models to support sustainable forest management, relying on biophysical and economic assessments.

Using the same spatial and biophysical inputs, we assess differences between valuation approaches along three dimensions: (i) numerical outcomes, (ii) the narrative conveyed about the FES importance and distribution, and (iii) the interpretability of results in the light of misinterpretations of valuation outputs as "earnable income", observed during the Forest EcoValue project. We analytically examine whether reduced misvaluation alters the communicative properties and interpretation risks of monetary FES values. The results provide practice-oriented insights into the strengths and limits of value transfer for local applications, suggesting that increased methodological precision alone does not resolve key challenges at the science-policy interface. Instead, effective communication and framing of monetary values emerge as decisive factors in ensuring their responsible use in decision-making.

**Keywords:** adjusted value transfer, meta-analytic value transfer, monetary value, forest ecosystem services, science-policy interface

## 8. Multidimensional Impact Assessment of Water Sports Tourism on Coastal Urban Development: A Comparative Study of Genoa and Aveiro

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As European port cities transition from industrial hubs to the "Blue Economy," coastal tourism has emerged as a significant driver of economic growth and employment. However, this shift is accompanied by persistent challenges, including port pollution, coastal ecosystem degradation, and "blue gentrification." Consequently, evaluating both the ecological-economic and social values derived from water sports tourism is pivotal for ensuring the sustainability of coastal ecosystem services. Existing assessment methodologies predominantly focus on measuring direct economic contributions, often overlooking the spatial heterogeneity of economic flows, supply chain environmental externalities, and hidden environmental costs.

This study employs an integrated economic-ecological coupling analysis framework applied to two distinct coastal regions: Genoa, Italy, and Aveiro, Portugal. Utilizing Multi-Regional Input-Output Models (MRIO), the research traces the economic value added generated by water sports tourism (e.g., equipment procurement and yacht leasing). In conjunction with Environmentally Extended Input-Output Analysis (EE-IOA), the study performs Natural Capital Accounting to quantify the "hidden environmental costs" associated with coastal ecological strain in Genoa and lagoon degradation in Aveiro. This approach calculates the Net Economic Contribution of water sports tourism, providing a robust quantitative basis for assessing "eco-efficiency." Simultaneously, the study applies Social Exchange Theory (SET) to analyze local residents' perceptions of water sports tourism and the phenomenon of "blue gentrification," thereby preventing decision-making distortions that arise from an exclusive focus on economic valuation to the detriment of social concerns.

By comparing two distinct types of transitioning port cities while accounting for spatial heterogeneity, this research addresses the methodological challenges inherent in assessing coastal ecosystem services



within the intertwined nexus of tourism, environmental quality, and community well-being. These primary valuation estimates will contribute to improving value transfer functions for coastal and blue space ecosystem services, addressing critical data gaps in existing databases, and providing empirical evidence to substantiate value transfer functions for future meta-analyses.

**Keywords:** Natural Capital Accounting; MRIO and EE-IOA; Water Sports Tourism; Value Transfer; Spatial Heterogeneity

## 9. Integrated spatially explicit assessment of multiple cultural ecosystem services values from nature-based solutions: the case of Aveiro (Portugal)

**First author:** Carlotta Quagliolo

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Cities are facing increasing pressures from population growth, urban sprawl and environmental impacts, while climate change-related challenges strongly intensify their vulnerabilities. Therefore, urban adaptation led to the growing interest in the use of green/blue solutions, such as nature-based solutions (NBS), to address and mitigate these urban challenges while contributing to social welfare, human health and well-being. Hence, an improved understanding of the economic benefits of nature in cities should inform policy makers about the economic viability of NBS, which can foster their implementation and maintenance. However, the available evidence is still partial to fully support policy makers, which requires a comprehensive evaluation of the spatial monetary ecosystem services values (ESV) that they provide. Primary valuation methods can be used to assess ESV, though methodologies vary widely, their implementation is costly and, hence, obtaining relevant, reliable and comparable urban nature ESV is challenging. The objective of this study is to develop an integrated spatially explicit assessment of the multiple cultural ecosystem service values (recreational, aesthetic and heritage) from NBS, using a spatially explicit meta-analytic value function transfer (MA-VFT) approach. For the case of urban park NBS in the City of Aveiro (Portugal), multiple cultural ESV are estimated based on i) city-wide average explanatory variable values and ii) neighborhood-specific weighted explanatory variable values. Results show that total cultural ESV from urban parks in the City of Aveiro amount to ~213 million €/year and that this total value is underestimated by almost 5% when calculations are based on city-wide average explanatory variable values. Comparing cultural ESV between urban parks, results show that cultural ESV per urban park range between 40-45 million €/year and that these values are underestimated by up to 12% when calculations are based on city-wide average explanatory variable values. These underestimations are explained by income and population density values that are above (city-wide) average in the neighborhoods surrounding the urban parks. These results aim to inform urban planners and policymakers regarding decisions to invest in urban park NBS, thereby considering local conditions as to achieve largest human health and well-being benefits across all urban residents.

**Keywords:** Urban nature, Cultural ecosystem services values, Meta-analytic value function transfer, Spatially-explicit assessment, Nature-based solutions