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SESSION DESCRIPTION

ID: B2

Freshwater Ecosystem Services for Restoration, Management, and Policy: linking restoration, valuation and nature-based solutions for research and decision-support

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Abstract:

Freshwater ecosystems provide essential services that underpin environmental health, human well-being, and sustainable development, including water quality regulation, flood mitigation, climate regulation, carbon sequestration, and diverse cultural and relational values. However, despite their critical role, knowledge of Freshwater Ecosystem Services (FES) remains fragmented and underrepresented, which limits their effective integration into water management, restoration, and policy frameworks.

This session brings together three complementary themes: assessing and managing FES for integrated watershed protection, quantifying the biophysical and socio-economic benefits of freshwater restoration to support nature-based solutions, and applying the ecosystem services concept to meet the objectives of the EU Water Framework Directive. It seeks to foster stronger inter- and transdisciplinary collaboration among researchers, water managers, policymakers, and other stakeholders to address knowledge gaps, share methodological advances, and identify best practices for integrating FES into decision-making.
Through case studies and conceptual presentations, followed by a joint discussion, this session focuses on holistic and systemic approaches to FES, including advancing nature-based solutions, multi-service assessments, modelling and valuation approaches, restoration actions, and strengthening science-policy interfaces for integrated watershed management to support environmental conservation and human well-being.
The session will result in two main outcomes: a peer-reviewed synthesis of FES research and methods, and the launch of a thematic interdisciplinary working group to coordinate research, inform policy, and guide sustainable freshwater conservation and management across scales and sectors.

Goals and objectives of the session:

This session aims to advance the understanding, assessment, and practical application of Freshwater Ecosystem Services (FES) as a common framework for research, management, and policy. We welcome studies encompassing multiple ecosystem services, habitat types, geographical contexts, and diverse analytical approaches, including empirical studies, reviews, modelling exercises, and concept-based discussions. We also welcome analyses of decision-making contexts that shed light on the role of FES in conservation, restoration, prioritisation, and management strategies supported by nature-based solutions, particularly those drawing on European and comparative international case studies addressing service quantification, valuation, and trade-offs.

We seek to bring together diverse FES approaches to integrated research, water management, ecosystem restoration, and the implementation of the EU Water Framework Directive, the Nature Restoration Law, and related environmental goals, and to serve as a starting point for an interdisciplinary community on FES that integrates scientific research, management, and policy.

Specific Objectives

1. Synthesize current knowledge and approaches on freshwater ecosystem services, including water quality and quantity regulation, erosion and flood control, nutrient retention, climate regulation, carbon sequestration, and habitat provisioning, while highlighting both well-established and emerging or underrepresented services.

2. Identify main knowledge and implementation gaps in FES research and management, with a particular focus on strategies for protecting and restoring freshwater ecosystems and their services, while aligning with broader goals of nature conservation, climate resilience, and sustainable development goals.

3. Explore decision-making contexts and knowledge needs that support prioritisation of freshwater restoration and the efficient allocation of resources to nature-based solutions, and to share examples of best practice in applying the ecosystem services concept to water management planning to support the objectives of the Water Framework Directive.

4. Establish a thematic interdisciplinary working group dedicated to the research and management of freshwater ecosystem services, promoting collaboration across scientific, management, and policy domains to co-produce knowledge, bridge research-practice gaps, and guide coordinated action for the conservation and sustainable use of freshwater ecosystems

Planned output / Deliverables:

The session is expected to create a collaborative space for researchers, policymakers, and practitioners to share approaches and experiences, and identify knowledge and implementation gaps in assessing and in-

tegrating FES into watershed management, conservation, and sustainability planning and decision-making, with attention to both tangible and less tangible services.

Key outcomes of this session include a joint peer-reviewed publication summarising current FES research and management perspectives & scope, potentially including a synthesis of methodological advances in modelling and valuation that link ecosystem services assessment to policy and management decisions, as well as practical guidance on FES in line with the EU Water Framework Directive.

The session will also initiate a thematic interdisciplinary working group on FES to coordinate research, support knowledge transfer, and inform policy and management, while contributing to ESP working groups (BWG 2a and BWG 2b) and supporting ongoing European initiatives on upscaling nature-based solutions..

Session format:

Standard session composed of three sub-sessions:

- Sub-session 1. Freshwater ecosystem services for integrated watershed management and protection – *Juan Pablo Pacheco, Bence Decsi, Pablo E. Prado Velasco, Marcus Ming Fricke, Zsolt Kozma, Kenneth M. Persson, Linus Zhang*
- Sub-session 2. Quantifying the biophysical and socio-economic benefits of freshwater ecosystem restoration: understanding knowledge needs for up-scaling nature-based solutions – *Xavier Garcia, Sien Kok, Nicolas Grondard, Kerry Waylen, Sebastian Birk*
- Sub-session 3. Support of the fulfilment of the objectives of the European Water Directive through the implementation of ecosystem services concept to water management planning – *Jiri Schneider, Jiri Jakubinsky, Martin Pawel*

Each sub-session will include oral presentations of 10 minutes, followed by 5 minutes for questions, in 15-minute slots.
The sub-sessions will conclude with a joint discussion of 30 minutes, focused on establishing the basis for the working group on Freshwater Ecosystem Services and identifying the main components to include in the perspective paper. Overall, the session is expected to last 5 hours

Voluntary contributions accepted:

Yes, I allow any abstract to be submitted to my session for review

Related to ESP Working Group:

BWG 2 – Freshwater systems