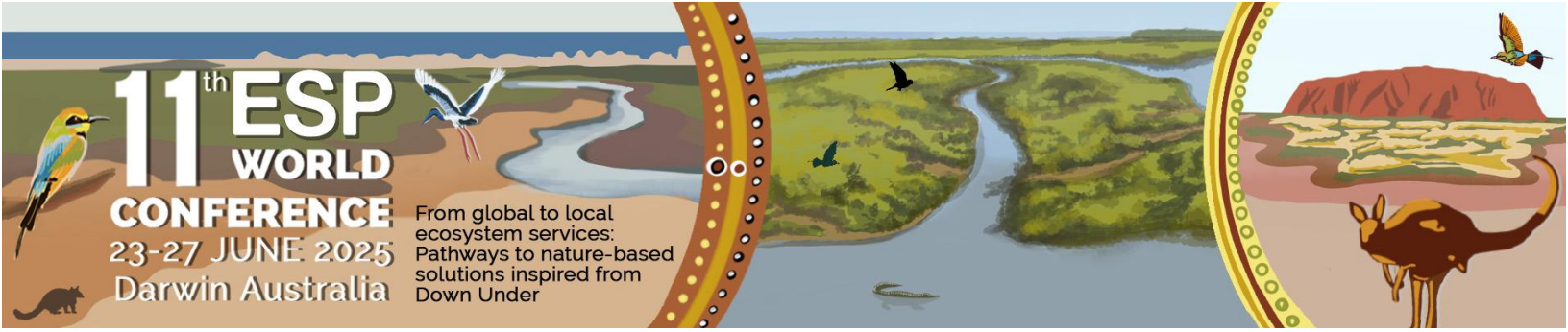


BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: B2

Healing riverscapes: promoting nature-based solutions for conserving/restoring rivers

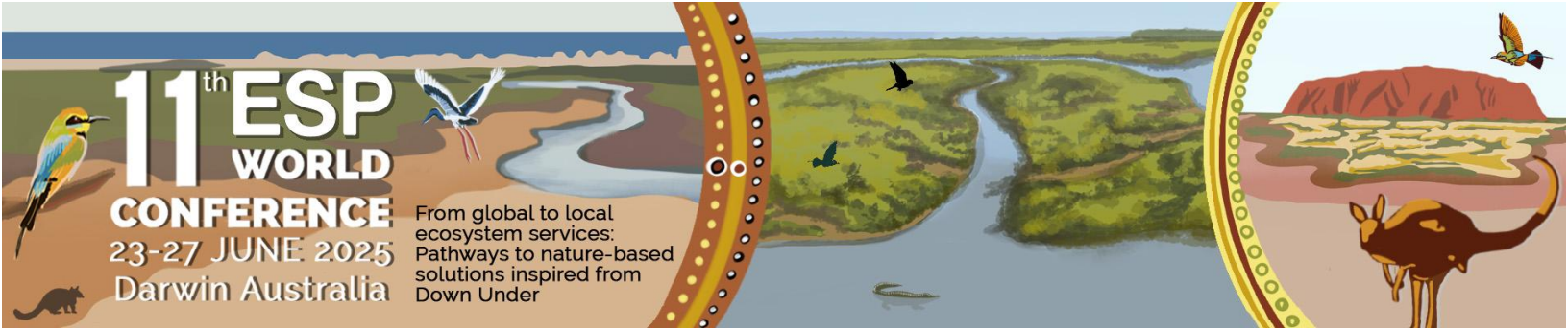
	Name	Organisation	E-mail
Host:	Syed Ainul Hussain	Wildlife Institute of India	ainul.hussain@gmail.com

Abstract:

The degradation of river ecosystems due to urbanization, pollution, and climate change poses significant challenges to biodiversity and human well-being. Nature-Based Solutions (NbS) offer innovative approaches that leverage natural processes to restore river systems while providing ecological, social, and economic benefits. This session aims to explore the principles, methodologies, and case studies of NbS in river restoration, highlighting their effectiveness in addressing contemporary environmental challenges. As an outcome of the session sustainable strategies will be developed for river restoration that leverages natural processes to enhance ecosystem resilience and address societal challenges. During the session, scholars representing diverse geographical contexts will share their experiences, observation and best NbS used for restoration of river ecosystems in various socio-ecological setups. By analyzing case studies shared framework will be developed that can be employed to identify the best suited strategies for a particular socio-political-ecological scenario. Challenges in integrating NbS into policy frameworks and decision-making processes will be highlighted to address the issues such as stakeholder and policy coherence. Nature-Based Solutions represent a paradigm shift in river restoration. By harnessing the power of natural processes, we can create resilient ecosystems that benefit both nature and society. This session will provide a platform for knowledge exchange and collaboration among stakeholders committed to advancing river restoration efforts through innovative solutions.

Goals and objectives of the session:

The session aims to derive multiscale and multi-disciplinary NbS pathways for restoring river ecosystems and maximizing benefits for society in the face of climate change. The session also aims at fostering dialogue, knowledge sharing and inspire locally relevant and inclusive NbS actions. The session will showcase successful NbS case studies and interventions for river restoration, which transcends beyond political boundaries. The session will also explore the effectiveness of NbS in restoring river ecosystems, integration of NbS into aquatic biodiversity conservation, and challenges and opportunities in implementing NbS at various scales.



Planned output / Deliverables:

1. Bringing case studies on NbS to a common platform for dissemination and outreach of best practices, to enable increased potential of NbS interventions for river restoration.

2. Develop collaborative network among stakeholders practicing NbS and those interested in implementing NbS.

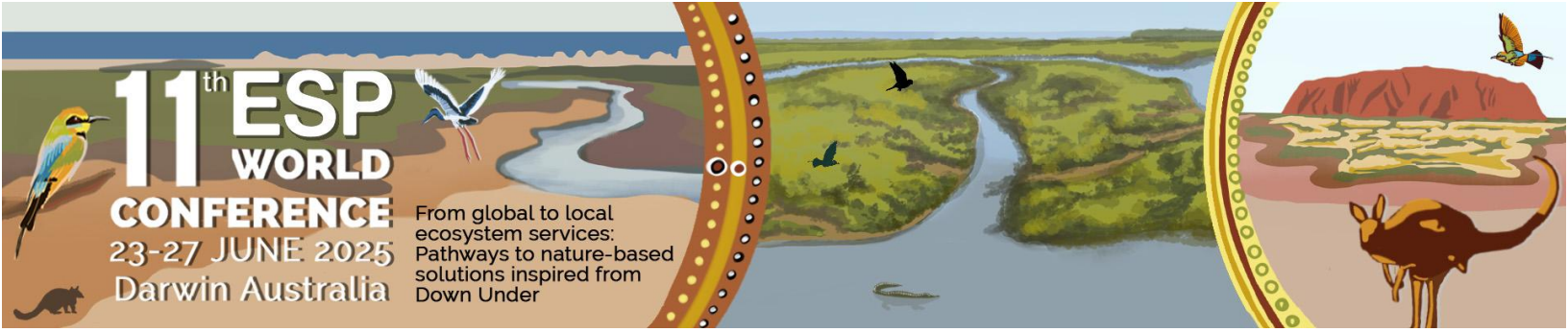
3. Identification of locally relevant and inclusive best practices and recommendations for future river restoration projects using NbS.

II. SESSION PROGRAM

Room: Damibila 1
Date of session: 26th June 2025
Time of session: 10:30 to 12:30 GMT+2

Timetable speakers:

Time	First name	Surname	Organization	Title of presentation
10:30 to 10:35	Hosts			Introduction to the session
10:35 to10:50	Chi-Chang	Liu	National Taiwan University	Restoration as a Nature-based Solution: A Case Study of a Stream in Eastern Taiwan
10:50 to 11:05	Vytautas	Narusevicius	Lithuanian Ornithological Society	Nature-based solutions for rivers and neighbouring remote rural areas biodiversity enhancement: habitat restoration examples from Lithuania
11:05 to 11:20	Mary	Mulenga	The Copperbelt University, Zambia	Advances in the integration of microalgal communities for biomonitoring of metal pollution of aquatic ecosystems in sub-Saharan Africa: from local to regional context
11:20 to 11:35	Agnes	Vari	Hungarian Research Network - Centre for Ecological Research	What do we need to successfully restore our rivers? Factors supporting implementation of freshwater restoration projects in Europe
11:35 to 11:50	Sarah	Royal	NRM Regions Australia	Restoration of riverscapes to enhance nature-based disaster resilience



Time	First name	Surname	Organization	Title of presentation
11:50 to 12:05	Fazheng	Sun	Shenzhen Nature Ecological Garden Technology Co., Ltd., Shenzhen, Guangdong, China	Protection, Restoration, and Utilization of Water and Soil Ecology Under the Paradigm of New Quality Productive Forces
12:05 to 12:20	Thomas Ava	Dick Jarrett	Jagun Alliance Aboriginal Corporation	Caring for Country in Riverscapes: Indigenous-Led Restoration and Relational Approaches to River System Health
12:20 to 12:30	Syed Ainul	Hussain	Wildlife Institute of India	Discussion and closing remarks

III. LIST OF ABSTRACTS

The first author is the presenting author unless indicated otherwise.

1. Restoration as a Nature-based Solution: A Case Study of a Stream in Eastern Taiwan

First authors(s): Chi-Chang Liu

Other author(s): Nai-Yun Chang

First author affiliation: National Taiwan University

Contact: chichangliu@ntu.edu.tw

Keywords: Nature-based Solutions (NbS), Ecological restoration, IUCN Global Standard for NbS, River ecosystem connectivity, Cross-agency collaboration

In the context of climate change and rapid human development, ecological restoration as an essential approach of Nature-based Solutions (NbS), addresses social, economic, and environmental challenges. This study adopts the IUCN Global Standard for NbS to evaluate a cross-agency ecological restoration project in a stream in eastern Taiwan.

This project aims to restore the connectivity of river ecosystems through near-natural engineering methods, such as the removal of instream barriers and the restoration of key indicator species. It also incorporates the " Intergrated Watershed Management Platform" to facilitate cross-agency collaboration and promote the planning and execution of the project. Additionally, the project balances the needs of local communities regarding water resource management and disaster prevention, creating a harmony between societal and ecological objectives.

Through a review of project reports and interviews with stakeholders, we found that this case aligns well with the IUCN criteria for addressing societal challenges (Criterion 1), biodiversity net-gain (Criterion 3), inclusive governance (Criterion 5), and sustainability and mainstreaming (Criterion 8). Furthermore, the project demonstrates compliance with design at scale (Criterion 2), balance trade-offs (Criterion 6), and adaptive management (Criterion 7). However, economic feasibility (Criterion 4) requires improvement, particularly in conducting long-term cost-benefit analyses and diversifying funding sources.

This case highlights the importance of applying the IUCN Global Standard throughout project lifecycles to achieve ecological, social, and economic goals, providing valuable insights for NbS implementation worldwide.

2. Nature-based solutions for rivers and neighbouring remote rural areas biodiversity enhancement: habitat restoration examples from Lithuania

First authors(s): Vytautas Narusevicius

Other author(s): Irena Mereskeviciene

First author affiliation: Lithuanian Ornithological Society

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Keywords: Ecosystem services, nature-based solutions, habitat restoration, monetary valuation, LIFE.

Presentation is based on two case studies – the results and activities of the LIFE projects (LIFE TERNS and LIFE21-NAT-LT-LIFEfarms for birds), dedicated to restoration and management of breeding or staging grounds of the bird species of EU importance, implemented in Lithuania. Nature-based solutions – actions to address societal challenges through the conservation, sustainable management and restoration of ecosystems (IUCN) – were utilised to ensure suitable habitat conditions for rare waders in inland waterbodies and wet meadows in relatively remote, therefore complicated to manage, rural areas. The assessment of the impact of management practices on the selected ecosystem services reflected the cases as the commendable and replicable examples of win-win results, with business and local farmers interests on one side, and the well-being of ecosystem habitats and biodiversity on the other. The monetary valuation of expected changes in the assets or quality of ecosystem services served as an argument to justify a transformative change towards sustainable nature management.

3. Advances in the integration of microalgal communities for biomonitoring of metal pollution of aquatic ecosystems in sub-Saharan Africa: from local to regional context

First authors(s): Mary Mulenga

Other author(s): Monde Concillia, Todd Johnson, Kennedy Ouma, Stephen Syampungani,

First author affiliation: The Copperbelt University

Contact: marymulenga452@mail.com

Keywords: Biomonitoring, microalgal e-DNA, SDG 6 and 14, citizen science, sub-Saharan Africa

Understanding how local ecological insights contribute to global sustainability efforts is essential for achieving nature-based solutions. This paper explores recent advancements in integrating microalgal communities for monitoring metal pollution in aquatic ecosystems across sub-

Saharan Africa (SSA), emphasizing their role in managing aquatic biodiversity as well as contributing to the Sustainable Development Goals (SDGs). By synthesizing research articles published between January 2000 and June 2023, the article highlights the potential of microalgae as bioindicators in emerging biomonitoring technologies while identifying existing research gaps. Our paper discusses the application of diatoms either individually or alongside other bioindicators, such as macroinvertebrates, macrophytes, and fish, in combination with physicochemical methods in aquatic ecosystem monitoring. It further discusses why the integration of microalgal taxa in SSA remains significantly low (<1%) compared to other regions globally although the microalgal communities have played a crucial role in compliance assessments (76%), ecological diagnoses (38%), and early-warning systems (38%) for aquatic ecosystem health. The paper also talks about how emerging technologies, including microalgal environmental DNA (eDNA) (14%), which have been incorporated into biomonitoring are currently underutilized.

The findings underscore the importance of enhancing and standardizing integrative biomonitoring approaches while promoting citizen science at national and regional levels. Strengthening these efforts can support global environmental sustainability goals by improving water quality management, conserving biodiversity, and fostering sustainable ecosystem restoration in SSA and beyond.

4. What do we need to successfully restore our rivers? Factors supporting implementation of freshwater restoration projects in Europe

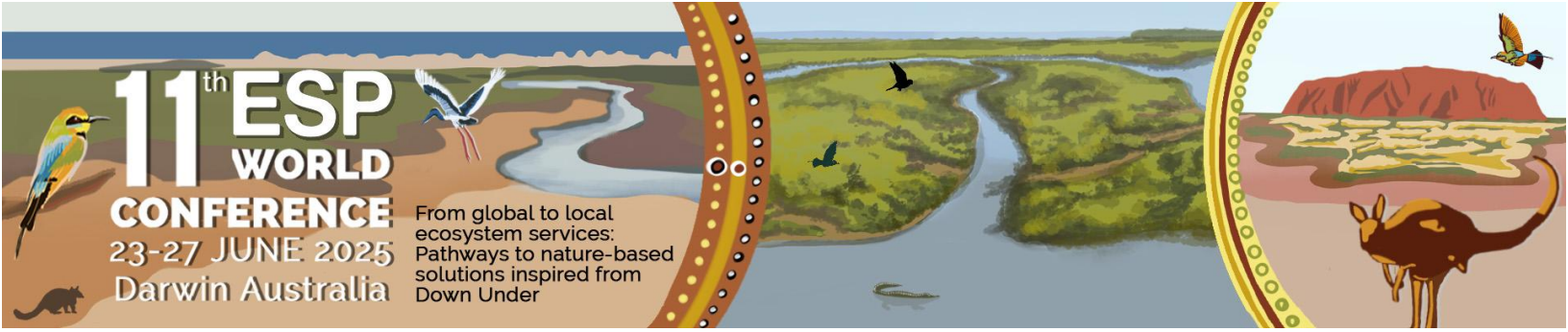
First authors(s): Ágnes Vári

Other author(s): Balázs András Lukács, Mark Morris

First author affiliation: Hungarian Research Network – Center for Ecological Research

Contact: agnes.vari.sec@gmail.com

Keywords: freshwater, survey, socio-cultural context, Nature based Solutions, ecosystem services



Freshwater is essential to life on earth and one of the most vulnerable ecosystems in the world. Humans have been using rivers and lakes in multiple ways, while exerting multiple pressures on the water bodies. While attempts have been made to protect and restore them, their status is in many regions still inadequate.

We reviewed European freshwater restoration projects, focusing on rivers, and asked key project participants to share their insights on factors contributing to the successful implementation of restoration projects. We overviewed which methods and approaches were taken, from general framings (e.g. ecosystem services, Nature based solutions) to specific measures implemented (e.g. restoration of floodplain connectivity, or longitudinal connectivity).

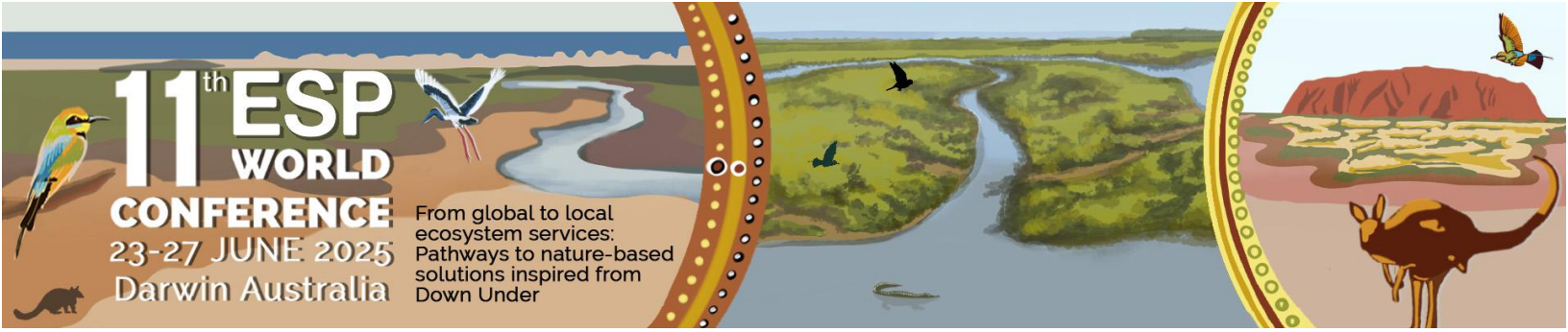
We analyzed 162 responses to our survey, from 35 countries with respondents covering practitioners, government representatives, researchers and non-profit organizations. We tested whether different factors emerged within different socio-cultural contexts within the analyzed European countries. Interviews with selected project leads provided further in-depth insights. The main findings point at four major clusters that help to successfully implement restoration: 1) sustained and sufficient funding that enables long-term planning; 2) commitment and alignement at the decision making /political level, including resolving contradictory legislation and sectorial contradictions; 3) concrete goals, e.g. specific water quality targets; 4) community support: engaging stakeholders and resolving stakeholder conflicts, including the often contradicting interests between nature conservation and short term economic development.

Our findings can inform future restoration projects, with insights available to be adopted by different societal groups involved in restoration from decision makers to practitioners and local communities.

5. Restoration of riverscapes to enhance nature-based disaster resilience

First authors(s): Bek Christensen

First author affiliation: NRM Regions Australia



Other author(s): Sarah Hoyal, Rachel Morgain

Presenting author: Sarah Hoyal

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Contact presenting author: sarah@nrmregionsaustralia.com.au

Keywords: Nature-led resilience, Climate adaptation, Natural Resource Management

Australia's Natural Resource Management (NRM) sector represents a unique national infrastructure of interlinked, regionally embedded expertise and capability for improving landscape resilience. NRM organisations work through local networks and community engagement to manage biodiverse ecosystems and other natural resources. The work of NRM organisations is critical in restoring degraded systems to maximise societal benefits, in the face of increasing climate-related hazards.

Many organisations embed disaster resilience in their core programs, with river restoration emerging as a key strategy to deliver biodiversity benefits, while delivering multiple co-benefits to communities, including enhanced disaster resilience through flood mitigation.

This presentation will share case studies and lessons from Australia's NRM sector on practices and effectiveness of river restoration for biodiversity and disaster resilience. These will be both qualitative and quantitative findings from a portfolio of case studies including:

- Riverbank protection for reducing flood damage on the NSW north coast

- Reducing flood risk to heavily populated areas of SE Queensland through riparian restoration.

- Restoring riparian areas in the heavily modified agricultural landscape of WA's Northern Agricultural Region to reduce flood and fire risk.

- Demonstrating multiple benefits of NbS to build a comprehensive business case for scaled-up investments in NbS to address climate and disaster risk.

- Protecting sensitive aquatic habitats from wildfire to provide benefits for local properties and industry.

- Evaluating the benefits of streambank and wetland restoration in the Wet Tropics for flood and climate risk reduction.

In addition we will share cross-program lessons emerging from the national Nature-led Resilience program.

Drawing these threads together, we will examine the relationships between river restoration as a nature-based disaster risk reduction solution, and broader 'resilience' strategies. We will explore pathways for both strengthening the evidence-base to support the scaling up of nature-based solutions for river protection and disaster risk reduction.

6. Protection, Restoration, and Utilization of Water and Soil Ecology Under the Paradigm of New Quality Productive Forces

First authors(s): Fazheng Sun

Other author(s): No

First author affiliation: Shenzhen Nature Ecological Garden Technology Co., Ltd., Shenzhen, Guangdong, China

Contact: sunfazheng@sina.com

Keywords: Water and Soil Ecology, New Quality Productive Forces, Green and Low-Carbon

The intrinsic relationship between humanity and nature is fundamentally anchored in the interactions of water and soil ecology, which encompasses human-water dynamics, soil stewardship, and vegetation management. Human productive activities have continuously reshaped Earth's water and soil ecosystems, yielding dualistic environmental consequences: while improving living conditions and economic development, these anthropogenic interventions have

simultaneously triggered ecological crises such as climate destabilization, biodiversity depletion, and pollution proliferation.

Water and soil ecology constitutes the structural nexus of global ecosystems, serving as the critical regulator of ecological equilibrium. This theoretical framework unifies resource utilization, environmental governance, and ecological conservation, establishing a cross-disciplinary foundation for environmental studies. Under the paradigm of New Quality Productive Forces, strategic priorities must focus on green and low-carbon transitions to advance the protection, restoration, and sustainable utilization of water and soil ecology.

The theory of water and soil ecology represents the scientific systematization of the doctrine "Lucid waters and lush mountains are invaluable assets" (Xi, 2005). It elevates the principles of Nature-based Solutions (NbS) through theoretical innovation, providing the conceptual bedrock for establishing Water and Soil Ecology as an emerging discipline. This framework integrates hydrological cycles, soil biogeochemical processes, and vegetation succession mechanisms, offering systematic methodologies for addressing Anthropocene environmental challenges.

7. Caring for Country in Riverscapes: Indigenous-Led Restoration and Relational Approaches to River System Health

First authors(s): Thomas Dick

Other author(s): Ava Jarett, Richard Geddes, Kavitha Chinathamby, Kristin den Exter

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Keywords: Caring for Country, rivers, restoration, catchment, governance

Riverscapes are ecologically dynamic and culturally significant systems that are increasingly affected by anthropogenic pressures, including land degradation, water extraction, and the intensifying impacts of climate change. In particular, the increasing frequency and severity of flood events across many Australian catchments highlight the need for adaptive and culturally

informed approaches to river management. This paper examines the Heal the Rivers project—an Indigenous-led initiative that advances ecological and cultural restoration through the principles and practices of Caring for Country.

Caring for Country is a holistic and relational framework rooted in First Nations knowledge systems and responsibilities. In riverscape contexts, it encompasses activities such as cultural burning, riparian revegetation, seasonal waterway monitoring, and the protection of sacred sites. These practices are underpinned by long-term, place-based observation and intergenerational transmission of knowledge, enabling nuanced responses to environmental change and variability, including extreme hydrological events.

This paper presents the Heal the Rivers project as a case study demonstrating how Indigenous governance, knowledge, and lore can inform landscape-scale restoration strategies. The project positions rivers not as inert resources, but as living and sovereign entities requiring care, respect, and accountability. Through a relational ontology that integrates cultural and ecological priorities, Caring for Country contributes to more resilient and responsive management practices, particularly in the face of increasingly unpredictable climate conditions.

Rather than supplementing Western ecological science, Indigenous knowledge systems offer robust, context-specific frameworks for understanding and managing environmental complexity. Recognising and resourcing Indigenous leadership in riverscape restoration offers significant opportunities for advancing both ecological health and cultural continuity in a time of accelerating environmental change.