



THE UNIVERSITY
of EDINBURGH

SEASCAPE SYMPOSIUM II: RECONNECTING THE SEASCAPE

CONFERENCE PROCEEDINGS

Wednesday 4th - Thursday 5th June 2025

Huxley Lecture Theatre, ZSL, London NW1 4RY



We support the



WITH THANKS TO

Organising committee

Georgina Banfield, Senior Research Associate, University of Portsmouth

Alison Debney, Conservation Lead, Wetland Ecosystem Restoration, ZSL & Co-founder of Native Oyster Network

Celine Gamble, Restoration Project Manager, ZSL

Morwenna Grigg, Coastal Habitat Restoration Project Officer, ZSL

Harriet McAra, Science Communications and Events Manager, ZSL

Prof Joanne Preston, Co-founder of Native Oyster Network, University of Portsmouth & Solent Seascape Project

Dr Philine zu Ermgassen, Marine Ecosystem Restoration Expert and Honorary Fellow, University of Edinburgh

Steering Committee

Dr Tundi Agardy, Founder, Sound Seas

Dr Elisa Bayraktarov, Data and Science Manager, The Nature Conservancy

Dan Crockett, Ocean and Climate Director, Blue Marine Foundation

Angus Garbutt, Senior Coastal Ecologist, Centre for Ecology & Hydrology

Dr Boze Hancock, Senior Marine Habitat Restoration Scientist, The Nature Conservancy

Dr Richard Lilley, Co-founder, European Seagrass Restoration Alliance

Professor Pip Moore, Professor of Marine Science, Newcastle University

Caroline Price, Head of Nature & Environment (Marine), The Crown Estate

Morven Robertson, Funding Manager, Esmée Fairbairn Foundation

Professor Graham Underwood, University of Essex

Dr Lisa Wedding, Associate Professor, University of Oxford

Dr Tom Worthington, Aquatic Ecologist, University of Cambridge

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Image: Native oyster © Dr Jose M. Fariñas-Franco

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OVERVIEW

The Challenge

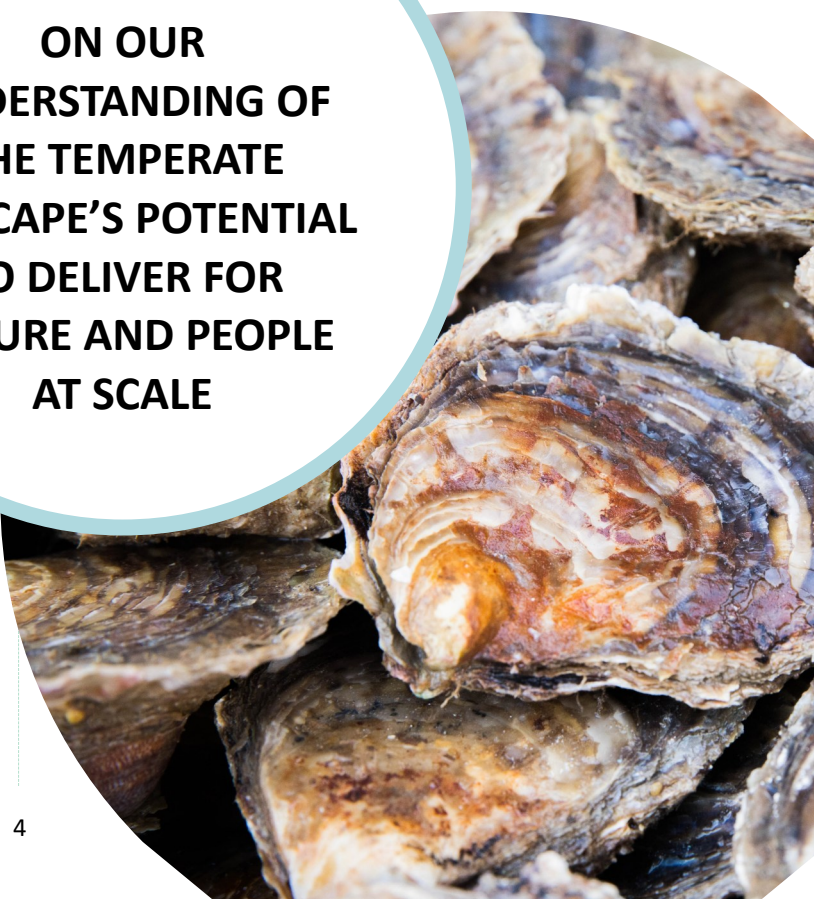
Temperate coastal habitats, such as saltmarsh, seagrass meadows, oyster reefs, and kelp forests, individually support a diverse abundance of marine life and hold critical value for climate regulation, water quality, and coastal defence. However, the potential for coastal habitats to deliver these ecosystem services is amplified when they co-exist as one connected habitat mosaic, forming the temperate coastal seascape.

These habitats and their associated biodiversity are, however, in peril. The European native oyster ecosystem has been assessed as collapsed under the IUCN Red List Assessment. Seagrass loss has accelerated over the last 100 years (with up to 90% of UK seagrasses lost), 50% of global saltmarshes are degraded, kelp forests are decreasing by 1.8% annually, and 60% of existing kelp forests are deteriorating. As we reach halfway through the UN Decades on

Ecosystem Restoration and Ocean Science for Sustainable Development, there is hope in the number and scale of scientific research and restoration of coastal habitats.

If restoration targets are to be delivered to meet the vision of a world living in harmony with nature by 2050, set out by the Global Biodiversity Framework, it is time to build on our understanding of the temperate seascape's potential to deliver for nature and people at scale.

**IT IS TIME TO BUILD
ON OUR
UNDERSTANDING OF
THE TEMPERATE
SEASCAPE'S POTENTIAL
TO DELIVER FOR
NATURE AND PEOPLE
AT SCALE**



Seascope Symposium I: Ecological connectivity across temperate coastal habitats

In 2022, ZSL in collaboration with the University of Portsmouth held the first [symposium on seascope ecological connectivity](#), that brought together 166 delegates from 89 institutions and 9 countries across a range of stakeholders (Figure 1). This symposium aimed to facilitate knowledge exchange between habitat experts, connect scientists with practitioners and policy makers, and consider the evidence for ecological connectivity across coastal habitats in temperate waters.

A following knowledge-analysis workshop and accompanying publications highlighted that a seascope approach to coastal habitat restoration could yield the required successes for the recovery of ecosystem functioning and services delivery by recognising the ecological connectivity and feedback systems that exist between habitats. This understanding of ecological connectivity across temperate ecosystems also informs how we achieve our global climate and biodiversity policy goals.

Outputs from Seascope Symposium I

Policy facing report advocating for seascope restoration approach:
Garbutt, A., Underwood, G. J. C., Harley, J., Boskova, K., Hardy, M.J., McGarrigle, A., Millington-Drake, M., Gamble, C., Debney A., zu Ermgassen, P.S.E., and Preston, J. (2024) [Restoring our seascapes: evidence and actions for coastal habitat restoration at scale](#). Blue Marine Foundation Report.

Peer reviewed journal article outlining scientific evidence for connectivity:
Preston, J., Debney, A., Gamble, C. et al. (2025) Seascope connectivity: evidence, knowledge gaps and implications for temperate coastal ecosystem restoration practice and policy. npj Ocean Sustainability **4**, 33. <https://doi.org/10.1038/s44183-025-00128-3>

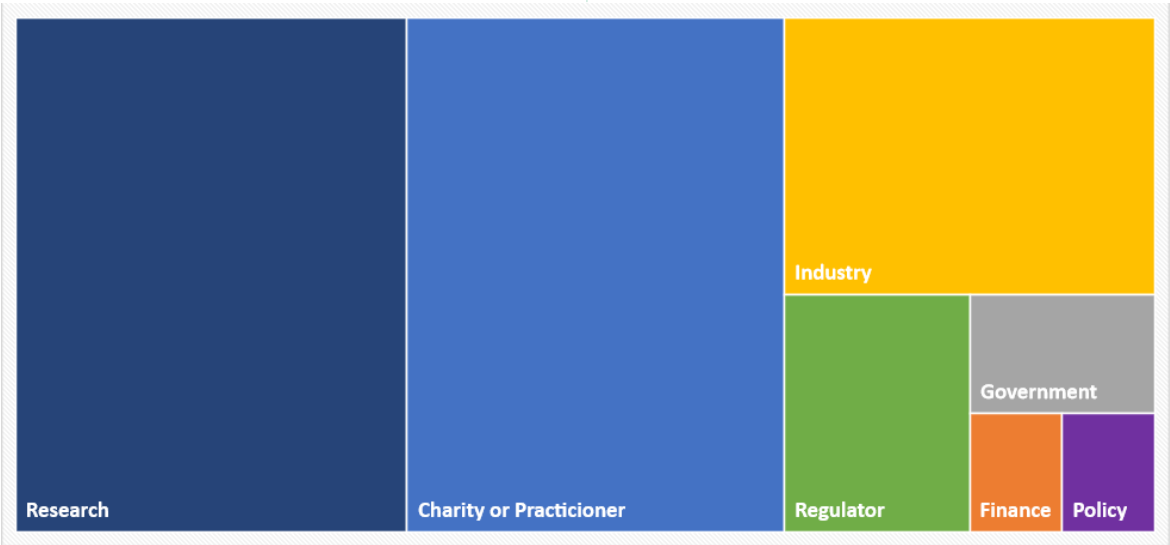


Figure 1: The relative proportion of self identified stakeholder groups represented across speakers and attendees of the Seascope Symposium I in November 2022

Seascape Symposium II: Reconnecting the Seascape

On June 4th-5th 2025, ZSL hosted the second symposium, **Reconnecting the Seascape**, in collaboration with the University of Portsmouth and the University of Edinburgh with the following aims:

- Connect scientists, policy makers and practitioners working across different temperate coastal habitats to facilitate knowledge exchange, build networks and facilitate collaborative action;
- Increase understanding of the ecology, connectivity and interactions between habitats across the temperate seascape;
- Advance scientific approaches for assessing the benefits delivered by reconnected and restored habitats, to support finance and policy mechanisms that enable larger scale seascape ecosystem recovery;
- Build a community of scientists, policymakers, and practitioners equipped to deliver ecological restoration of temperate ecosystems at scale.

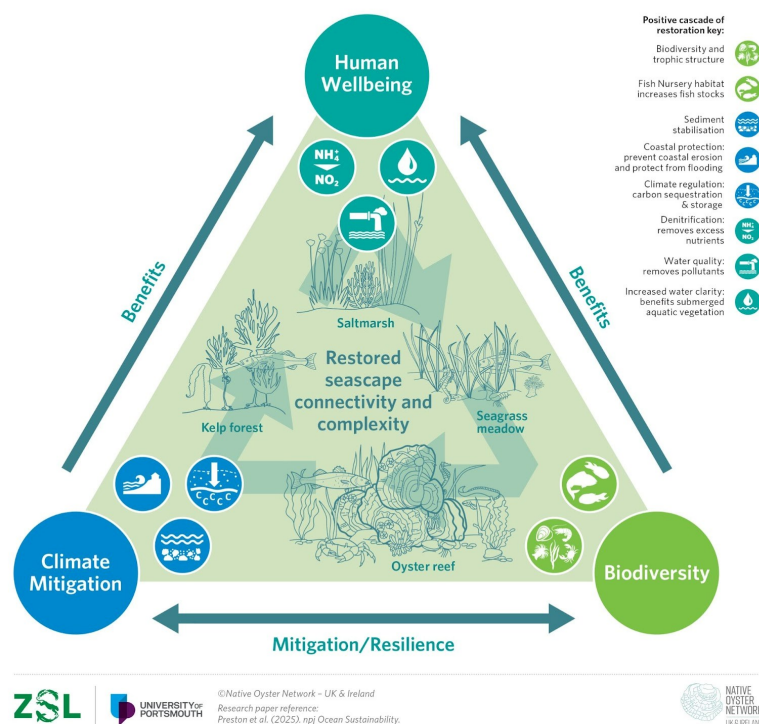


Figure 2: Conceptual diagram of how ecosystem service delivery from a restored and connected seascape underpins the interrelationships between climate mitigation, biodiversity and human wellbeing. [View full paper.](#)



Image: Symposium audience © Matt Worthington

SYMPOSIUM PROGRAMME

Day 1

09:40	Welcome, Andrew Terry, ZSL
09:50	Session 1: Principles & drivers of seascape restoration Session chair: Alison Debney, ZSL Speaker 1: Prof Joanne Preston, University of Portsmouth Speaker 2: Dr Lisa Wedding, University of Oxford Speaker 3: Dr Philine zu Ermgassen, University of Edinburgh Speaker 4: Prof Martin Gullström, Södertörn University
11:15	BREAK
11:45	Session 2: Advances in habitat specific ecology related to up scaling restoration Session chair: Dr Philine zu Ermgassen, University of Edinburgh Speaker 1: Prof Iris Möller, Trinity College Dublin Speaker 2: Dr Ray Ward, Queen Mary University of London Speaker 3: Bryan DeAngelis, The Nature Conservancy Speaker 4: Assoc Prof Richard Unsworth, Swansea University
13:10	LUNCH
14:10	UN Decade on Ecosystem Restoration talk: Melissa de Kock, UNEP-WCMC
14:30	Session 3: Advances in seascape restoration practice Session chair: Dr Richard Lilley, European Seagrass Restoration Alliance Speaker 1: Angela Lazou Dean, Blue Marine Foundation Speaker 2: Dr Henrike Semmler Le, WWF Denmark Speaker 3: Anna Cucknell, ZSL
15:35	BREAK
16:00	Session 4: Overcoming financial barriers to scaling up nature-based solutions/restoration Session chair: Caroline Price, The Crown Estate Speaker 1: Elizabeth Beall, Finance Earth Speaker 2: Dr Sophus zu Ermgassen, University of Oxford Speaker 3: Kaija Barisa, Blue Marine Foundation
16:05	Panel discussion, Chaired by Caroline Price
16:25	
16:40	Speaker 3: Kaija Barisa, Blue Marine Foundation
16:45	Panel discussion, Chaired by Caroline Price
17:15	Closing words, Matthew Gould, ZSL
17:30	Drinks Reception & Poster Session
18:30	Symposium Dinner, Mappin Pavilion

Day 2

09:30	Welcome, Alison Debney, ZSL
09:35	Keynote speaker: Dr Elisa Bayraktarov, The Nature Conservancy
10:00	Session 5: Community-driven conservation Session chair: Prof Joanne Preston, University of Portsmouth Speaker 1: Dr Aline Da Silva Cerqueira, Sussex Bay & Alice Clark, University of Sussex Speaker 2: Danny Renton, Seawilding Speaker 3: Ffion Mitchell-Langford, Campaign for National Parks Speaker 4: Louise MacCallum, Blue Marine Foundation
11:25	BREAK
11:50	Session 6: Advances in Monitoring the marine environment at seascape scales Session chair: Dr Tom Worthington, University of Cambridge Speaker 1: Nathan Gerald, NatureMetrics Speaker 2: Prof Rod Connolly, Griffith University Speaker 3: Angus Garbutt, UK Centre for Ecology & Hydrology
13:15	LUNCH
14:15	Session 7: Measuring and enabling connectivity Session chair: Professor Graham Underwood, University of Essex Speaker 1: Dr Maria Vozzo, CSIRO Speaker 2: Dr Luke Helmer, Blue Marine Foundation Speaker 3: Dr Emma Ward, Bangor University Speaker 4: Georgina Chandler, ZSL
15:40	BREAK
16:05	Session 8: Source-to-Sea approaches Keynote speaker: Dr Sally Little, Nottingham Trent University Discussion chair: Dr Tundi Agardy, Sound Seas Panel: 1) Dr Elena Gissi, Stanford University 2) Dr Sally Little, Nottingham Trent University 3) Dominic Pattinson, OSPAR Commission 4) Gwen Maggs, Tor to Shore 5) Roger Proudfoot, Environment Agency
17:10	Closing words, Prof Joanne Preston, University of Portsmouth
17:15	Symposium end

KEYNOTE SUMMARIES

Melissa De Kock UNEP-WCMC

UN Decade on Ecosystem Restoration: Science - Movement - Action

Melissa De Kock's presentation highlighted the science and policy that underpins the [UN Decade on Ecosystem Restoration \(2021–2030\)](#), launched as a response to ecosystem degradation, biodiversity loss and accelerating climate change. With 75% of terrestrial and 66% of marine environments impacted by human activity, and the 1.5°C climate goal unattainable without boosting natural carbon sinks, the Decade represents a timely movement for coordinated global action.

The Decade's mission is to prevent, halt, and reverse ecosystem degradation worldwide by building political will, increased technical capacity, and fostering a global movement for restoration. It has been formed upon a strong policy mandate ([UN General Assembly Resolution A/RES/73/284](#)) and supported by [UNEP](#), [FAO](#), and a growing partner network of over 250 organisations.

The Governance of the Decade is supported by a diverse Advisory Board and five Task Forces focused on best practices, science, finance, youth engagement, and monitoring. More than 300 practical recommendations and ten guiding principles underpin restoration efforts across ecosystems, from mangroves to marine habitats.

Key outputs of the Decade were presented, including:

- [Framework for Ecosystem Restoration Monitoring \(FERM\)](#), a global platform to track restoration progress and share best practices.
- [Digital Hub](#), an interactive platform to

connect, register, and promote restoration efforts worldwide.

- [World Restoration Flagships](#), showcasing scalable and strategic ecosystem restoration efforts.

New UN World Restoration Flagships will be announced in 2025, these projects represent ambitious, high-impact examples of ecosystem restoration globally and are recognised for their transformative potential and scalability. The call for Flagship nominations is now open, and restoration projects of all sizes and geographies are encouraged to apply. The benefit of being recognised as a Flagship brings international visibility, technical support, and alignment with global restoration goals.

The Decade serves as a positive and inclusive antidote to climate anxiety, promoting a hopeful narrative and inviting everyone—from policymakers to grassroots actors—to join the global [#GenerationRestoration](#) movement.

Matthew Gould CEO, ZSL

Day 1 Closing Remarks

Matthew Gould started his closing remarks thanking the organisers, speakers, panellists and ZSL team for organising the symposium.

Matthew expressed his profound agreement with the end of day one panel discussion on financial barriers, that highlighted the need for regulatory mechanisms to drive compliance if we are to achieve the scale of restoration needed. As such, he believes it is therefore critical that those working to restore habitats engage with government and policy to create the frameworks necessary, linked to regulation and suitable

Cont. overleaf.

Day 1 Closing Remarks Continued

economic drivers, for widescale seascape restoration.

However, Matthew noted that the current political environment may not support the national and global policies required, and therefore this community needs to be able to operate at different altitudes in coming years. A clear action we can provide is to continue to deliver the science to provide the evidence which will underpin the conversations required to drive policy change. This includes conducting pilots to demonstrate what is effective and what isn't, and having the honesty to present unsuccessful outcomes so we can all learn from it and avoid wasting time.

Finally, Matthew emphasized the importance of engaging with members of the public, to socialise positive attitudes and understanding of our need for nature restoration to allow policy change to be driven from the bottom up. He encouraged everyone to engage both within but importantly outside of our traditional networks to build alliances with the usual and unusual suspects.

Dr Elisa Bayraktarov The Nature Conservancy

Planning for seascape restoration under future climate change and coastal risk to nature and people

Visiting from The Nature Conservancy, Australia, Dr Elisa Bayraktarov's keynote speech emphasised the importance of seascape restoration as a means of mitigating the degradation and loss of coastal marine habitats, and associated socio-ecological functions and services they provide, under current and future climate conditions.

Australia has seen a 85% decline of Sydney Rock Oyster Reefs and 99% of Australian Flat Oysters, with wild shellfish reefs functionally extinct. The recognition of their importance in forming key

habitats, combined with a significant gap in attention and funding for temperate southern seascapes in Australia led to the establishment of the TNC's Great Southern Seascapes program in 2015 and Reef Builder program in 2021. These projects were quick to scale up, with 21 reefs being restored in 28 locations covering 62 hectares by 2023, as well as giving the country a welcome economic boost.

The plan is to restore 300ha and 60 reefs by 2030 to meet national (Australia's Strategy for Nature 2024-2030) and international goals (UN Decade on Ecosystem Restoration 2021-2030 and Kunming-Montreal Global Biodiversity Framework).

Having highlighted that optimal location is key to restoration success, Dr Bayraktarov went on to describe how the TNC developed a custom Restoration Suitability Modelling approach to support restoration site selection. Habitat suitability models of 13 restoration target species under current conditions and for 2050 and 2090 were carried out. The results were combined with an analysis of coastal risks posed by climate change in vulnerable locations and then integrated into a spatial prioritisation analysis to identify the top 30% of Australia's coastal waters for seascape restoration.

The goal was to identify priority areas for seascape restoration that have the greatest potential to thrive under both current and future climate scenarios, whilst benefiting nature and people at greatest risk of climate change.

The closing remarks highlighted that the spatial data layers and source codes underpinning this analysis will be shared in a forthcoming paper, providing a blueprint to guide future restoration efforts worldwide.

Dr Sally Little

Nottingham Trent University

Unlocking source-to-sea connectivity through Tidal Freshwater Zones

Dr Sally Little's keynote speech stressed that connectivity between land, rivers, estuaries and seas is crucial for the survival of species and the maintenance of ecosystem functions, but current restoration efforts remain fragmented by disciplines.

One critical, yet often overlooked, part of the ecological continuum is the tidal freshwater (TFZ) and low-salinity zones (LSZ) at the upper reaches of estuaries. These zones are important because they serve as physical gateways between the catchment and the coast. However, they are often neglected in restoration planning as they fall into a "disciplinary limbo"; described as too fresh for marine scientists and too tidal for limnologists. Without addressing upstream impacts, conservation efforts in the seascape risk being undermined by upstream pressures that remain unaddressed.

Historically, tidal freshwater marshes, which provide higher levels of ecosystem services per unit area than salt marshes and have potential for greater carbon capture and storage than salt marshes and seagrass, lined many estuaries. But agricultural drainage and development have reduced their presence. Climate change further exacerbates these losses by pushing saltwater further up estuaries, threatening the survival of these zones and leading to estuarine squeeze, as described in [this paper](#).

The lack of knowledge about the extent, location, and vulnerability of these zones has been a major barrier to restoration. To address this, a [recent study](#) was described whereby over 76,000 salinity measurements were taken to map the salinity zones of every estuary in England and Wales, allowing the researchers to identify estuaries with

TFZ's at risk. Furthermore, historical records identify potential restoration areas of tidal freshwater marshes and other important, but much depleted habitats such as wet woodlands.

The analysis revealed that there is significant untapped potential for implementing Nature-based Solutions (NbS) in TFZ's and LSZ's to help to compensate estuarine squeeze and address upstream pressures prior to the seascape.

The presentation concluded with a call to action for landscape-scale restoration, urging a shift from fragmented conservation to a unified source-to-sea strategy. By restoring these vital zones, we can improve the resilience of ecosystems and address upstream pressures before they reach the seascape.

Professor Joanne Preston

University of Portsmouth

Symposium Closing Remarks

Prof Joanne Preston's closing remarks began with a summary of the symposium and noted whilst the topics discussed were sometimes challenging and complex, the goals they serve are both timely and urgent. Day one provided a synthesis of the scientific theory and evidence behind seascape ecosystem restoration, and considered how we can reset our nature recovery ambitions appropriately to reflect lost ecosystems and meet our bold international policy goals. Updates on advances in restoration ecology and practice were delivered by single habitat experts and invaluable lessons learnt from countries furthest progressed on delivering large scale and seascape marine restoration. The final session started to grapple candidly with the challenging barriers of policy and unlocking finance mechanisms and pathways to upscale marine ecosystem recovery.

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Symposium Closing Remarks Continued

For the second day of the symposium she reflected on the inspiring and emotionally resonant talks about community driven restoration and the aspiration taken from technical and artificial intelligence innovations applied to measuring and analysing progress. Seascope project updates demonstrated the high standard of monitoring, evaluation and reporting of restoration, before we returned to connectivity, exploring the tidal freshwater zone as we looked towards wholescapes in the final discussion, encapsulated in the Environment Agency's Source to Sea animation.

The passion, commitment, knowledge and pioneering spirit in the room was incredible and inspiring, yet the frustration and ecological grief was also keenly felt amongst the energy and optimism. It was clear there is a rich seam of knowledge and expertise within our wider seascapes community but we heard the call from those working in policy for more effective lobbying and communication to socialise this knowledge to effect real change.

After presenting the preliminary results from the seascope network survey (see page 12), thanks were given to the Steering Committee, co-organisers, and Esmée Fairbairn and EU life for providing match funding towards the symposium and workshop. A final acknowledgment of thanks was given to the wonderful speakers and delegates - the community that is making marine ecosystem recovery happen through hard work and dedication day in day out.

Discussion Sessions

Full recordings for discussion sessions 4 and 8, *Overcoming financial barriers to scaling up nature-based solutions/restoration* and *Source-to-Sea approaches* respectively, can be found on the ZSL Science and Conservation YouTube channel. Direct links for each session recording can be found on [page 14](#).



THEMATIC SYNTHESIS OF SYMPOSIUM FINDINGS

A survey was conducted to gather opinion from the symposium participants on the need, value and scope of forming a ‘Seascape Restoration Network’ to continue the aims of the symposium. There were 81 responses to the survey. Habitat expertise was assessed through the habitats they most worked with (Figure 3), with 65% of respondents working across multiple habitats. Other habitats cited included offshore (Dogger Bank & wind farm locations), maritime woodlands, freshwater marshes, marine protected areas, dunes, stone reefs, maritime archaeology and other reefs.

Habitat expertise of survey respondents

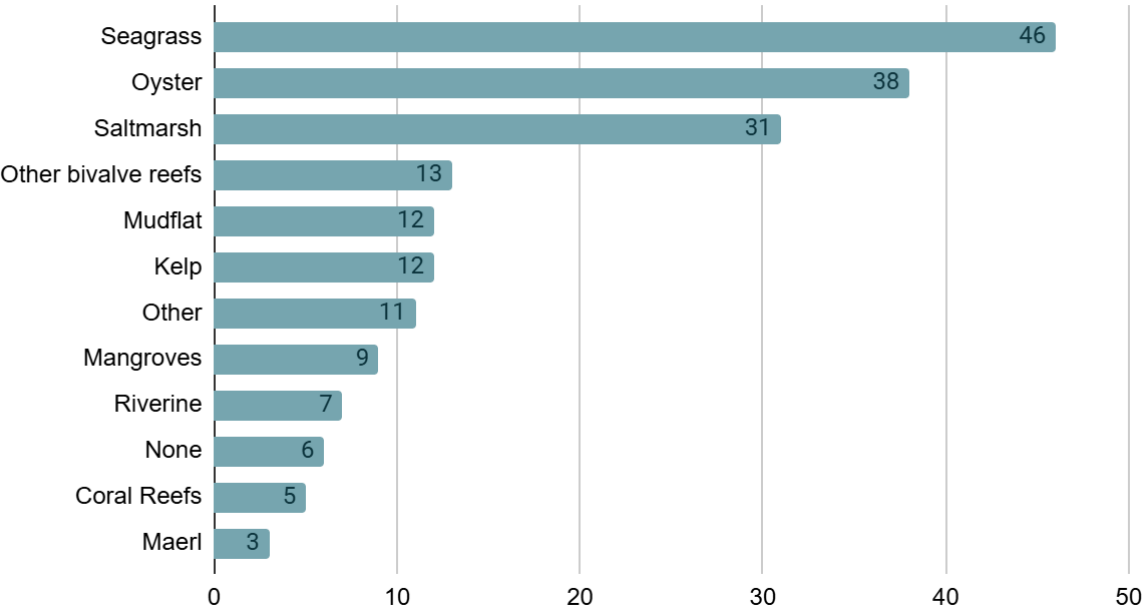
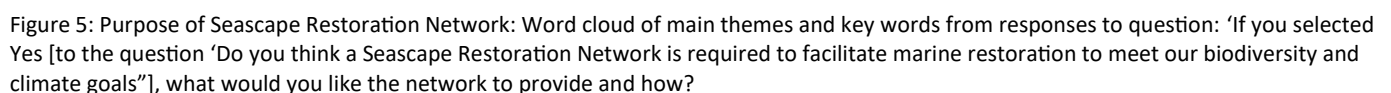
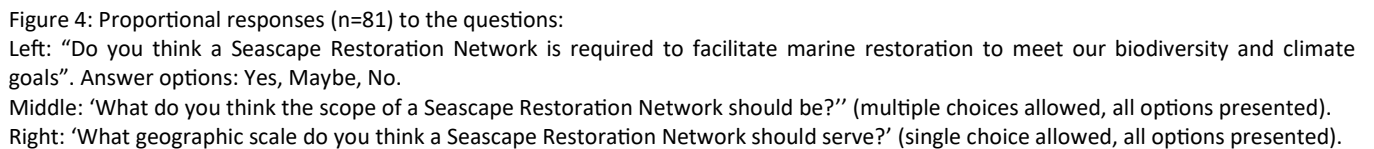


Figure 3: Habitat expertise expressed as no of respondents working with habitat types

When the respondents were asked what they would like the network to provide, there were clear recurring themes, of knowledge exchange, unity and effectiveness, enabling networking and collaboration, and to enable learning from both success and failures from projects. The scope and purpose of a network identified as important is summarised in the word cloud below (Figure 5).



Sectors represented at the SeascapE Symposium II

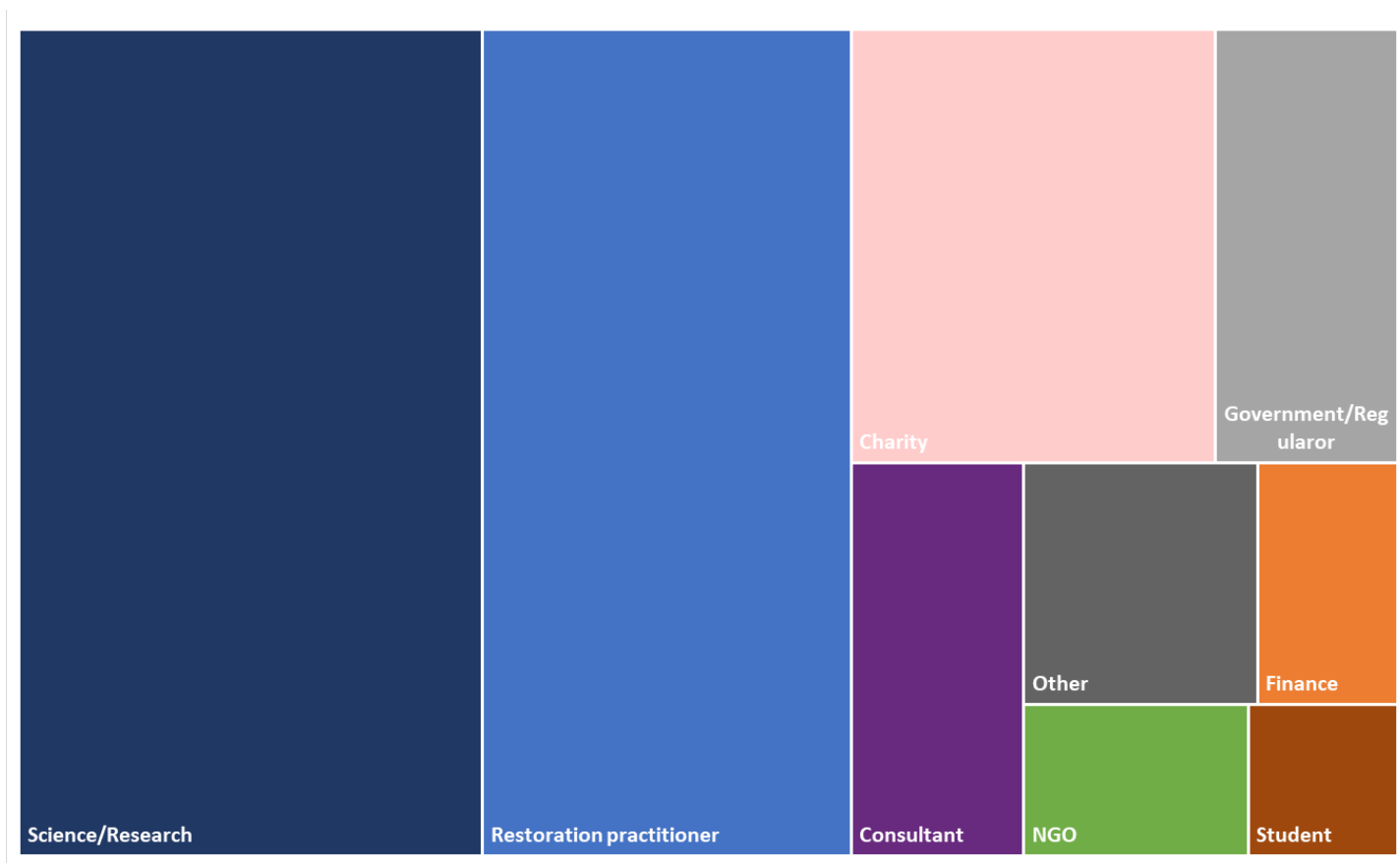


Figure 6: The relative proportion of self identified stakeholder groups represented across speakers and attendees of the SeascapE Symposium II in June 2025.

Watch all SeascapE Symposium II recordings

You can find all recordings of the SeascapE Symposium talks and discussion sessions on the ZSL Science and Conservation YouTube channel at www.zsl.org/iozyoutube, or through the links below.

DAY 1

[Session 1: Principles & drivers of seascape restoration](#)

[Session 2: Advances in habitat specific ecology related to up scaling restoration](#)

[Session 3: Advances in seascape restoration practice](#)

[Session 4: Overcoming financial barriers to scaling up nature-based solutions/restoration](#)

DAY 2

[Session 5: Community-driven conservation](#)

[Session 6: Advances in monitoring the marine environment at seascape scales](#)

[Session 7: Measuring and enabling connectivity](#)

[Session 8: Source-to-Sea approaches](#)

SYMPOSIUM TALK AND POSTER ABSTRACTS

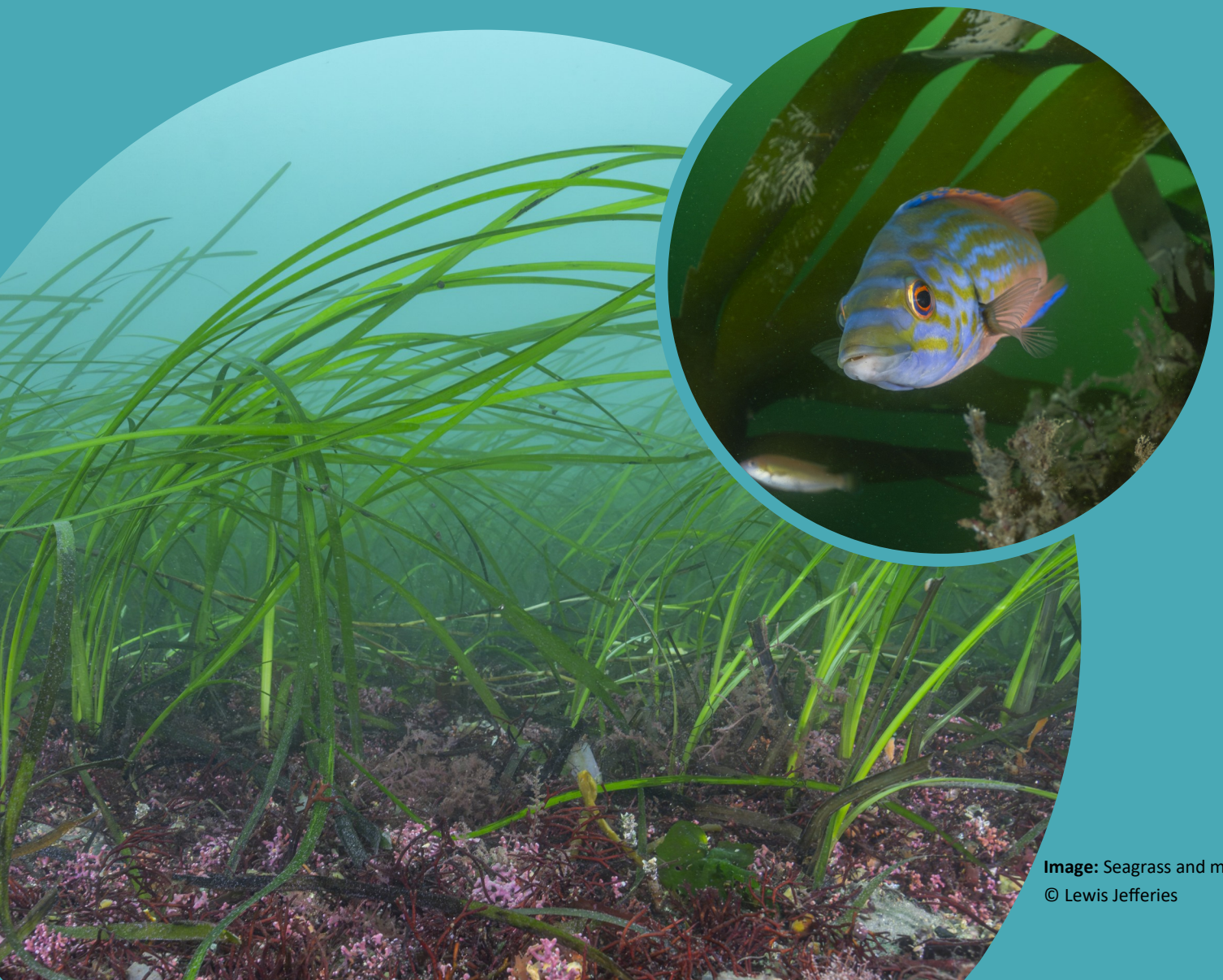


Image: Seagrass and mearl
© Lewis Jefferies

Session 1: Principles & drivers of seascape restoration

Chair: Alison Debney, Conservation Lead, Wetland Ecosystem Restoration, ZSL

9:55 Professor Joanne Preston

Joining the blue dots – how our understanding of connectivity across the seascape can support policy goals for effective and ambitious marine nature recovery

Temperate coastal marine ecosystems have undergone severe global loss and degradation. Societal goals to restore planetary resilience through climate mitigation, reversing biodiversity loss and ameliorating pollution are set out by key international policy frameworks, namely: the United Nations Framework Convention on Climate Change, Global Biodiversity Framework and the Sustainable Development Goals. Here we provide an overview of the outputs from the first seascape symposium. We present a logical framework for marine ecological connectivity and present evidence that connectivity plays a key role in achieving these international policy targets. We demonstrate that ecosystem functioning, and the delivery of ecosystem services require the existence of a healthy mosaic of coastal habitats, maintained by the exchanges of matter and energy between them. We therefore advocate, that a seascape approach that restores connectivity and optimal structure-function relationships, is crucial for successful ecosystem restoration. Consequently, we provide recommendations to deliver seascape restoration of coastal habitats at scales needed to meet our societal ambitions. Acknowledging the interconnected nature of coastal ecosystems also has implications for policy. We identify opportunities and actions to support nature recovery and integrate policy frameworks across climate and biodiversity agendas to achieve international goals for planetary resilience. Finally, we reflect on the effectiveness of networks in facilitating nature recovery and how we can build on the current cultural momentum and awareness to achieve restoration at scale.

Joanne Preston is a leading expert in coastal restoration ecology, based at the Institute of Marine Sciences, University of Portsmouth. Her research group focuses on understanding the biodiversity, function, connectivity and value of marine biogenic coastal habitats and applying this to effective practice and monitoring of ecological restoration at seascape scale. In 2017 she founded the UK/Ireland Native Oyster Network with ZSL, and is a founding advisory board member for the European Native Oyster Restoration Alliance, currently chairing its Monitoring Working Group. Working with a group of expert authors, Joanne edited a series of habitat restoration handbooks launched at COP26. She is scientific monitoring lead for the ELSP-funded Solent Seascape Project and is working on projects for DEFRA, CEFAS and NERC to quantify and value the ecosystem services provided by coastal habitats.

10:15 Dr Lisa Wedding

Five Ways Seascape Ecology Can Help to Achieve Marine Restoration Goals

Marine restoration is increasingly recognized as a key strategic activity to regenerate ecosystem integrity, safeguard biodiversity, and enable ocean sustainability. Global restoration policies such as the Kunming-Montreal Global Biodiversity Framework have area-based restoration targets that deliver positive outcomes for ecosystem integrity and connectivity. Achieving global restoration targets and regenerative ocean health requires scaling up restoration efforts in ecologically and socially meaningful ways. Seascape restoration is an emerging holistic approach to restoring degraded ecosystems that considers the social-ecological system, including the related connectivity and interdependence among different species (including humans), habitats, and ecosystems. This talk will outline how the 5Cs of seascape ecology — Context, Configuration, Connectivity, Consideration of scale, and Culture — can help inform marine restoration ecology and enhance the design of nature-based solutions to achieve global restoration targets. A consistent language and framework for marine restoration practitioners will be shared and four key operational pathways identified for coastal seascape restoration, including 1) a focus on the recovery of wider interconnected habitats across the land-sea interface; 2) integration of the 5Cs from initial site selection to monitoring restoration outcomes; 3) the representation of social, historical, cultural, and ecological variables to assess site suitability, and 4) a need for transdisciplinary collaborations that create integrative and multifaceted restoration projects.

Lisa Wedding is an Associate Professor in the School of Geography and the Environment at the University of Oxford, where she leads the Oxford Seascape Ecology Lab. Her research advances the theoretical foundation in the newly emerging field of seascape ecology, develops novel techniques to apply remote sensing technology to map and model the ocean, and links geospatial science to ocean policy opportunities. Lisa is Associate Editor for the Nature journal Ocean Sustainability, and Editorial Board Member of the journal Landscape Ecology, where she is co-leading a special collection in Landscape Ecology this year on "Seascape Ecology as a Solutions-oriented Science".

Session 1: Principles & drivers of seascape restoration

Chair: Alison Debney, Conservation Lead, Wetland Ecosystem Restoration, ZSL

10:35 Dr Philine zu Ermgassen

Raising the ambition of marine restoration to the seascape scale

Marine habitat restoration is an increasingly accepted and practiced activity globally. Yet in many cases there remains a stark mismatch between the scale of the activities and the need to restore what has been actively extracted or destroyed. Historical ecology provides us with much needed insights into the scale of the restoration need and also much needed guidance as to what can and must be restored in order to bring our oceans back to health. This presentation will illustrate some key lessons drawn from historical ecology and explore what this means for the ambition to restore at the seascape scale.

Philine zu Ermgassen is an independent consultant and visiting researcher at the University of Edinburgh, based in Berlin. She has worked on quantifying the ecosystem services delivered by threaten coastal habitats, and on oyster restoration globally for over a decade. Philine now leads the SER Europe Marine Restoration Working Group Task Force 2, which is working towards developing marine restoration standards.

10:55 Professor Martin Gullström

A seascape ecology approach to understanding coastal blue carbon sequestration capacity reinforces conservation prioritisation, multi-habitat restoration and climate change mitigation

Coastal seascapes comprise intricate mosaics of widespread productive key habitats, such as seagrass meadows and salt marshes. Many coastal areas are, however, highly constrained by cumulative environmental stressors and competition for space, which may affect important ecosystem services such as the critical blue carbon sink function of vegetated coastal habitats. To safeguard sustainable climate governance, coastal managers therefore call for spatial conservation prioritization and restoration strategies contributing to long-term blue carbon storage. Using a multi-scale seascape ecology approach, this research synthesizes lessons learned from studies assessing the influence of seascape configuration and connectivity on blue carbon stock dynamics in coastal multi-habitat landscapes. Insights from major field efforts identified blue carbon hotspots within coastal seascapes comprised of large continuous blue forest ecosystems (such as extensive intact seagrass meadows) and the importance of considering coastal morphology (affecting local hydrodynamics) as an important predictor for long-term carbon storage and the quality of sediment organic matter. Strong land-to-sea gradients were shown to generate distinct patterns of blue carbon stock levels and source composition. Spatial connectivity analysis showed that land-use changes due to urban development, deforestation and habitat degradation altered the supply and movement patterns of blue carbon in coastal seascapes. The research clearly demonstrates benefits of using a seascape ecology approach to understanding coastal blue carbon sequestration capacity, contributing to safeguarding vital climate regulation services and to supporting policy makers for successful planning of seascape-scale restoration, preservation and rewilding of multi-habitat systems.

Martin Gullström is a professor of environmental science specialised in marine ecology at the School of Natural Sciences, Technology and Environmental Studies, Södertörn University, Sweden. His research concerns seascape ecology, ecological connectivity, coastal blue carbon science, seagrass ecology and physiology, food-web ecology, fish and fisheries ecology, social-ecological research, and global climate/environmental changes. The research aims to support nature conservation and restoration, resource management, and spatial planning of the coastal marine environment.

Session 2: Advances in habitat-specific ecology related to upscaling restoration

Chair: Dr Philine zu Ermgassen, Visiting Researcher, University of Edinburgh

11:50 Professor Iris Möeller

Coastal Seascapes - looking beyond the dykes

Coastal areas are arguably the most dynamic environments on Earth and they are intricately connected to the land 'behind' and the sea 'in front'. We tend to ignore that connectivity and divide these environments into 'terrestrial' and 'marine'. However, nature reminds us frequently that there is no such division in reality. Furthermore, constant coastal change results from processes that play out over seconds, to millennia and is forced by the joint action of physical, ecological, and human forces. Change is the norm here. History has shown us that, if we interfere with it, we inevitably disrupt the working system and have to continue to interfere at a cost to us. The benefits we gain from adopting a full 'seascape' perspective are becoming increasingly clear and there are immense opportunities in adopting such a perspective, for just and sustainable climate adaptation and mitigation, including key considerations around biodiversity and human well-being. Adopting such an integrative approach, however, means that we have to ask difficult questions. For example, who are the winners and losers of our commonly adopted 'coastal fixes' applied to resolve issues of local coastal flood and erosion risk? How we can best 'let go' of the false sense of being able to control our coasts and separate out the 'terrestrial' from the 'marine' is the key question and this requires us to move to a system of observing, anticipating, and working with nature. In all this, we must empower local communities to harness the opportunities a changing coastal seascape has to offer.

Iris Möller holds a PhD in Geography from the University of Cambridge. After a short spell of working at HR Wallingford Ltd, she joined the University of Cambridge's Coastal Research Unit as a Research Associate and Deputy Director. A Full-Time College Lectureship in Physical Geography at Fitzwilliam College and then a University Lectureship in Physical Geography (Coastal Processes) at the Department of Geography at the University of Cambridge followed. In October 2019 she moved to Trinity College and stepped into the role of Head of Department in January 2020. She is internationally recognised for her work on the buffering function of shallow coastal environments with a strongly applied focus on improving coastal flood and erosion risk management. Her most recent research has focused on bringing together an understanding the bio-physical functioning of coastal ecosystems and landforms with that of the human interaction with such spaces to achieve a more integrated land- and seascape scale approach towards sustainable use of coastal environments.

12:10 Dr Raymond Ward

Overview of the Sussex Kelp Restoration Project research & monitoring programme

Along the coastline of West Sussex however, once extensive kelp forests have significantly declined, with less than 4% of the historic area estimated to remain. The original decline was likely triggered by the Great Storm of 1987 which caused significant kelp dislodgement and opened up areas previously inaccessible to fishers, the subsequent development of trawler fishing in the newly opened up area and reductions in coastal water quality further degraded these kelp beds and prevented kelp recovery. In 2021 the Sussex Inshore Fisheries and Conservation Authority (IFCA) established the Nearshore Trawling Byelaw, which prohibited the use of bottom trawling along large sections of the Sussex coast, with the aim of facilitating the recovery of essential fish habitats, including kelp beds and their associated assemblages and ecosystem services. Following the inception of the Byelaw, a range of research organisations and NGO's have come together to support the research and monitoring of the local marine environment in order to monitor changes in biodiversity including both sessile and errant animals as well autotrophs (using eDNA, ARMS, BRUVs, towed video transects, traditional ecological surveys), evaluate changes in abiotic conditions (remotely sensed data and SONDES), map the distribution of the kelp over time (diver surveys) and assess the carbon stocks and sequestration capacity of the deeper water sediments in the offshore zone (210Pb, stable isotope analysis, eDNA).

Raymond Ward is a Reader in Marine Sciences at Queen Mary, University of London. For the last 15 years, he has been researching the impacts of global change on coastal and marine ecosystems. He has a particular interest in using novel techniques such as AI, remote sensing, eDNA for the assessment of climate change and pollution as stressor factors, and how best to restore degraded coastal ecosystems to maximise ecosystem service provision, biodiversity and climate mitigation potential.

Session 2: Advances in habitat-specific ecology related to upscaling restoration

Chair: Dr Philine zu Ermgassen, Visiting Researcher, University of Edinburgh

12:30 **Bryan DeAngelis**

Scaling Up: The Evolution and Global Context of Oyster Restoration in the United States

The United States has emerged as a global leader in oyster restoration, with projects increasing in scale and complexity in recent years. This presentation explores the enabling conditions in the United States, rooted in developments nearly 50 years ago, that facilitated the trajectory of oyster restoration in the U.S., including the ecological, economic, and policy-driven motivations that have fueled its growth. Key enabling conditions include the United States reactive legal frameworks focused on remediation and compensation, robust public-private partnerships, sustained federal and state funding, advances in restoration science particularly around recognizing the ecosystem services provided by oyster reefs, and a dedicated effort to raise ambition for scaled restoration. By contextualizing U.S. efforts within the broader international landscape, this talk aims to identify transferable lessons and critical success factors that can inform and inspire oyster restoration worldwide.

Bryan DeAngelis is a marine habitat restoration expert with over 25 years of experience leading large-scale coastal restoration initiatives. As a Lead Scientist for The Nature Conservancy, he provides scientific and strategic leadership across the United States. Prior to joining The Nature Conservancy, Bryan worked for the U.S. government with the National Oceanic and Atmospheric Administration's Restoration Center. His work spans several aspects of restoration, including habitat valuation, monitoring and evaluation, and workforce development. He is recognized for advancing ecosystem-based restoration in the U.S. through science, partnerships, and policy innovation.

12:50 **Associate Professor Richard Unsworth**

Swansea University and Project Seagrass

Seagrass restoration is a challenging endeavour, with high failure rates and many underlying complexities. But treating this all as one process ignores the devil hiding in the details. This is because not all seagrasses are built the same, seagrasses within the temperate coastal seascape are varied. Not only do we get different species, but we get the same seagrass species living in different environmental settings of the seascape, from the muddy upper intertidal to the clear water depths. This results in seagrasses with varied ecological functions across the seascape. In this talk, I examine these varied environments and the differences in seagrass condition, function and biodiversity, and how many of these factors propagate to the way we consider their conservation and restoration.

Richard Unsworth is based within the SEACAMS team at Swansea, and is an academic editor at PLoS One and vice-president of the World Seagrass Association. Richard is also a founding director of Project-Seagrass and continues to work as a senior scientist at SeagrassWatchHQ. His expertise lie in the ecological structuring processes of marine systems and the implications of these systems for society. Richard has more than twelve years' experience of research in marine systems and conducts collaborative interdisciplinary research in Europe, Australia, Indonesia, Columbia and the Turks and Caicos Islands. Richard's other roles include membership of the editorial boards of Marine Pollution Bulletin and Marine Environmental Research.

Session 3: Advances in seascape restoration practice

Chair: Dr Richard Lilley, Co-founder, European Seagrass Restoration Alliance

14:10	Melissa de Kock, Deputy Director, UN Environment Programme World Conservation Monitoring Centre The UN Decade on Ecosystem Restoration
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14:35 Angela Lazou Dean

Revitalising Greece's largest wetland, the Amvrakikos Gulf

The Amvrakikos Gulf, a 405 km² semi-enclosed bay in Greece, is a place of extraordinary natural beauty and ecological significance. It contains 26 lagoons covering 25% of the whole Hellenic lagoon surface. It hosts 290 bird species with 16% of the Greek waterbirds wintering there, and supports the largest population of bottlenose dolphins in the Mediterranean. It also serves as a key habitat for sea turtles, sharks, and rays, and is one of the last refuges for the nearly extinct fan mussel *Pinna nobilis*. Despite numerous protection designations, the Gulf faces serious ecological and socio-economic threats. It is becoming a dead zone, with anoxia and hypoxia caused mainly by pollution from agricultural runoff. Overfishing, habitat destruction, and a lack of effective management have further destabilised the ecosystem. In response, a coalition of partners—the Amvrakikos Alliance—supported by Blue Marine, is launching an ambitious restoration initiative to reconnect nature across the Gulf, funded by the Endangered Landscapes and Seascapes Programme. The mission includes restoring the *Pinna nobilis* population, rebuilding seabird nesting sites, and developing an efficient, sustainable fisheries framework within the lagoons. It also aims to reduce agricultural and industrial pollution by working with farmers around the Gulf to improve irrigation practices and optimise fertiliser use. Halting the expansion of fish farming and unsustainable tourism is another key focus. Additionally, the removal of abandoned fishing gear and marine waste will help restore degraded habitats. Central to the project is community engagement—empowering local people to reconnect with and protect their environment. This initiative goes beyond conservation. It aims to revitalise the Gulf's ecosystem and secure a sustainable future for both marine life and the communities that depend on its health.

Angela Lazou Dean is Greece Projects Manager for Blue Marine Foundation. Angela's life has always been connected to the sea, and she is still amazed by its beauty, its mysteries, and how important it is for life. But she is also shocked that we do so little to protect it. That feeling—of needing to do something—has stayed with her over the years. Defending the sea has been the driving force of Angela's professional career. For over 20 years, she has actively campaigned for marine conservation across Greece and Europe—initially with national marine conservation NGOs, later with Greenpeace, and for the past three years with Blue Marine Foundation. As a biologist with extensive experience, Angela has been dedicated to advocating for the establishment of effective marine protected areas and the adoption of progressive policies for sustainable fisheries.

Session 3: Advances in seascape restoration practice

Chair: Dr Richard Lilley, Co-founder, European Seagrass Restoration Alliance

14:55 Dr Henrike Semmler Le

Marine Restoration at Scale: Implementing a Seascape Approach in Denmark

Denmark's marine environment, covering over 100,000 km²—more than twice the country's land area—is facing severe ecological decline. Historically rich and diverse due to the unique meeting of oceanic waters from the North Sea and brackish waters from the Baltic, parts of the Danish seas now rank among the most physically disturbed seabeds globally. Extensive bottom trawling, large-scale extraction of seabed stones, and chronic eutrophication have led to widespread habitat degradation. Eelgrass meadows, once spanning thousands of square kilometres, have shrunk to less than a third of their historical extent and are now mostly limited to shallow waters due to nutrient overload. Key fish species, such as cod, have experienced population collapses, with three out of four Danish cod stocks currently below safe biological limits. These losses highlight the urgent need for a new, large-scale, and systemic approach to marine restoration — one that moves beyond isolated pilot projects and addresses ecosystem health across interconnected habitats. This talk will present the rationale for adopting a seascape-scale restoration strategy in Denmark and share insight into one of the country's first efforts to apply this framework in practice. The initiative focuses on restoring a degraded coastal bay through reestablishing blue mussel and stone reefs, replanting eelgrass, and supporting cod recovery. The project is a collaboration between WWF Denmark, Aarhus University, the National Institute of Aquatic Resources at the Technical University of Denmark, and the University of Southern Denmark, supported by local municipalities, residents, and stakeholders. It aims to connect efforts across habitats and sectors, and to combine science, policy, and community engagement in practice.

Henrike Semmler Le is a marine biologist (PhD) with experience in academia before transitioning to advisory roles at ICES and later into the NGO sector. Since 2018, Henrike has been the Senior Specialist for Ocean and Fisheries at WWF Denmark. Henrike works on EU environmental legislation, fisheries policies, ecosystem-based management, marine spatial planning, and nature restoration, with some focus on the blue economy and blue finance. This role involves collaborating with ministries, research institutes, fishers' organizations, NGOs, and journalists to drive marine conservation efforts and sustainable ocean management.

15:15 Anna Cucknell

Transforming the Thames: seascape-scale restoration of the Greater Thames Estuary for people and nature

Transforming the Thames is a seascape scale coastal habitat recovery plan, with a vision to restore the Greater Thames Estuary to an outstanding, dynamic coastal habitat mosaic that provides for nature and people, and is ecologically recovered, reconnected and resilient. The Greater Thames Estuary is one of Europe's most important wetland complexes, evidenced by the 87 nature conservation designations in place across its 250,000 Ha. These wetlands are one of eight global flyways and have been put forward by the UK government as a Natural World Heritage Site (tentative list). It also is designated as an important fish nursery area and is one of the last strongholds of native oysters in England. However, due to coastal squeeze from developments, overfishing, pollution and disease the coastal habitats in the Thames are in an extremely degraded and fragmented state. In 2022, a coalition of 20 organisations, led by ZSL, joined together to develop a seascape scale habitat restoration plan (funded by the Endangered Landscape and Seascape Programme (ELSP)) called Transforming the Thames. Our partnership is made up of eNGOS, government bodies, landowners and industry. In 2025 we received a further \$5 million to deliver the first five-years of the plan which has three focus areas: active restoration (of six coastal habitats), removing barriers and enabling scale. This talk will discuss how we developed our seascape plan, the restoration activities scheduled for the next five-years and our challenges and lessons learnt over the last few years of seascape planning.

Anna Cucknell has been working in research and restoration of species and habitats for fifteen years across offshore, coastal and estuarine areas. Presently Anna manages the UK Coastal Habitat Recovery Programme at the Zoological Society of London. Through this role Anna is championing the development of partnerships and strategy, to test both the development of active restoration techniques and scale up habitat restoration across seascapes. Anna is the founder and chair of the Noltei Network and is managing the Transforming the Thames partnership project.

Session 4: Overcoming financial barriers to scaling up nature-based solutions/restoration

Chair: Caroline Price, Head of Nature & Environment (Marine), The Crown Estate

16:05	Elizabeth Beall, Managing Director, Finance Earth <i>Elizabeth Beall is a specialist in nature-based solutions and climate finance, with over 20 years of experience advising on nature-based project design, feasibility and investment models across a range of sectors and geographies. Elizabeth is a Managing Director at Finance Earth, where she has led marine and supply chain finance focused work including the design and management of the Fisheries Improvement Fund. Elizabeth previously led Global Counsel's climate and sustainability team, and has worked for the United Nations Food and Agriculture Organization and the Inter-American Development Bank with a focus on climate finance.</i>
16:25	Dr Sophus zu Ermgassen, Ecological Economist & Nature Finance Lead, University of Oxford <i>Sophus zu Ermgassen is the Nature finance lead at the University of Oxford's Nature-positive Hub, specialising in biodiversity finance, nature-positive organisations, infrastructure sustainability, sustainable finance, biodiversity offsetting and ecological economics. Sophus' academic research features regularly in popular media including the Guardian, BBC Countryfile, the Times, Sky News, the Financial Times and the ENDS report. Sophus is currently a Specialist Advisor to Parliament's Environmental Audit Committee and has held 3 expert advisory roles relating to biodiversity finance for the UK Treasury, Defra, and Natural England. He is co-host of the European Society for Ecological Economics podcast "Economics for Rebels", and co-directs the NatureFinance@Oxford seminar series at the University. Sophus was named as one of the 100 most influential environmental professionals in the UK by the ENDS Report in 2022, won the UKRI Natural Environment Research Council's early career policy impact award in 2023, led the team that won runner up most impactful research project at Oxford University in 2024 at the Vice-Chancellor's Awards, and was named as the most impactful early-career researcher in Oxford University's Medical, Physical and Life Sciences Division in 2024.</i>
16:40	Kaija Barisa, Senior Blue Economist, Blue Marine Foundation <i>Kaija Barisa joined Blue Marine in 2021 after completing her MSc in Environmental Economics and Policy at Imperial College London. Since joining Blue Marine, she has worked on implementing sustainable finance mechanisms in projects around the world, conducted research into the socioeconomics aspects of fisheries in the UK, and presented on ocean finance to governments, and at conferences and events around the world. She leads Blue Marine's work on nature markets and innovative ocean finance aiming to support and accelerate the goal to achieve 30% protection in the marine environment by redefining how we value the ocean.</i>
16:45	Panel discussion, chaired by Caroline Price

9:35

KEYNOTE: Dr Elisa Bayraktarov

Planning for seascape restoration under future climate change and coastal risk to nature and people

Extensive degradation and loss of coastal marine habitats, along with the socio-ecological functions and services they provide, have prompted global efforts in restoration of key habitat forming species. Attention is now shifting towards 'seascape' restoration efforts to scale-up and accelerate recovery. Effective restoration outcomes are needed not only to address current coastal challenges at priority locations but also to ensure persistence under future climatic conditions. To support resilient and 'future-proof' restoration efforts, this study led by The Nature Conservancy in Australia employed a national-scale modelling approach for Australia's temperate coastal waters. The goal was to identify priority areas for seascape restoration that have greatest potential of thriving under both current and future climate scenarios, whilst benefitting nature and people at greatest risk of climate change. Here we carried out habitat suitability models of 13 restoration target species under current conditions and five Intergovernmental Panel on Climate Change Shared Socioeconomic Pathways scenarios for 2050 and 2090. We combined the results with an analysis of coastal risks posed by climate change (e.g. erosion, flooding) in vulnerable locations (e.g. high population density and infrastructure). Finally, we integrated the results into a spatial prioritisation analysis, using Zonation, to identify the top 30% of Australia's coastal waters for seascape restoration. Developing these practical decision-making frameworks now is crucial to mobilise much-needed on-ground action towards feasible, cost-efficient, impactful, and nationally coordinated coastal restoration. This approach enables planning for real and lasting progress towards global restoration commitments under shifting baselines. I will finish my talk by providing an overview of the shellfish restoration work carried out by The Nature Conservancy in Australia between Perth in Western Australia and Noosa in Queensland to restore 62 ha of shellfish reefs.

Dr Elisa Bayraktarov is a Digital Mover and Shaker with a background in environmental monitoring who mobilises and interrogates data to craft solutions for problems related to threatened species and marine coastal ecosystems. Elisa is the Data & Science Manager at The Nature Conservancy in Australia. She oversees the collection and management of data for conservation projects and is accountable for the accuracy and currency of TNC data. Her team provides monitoring, evaluation and learning functions for conservation teams at TNC Australia. This includes identifying relevant science, providing access to data, and carrying out bespoke modelling and analyses.

Session 5: Community-driven conservation

Chair: Professor Joanne Preston, Professor of Marine Biology, University of Portsmouth

10:05

Dr Aline Da Silva Cerqueira & Alice Clark

Designing with Communities, Not for Them: A Transformative Vision for the Sussex Coast

Sussex Bay is a place-based, generational programme committed to restoring coastal and marine ecosystems while embedding deep community participation in every step of the journey. Described as the "blue mirror to the South Downs", Sussex Bay offers a unifying identity for 100 miles of connected seascape between Selsey Bill and Camber Sands. With a vision of thriving blue ecosystems that benefit nature, people, and local economies, Sussex Bay is working to redefine how we restore and relate to the sea. Built upon the core pillars of research, restoration, and radical collaboration, Sussex Bay's Strategic Blueprint for Seascape Recovery will set out a roadmap for evidence-led action across the land-sea interface. This collaborative strategy is being shaped through extensive stakeholder mapping and reflects our commitment to diversity, equity, inclusion, and high integrity funding. Over the next 12 months, our focus will be on listening, discussing, co-designing, and empowering—recognising that informed and inclusive participation is essential for transformative change. This strategy will harness local human, social, and cultural capital alongside natural capital to ensure that recovery is not only ecological but socially rooted. The blueprint allows us to explore existing research through a new lens as well as giving us space to conduct new research such as in ocean literacy, blue governance and ecological monitoring. Looking ahead to the next 3–5 years, Sussex Bay will continue evolving as a national exemplar in seascape recovery, holding space for new voices, strengthening community agency, and embedding ocean literacy at the heart of marine governance. Our approach is grounded in place, responsive to local capacities and cultures, and shaped by a belief that sustainable futures must be designed with—and not just for—the people they affect.

Session 5: Community-driven conservation

Chair: Professor Joanne Preston, Professor of Marine Biology, University of Portsmouth

10:05	<i>Aline Da Silva Cerqueira is the Participation and Engagement Lead at Sussex Bay, where she is responsible for embedding inclusive, place-based community engagement across a generational seascape recovery initiative. With a PhD in Conservation Science from King's College London and the ZSL Institute of Zoology, and over two decades of experience bridging research, policy, and practice in Brazil and the UK, Aline specialises in participatory marine research and governance, natural capital approaches, and climate change adaptation. A member of both the UK National Ocean Decade Committee and the Women's League for the Ocean, she brings a deep commitment to equity, ocean literacy, and local empowerment in coastal and marine restoration.</i> <i>Alice Clark is a final year PhD student from the University of Sussex. Her research focusses on monitoring the recovery of marine biodiversity along the Sussex coast since the introduction of the Nearshore Trawling Byelaw in 2021, using video surveys and environmental DNA. In recent months, Alice has extended her expertise beyond her PhD work by assisting in the development of Sussex Bay's Blueprint Seascape Recovery, a strategic plan aimed at safeguarding and restoring the area's marine and coastal assets.</i>
10:25	Danny Renton Seawilding - Community-based marine habitat restoration - seagrass and native oysters This talk will focus on the work of Seawilding in Argyll, a community-based charity established in 2020 that works to restore native oysters and seagrass in Loch Craignish and Loch Broom on the west coast of Scotland. It will discuss why the charity got going, the need for its work, the success and the challenges, and the prospects for active restoration in the future. <i>Danny Renton is the Founder and CEO of Seawilding. He is an ex BBC radio news reporter and documentary maker, and founder and project manager of multiple cultural heritage projects in the Balkans. After doing a Masters in Climate Change in 2011, and spending a lifetime sailing around Scotland, he decided to concentrate on conservation and restoration of the marine environment.</i>
10:45	Ffion Mitchell-Langford Addressing the missing link: National Parks at land, coast and sea In the UK's 1949 National Parks and Access to the Countryside Act, no-one thought about including the sea. Subsequently, the UK designated over 370 Marine Protected Areas (MPAs) across British seas. The designation landscape has become complicated, with effective management and restoration efforts challenged by competing stakeholder activities & interests, diverse values, disconnected land-sea governance, and a lack of access to, understanding and experience of our marine environment. Societally, these challenges are compounded by the disproportionate levels of deprivation experienced across coastal communities (UK Office of Statistics, 2024). There is a growing recognition in the UK of the transformative potential of National Marine Parks in supporting wholescape recovery and tackling social injustices at our coast (Ocean Conservation Trust, 2023). Building upon the UK's co-developed National Marine Park vision (Blue Marine Foundation, 2021) the anticipated National Park legislative reforms (UK Government, 2024), the UK's development of national Ocean Literacy Strategies and recommended next steps for Ocean Literacy research and practice (Shellock et al., 2024), the UK is presented with an exciting opportunity to connect governance at land and sea, whilst better support community-driven wholescape conservation through reimagining National Parks at land, coast and sea. This talk will introduce Campaign for National Park's National Marine Parks Project, share novel research insights and outline the potential of National Marine Parks in both delivering procedural justice for coastal communities, whilst aiding place-based wholescape restoration efforts. <i>Ffion Mitchell-Langford is the National Marine Parks Lead at Campaign for National Parks, the only independent charity dedicated to securing the future of National Parks in England and Wales. Supported by independent researcher Natasha Bradshaw, Plymouth Sound National Marine Park and Blue Marine Foundation, Ffion's work involves driving the National Marine Park vision forward, working with diverse audiences to scope National Parks across land, coast and sea.</i>

Session 5: Community-driven conservation

Chair: Professor Joanne Preston, Professor of Marine Biology, University of Portsmouth

11:05 Louise MacCallum

Engaging the local community with the Solent Seascape Project

The Solent Seascape Project is a multi-partner, multi-habitat, multi million pound seascape-scale restoration initiative taking place on England's south coast. This complex and ambitious project, the first seascape scale marine restoration project to begin in the UK, includes active restoration, a vast scientific monitoring programme to evidence the benefits of our restoration work and the development of nature positive marine biodiversity credits (a global first). Additionally, the Solent Seascape Project is working with Solent stakeholders and community groups, co-designing recovery plans for marine nature and developing an army of volunteers and marine champions to raise the profile of how a restored Solent could benefit not just nature, but also local people. This talk will outline the innovative ways the Solent Seascape Project has devised to work with stakeholders and engage the 1.5m people who make up our local community.

Louise MacCallum is the Solent Project Manager for Blue Marine Foundation and spent her childhood beachcombing along the Pembrokeshire coast. Since studying Marine Biology at the University of Liverpool she has worked on conservation projects in the UK and overseas. Louise has lived on the shores of the Solent for more than a decade and is passionate about restoring its intricate marine habitats.

Session 6: Advances in monitoring the marine environment at seascape scales

Chair: Dr Tom Worthington, Senior Research Associate, University of Cambridge

11:55 Nathan Gerald

Leveraging eDNA to Map Connectivity and Enhance Marine Ecosystem Recovery

Marine restoration efforts frequently overlook critical connectivity dynamics that can determine effective ecosystem restoration and long-term ecosystem resilience. This presentation explores how molecular tools, particularly using environmental DNA (eDNA), can provide insights into marine species distribution and habitat connectivity. It will highlight how eDNA can be used to enhance source to sea approaches and how it can be used to measure flow of species and resources across habitats including comparing different approaches to measure biodiversity and provenance and fate of blue carbon. In addition, I will explore integrating these molecular insights with biophysical models to assess connectivity among both adults and larvae habitats, creating opportunities to map dispersal pathways with better precision. With these novel methods we can now assess the functional footprint of existing habitats, identify optimal restoration sites, quantify biodiversity benefits, and evaluate ecosystem services including carbon sequestration—ultimately transforming how we design, implement, and monitor restoration initiatives across the seascape.

Nathan Gerald leads research and development of projects in the marine environment at NatureMetrics and spearheads research that enhances nature-based solutions. He has 60+ peer-reviewed publications and almost 20 years of experience in leading multifaceted projects from funding acquisition to science-based conservation actions. He has worked in diverse environments across multiple sectors on three different continents. His research focuses on bivalve restoration, community dynamics, blue carbon, using eDNA to assess present and past communities, as well as impacts of fishing, invasive species and global warming on marine ecosystems.

Session 6: Advances in monitoring the marine environment at seascape scales

Chair: Dr Tom Worthington, Senior Research Associate, University of Cambridge

14:55 Professor Rod Connolly

Restoring seascapes: automated monitoring of fishery and biodiversity outcomes

Automated underwater monitoring has revolutionised marine science and restoration. Advances in AI-driven data extraction from underwater drones and cameras now enables safe, cost-effective monitoring more frequently in more places. These technologies can identify, count and size animals, and track their movements linking seascape habitats. I will showcase how these tools are being used to assess fisheries value of restored shellfish reefs. By deploying large arrays of underwater cameras with automated data processing, we obtained robust estimates of fisheries enhancement. Fish production increased on average by over 6 t.ha⁻¹.yr⁻¹, reaching up to 13 t.ha⁻¹.yr⁻¹ on some reefs. Notably, benefits extended beyond the reef footprint, with a five-fold increase into adjacent habitats in the zone of influence for fisheries gains. Case studies in other structured ecosystems, such as mangroves and saltmarsh, further demonstrate the utility of automated biodiversity monitoring. In mangrove restoration sites, data revealed the rapid return of key fish indicator species within a year. Automated tracking also detected subtle differences in how animals use the forest edge versus the interior, informing more effective design and placement of future restoration projects. I will also highlight recent innovations enabling biodiversity monitoring in deep and turbid waters. These improvements in cost-efficiency and data reliability support the development of standardised global biodiversity monitoring programs - critical for reporting on ecosystem condition. Ultimately, these more reliable and reproducible measures of biodiversity and productivity help quantify ecological, social, and financial benefits, reinforcing the business case for large-scale coastal ecosystem restoration.

Rod Connolly is Director of the Global Wetlands Project (GLOW) headquartered at Griffith University in Australia. He specialises in coastal seascapes, with a focus on habitat connectivity that underpins vital ecosystem services such as fisheries and blue carbon. Together with his team of data scientists and ecologists, he develops decision-support tools to support wetland conservation and restoration. Rod has pioneered the use of automated AI-powered camera systems for reproducible, cost-effective monitoring of wetland habitats and fauna, delivering vastly improved measurements of ecosystem health and seascape connectivity.

15:15 Angus Garbutt

The UN 2030 Saltmarsh Breakthrough: accelerating restoration through global coordination of targets for expansion, policy and funding

The United Nations Breakthrough Agenda was launched at COP26 to help the world close the “collaboration gap” and accelerate international action on climate change. The Breakthrough Agenda provides a framework for countries, businesses and civil society to join up and strengthen collaborative actions every year in major emitting sectors, and a service to support coalitions of leading public, private and public-private global initiatives to deliver those actions. Since its launch, the Breakthrough Agenda has established an internationally-recognised, annual, COP-centred, collaborative process – backed by 61 countries covering over 80% of global GDP, and more than 150 international initiatives – that enhances global cooperation in seven major emitting sectors: power, road transport, steel, hydrogen, agriculture, buildings, and cement and concrete, covering over 60% of global emissions. UN 2030 Saltmarsh Breakthrough will act as the vehicle for international coordination and investment in expansion of saltmarsh and play a key role in countries and territories achieving NetZero targets. The first step in the process will be the launch of the first ‘State of the Worlds Saltmarshes’ report which will be launched on World Saltmarshes Day, 11th June 2025 at the UN Oceans Conference, Nice, France.

Angus has 30 years’ experience in coastal ecology and processes with a special interest in saltmarshes. He has worked on projects that have taken him around the world giving a unique insight into their diversity and cultural setting. His research team work on habitat restoration, blue carbon and finance, biodiversity and coastal processes with a focus on understanding the goods and benefits that coastal habitats provide for people and planetary health. He Chairs the UK Saltmarsh Forum bringing together Government Agencies, academics, business and NGO's to network, share knowledge and work together towards the preservation and creation of saltmarsh habitats, and sit on several other Boards and Committees related to coastal change and management.

Session 7: Measuring and enabling connectivity

Chair: Professor Graham Underwood, Professor of Marine and Freshwater Biology, University of Essex

14:20 Dr Maria Vozzo

Identifying spatial dependencies of cross-habitat facilitative processes to achieve at scale seascape restoration

Cross-habitat facilitative processes can enhance seascape connectivity and ecological functioning and resilience. Incorporating these processes may help scale-up urgent efforts to repair and restore seascapes; however, there remains uncertainty about the spatial dependencies of these processes and how they operate across different coastal habitat types. We used a multidisciplinary approach, including expert elicitation from ecologists, physical modellers, oceanographers, biogeochemists and restoration practitioners, and a synthesis of literature identified by these experts, to synthesise the influence of key environmental parameters on six key processes underpinning cross-habitat facilitation: wave attenuation, sediment dynamics, nutrient processing, water filtration, carbon dynamics and alkalinity export, and animal- and plant-mediated facilitation. Following this, we identified the spacing between habitat types over which processes may be operating and considered the potential overlap of these processes within distances from 0 metres to 100,000 kilometres. We found that all six processes have been documented to occur at distances from 1-100 metres, and that at all spacings considered there was potential for at least three processes to overlap. Finally, we outlined how this information can be used by practitioners seeking to incorporate cross-habitat facilitation when designing seascape restoration projects. These results demonstrate how cross-disciplinary approaches can inform seascape restoration efforts, and ultimately, help scale-up marine and coastal restoration to meet national and international goals.

Maria Vozzo is a Research Fellow at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Brisbane, Australia. Her research interests are in coastal marine habitat restoration and rehabilitation, and marine eco-engineering. Maria's current research focuses on methods and strategies to scale up coastal and marine restoration. To do this, she has been using a combination of approaches such as ecological analysis and synthesis methods to identify the spacing between coastal marine habitats that maximises positive interactions. In this process, she has worked with stakeholders from academia, government, industry and not-for-profit organisations to identify opportunities to test these concepts in the field.

14:40 Dr Luke Helmer

Multidisciplinary monitoring of restoration at scale across the Solent Seascape

The Solent Seascape Project is a pioneering marine restoration initiative focused on enhancing biodiversity and ecosystem resilience across the Solent—a region of high ecological value on the southern coast of the UK. One of the project's core goals is to monitor the changes across key marine and coastal habitats, such as seagrass beds, saltmarshes, oyster reefs, and seabird nesting sites. This talk explores how the project undertakes monitoring within the context of a dynamic seascape. Effective monitoring is essential for understanding how ecosystems react to active and passive interventions. We present a multidisciplinary approach combining ecological surveys, spatial mapping, remote sensing, and species tracking to assess both structural and functional connectivity. As well as behaviour change responses to address pressures causing direct habitat loss. The talk also addresses the challenges of monitoring in varied marine and coastal environments, where ecological linkages can be complex and influenced by factors such as tidal flow, water quality, and human activity. By integrating scientific data with stakeholder engagement and adaptive management, the project aims to build a connected, resilient marine ecosystem that supports both biodiversity and local communities. This session will highlight early findings, methodological lessons, and future priorities for connectivity monitoring within the Solent Seascape Project.

Dr Luke Helmer is the Restoration Science Manager at Blue Marine Foundation, where he manages scientific research and monitoring for the Solent Seascape Project. With a PhD in marine ecology, Luke brings experience in coastal ecosystem monitoring, ecosystem dynamics, species interactions, and restoration techniques. Passionate about bridging science and practical conservation, Luke works closely with partners, stakeholders, and local communities to deliver evidence-based restoration outcomes that benefit both marine biodiversity and coastal livelihoods.

Session 7: Measuring and enabling connectivity

Chair: Professor Graham Underwood, Professor of Marine and Freshwater Biology, University of Essex

15:00 Dr Emma Ward

Mixed provenance of organic carbon in temperate intertidal seagrass sediments

Blue carbon accreditation for climate mitigation services provided by coastal ecosystems, such as seagrass beds, currently focus on determining autochthonous organic carbon in their valuations. Here, a multi-proxy approach is used to determine the provenance of organic carbon in two intertidal temperate seagrass ecosystems in the Northeast Atlantic. The organic carbon to nitrogen ratio (C_{org}/N) and carbon isotope composition ($\delta^{13}C$) of seagrass tissues and sediments from an open coastal sandy site (Ryde, UK) and a muddy tidal inlet site (Farlington Marshes, UK) were measured. Sedimentary C_{org}/N was found to be higher at the muddy site than the sandy site, suggesting a greater contribution of marine algal organic matter in the latter. Isotopic mixing model analysis showed seagrass biomass contributes 12-16% to accumulated sedimentary C_{org} . These findings demonstrate that temperate Northeast Atlantic seagrass sediments are dominated by allochthonous C_{org} (84-88%) and that current blue carbon accreditation frameworks undervalue these ecosystems.

Emma Ward is currently a postdoctoral officer at Bangor University focused on the contribution of Blue carbon Ecosystems to climate change mitigation as part of the C-BLUES (Carbon sequestration in BLUe EcoSystems) project. Over the past 9 years her research portfolio has centred around natural capital and specialises in blue carbon, across tropical and temperate blue carbon ecosystems. The research we'll hear from today showcases some of her work completed whilst at the University of Portsmouth which utilises Stable Isotope Mixing Models to estimate carbon provenance and as such demonstrates connectivity between temperate coastal habitats in the Solent, UK.

15:20 Georgina Chandler

From practice to policy – embedding a seascape approach into decision making

Georgina Chandler is Head of Policy and Campaigns at ZSL, where she began in 2023 after 7 years at RSPB. By putting nature at the heart of decision making, Georgina's work aims to elevate the work of ZSL and to influence the issues that matter most, allowing people and wildlife to thrive together. Georgina engages in the UK policy making process in a range of ways, from the provision of evidence that can aid in science-led policy making, to engaging with parliamentarians and government departments. Her work also helps shape global policy, by engaging with UN conventions and negotiations.

Session 8: Source-to-Sea approaches

Chair: Dr Tundi Agardy, Founder and Executive Director, Sound Seas

16:05 KEYNOTE: Dr Sally Little

Unlocking Source-to-Sea Connectivity through Tidal Freshwater Zones

Effective seascape restoration hinges on a truly integrated source-to-sea approach—one that acknowledges the seamless connections between land, rivers, estuaries and sea. Without this holistic perspective, conservation efforts in the coastal zone risk being undermined by upstream pressures that remain unaddressed. While the principles of source-to-sea management are well-established in both policy and practice, implementation remains fragmented. Conservation and restoration efforts often fall along disciplinary lines and within ecological silos. Freshwater scientists tend to concentrate on river catchments—where nature-based solutions are already well-developed—while marine ecologists focus on brackish estuaries and coastal habitats like saltmarshes, native oyster beds, and seagrass meadows. As a result, one vital piece of this ecological continuum is frequently overlooked: tidal freshwater and low-salinity zones at the upper reaches of estuaries. These zones exist in disciplinary limbo; too fresh for marine scientists and too tidal for limnologists, they've become the “blind spot” in restoration planning. Yet these zones are not peripheral. On the contrary, they may be pivotal. Tidal freshwater areas serve as dynamic gateways, supplying and exchanging energy, matter, and organisms between the brackish estuary and the non-tidal freshwater river. Unfortunately, they are also among the most impacted and vulnerable of estuarine areas. Subject to intense land-use pressures, development, and the emerging threat of “estuarine squeeze”—where rising sea levels squeeze out these zones against fixed in-stream barriers. Despite their functional significance, they remain largely absent from restoration agendas, which typically focus on either the fluvial upstream and marine downstream ends of the continuum. This fragmentation hampers the effectiveness of source-to-sea approaches and undermines broader ecosystem resilience. In this talk, we argue that tidal freshwater zones are the missing link in integrated source-to-sea management. Drawing on new spatial analyses from across England and Wales, we will identify areas where these systems are most at risk and present a vision for restoring them. Through nature-based solutions—such as the re-establishment of tidal freshwater marshes and wet woodland—we can reconnect fragmented habitats, mitigate climate change, and build resilience from source to sea. If we are to achieve meaningful, landscape-scale restoration, we must look beyond conventional boundaries. By restoring tidal freshwater zones we can transform fragmented conservation efforts into a unified strategy for source-to-sea resilience.

Sally Little is a Senior Lecturer in Environmental Science at Nottingham Trent University, specialising in aquatic ecology across the freshwater, estuarine, and marine continuum. Her research examines the impacts of climate change on these systems and how we can mitigate these issues through nature-based solutions and ecosystem restoration linking source-to-sea. Dr. Little is immediate past president of the Estuarine and Coastal Sciences Association, a trustee of the Clean Rivers Trust and special advisor on a number of national research projects.

Session 8: Source-to-Sea approaches

Chair: Dr Tundi Agardy, Founder and Executive Director, Sound Seas

16:30 DISCUSSION SESSION

Dr Sally Little

Sally Little is a Senior Lecturer in Environmental Science at Nottingham Trent University, specialising in aquatic ecology across the freshwater, estuarine, and marine continuum. Her research examines the impacts of climate change on these systems and how we can mitigate these issues through nature-based solutions and ecosystem restoration linking source-to-sea. Dr. Little is immediate past president of the Estuarine and Coastal Sciences Association, a trustee of the Clean Rivers Trust and special advisor on a number of national research projects.

Dr Elena Gissi

Elena Gissi is a Visiting Scholar at Stanford University, and Senior Researcher at the National Research Council, Italy. Her research focuses on understanding and modelling the responses to climate change of marine life at multiple levels of biological organisation, to incorporate this knowledge in marine management for adaptation and mitigation of climate change. Elena has over a decade of research experience in producing and integrating ecological knowledge and insights in decision making processes. She has applied her findings in marine spatial planning in the Mediterranean Sea as well as environmental and energy planning, and has led European and national funded projects such as the EU Interreg Europe IRENES “Integrating Renewable Energies and Ecosystem Services in Environmental and Energy Policies”.

Dominic Pattinson

Dominic Pattinson is the Executive Secretary of the OSPAR Commission. He was appointed in June 2020. His role is to support OSPAR’s 16 Contracting Parties to implement the OSPAR Convention for the protection of the Marine Environment of the North-East Atlantic. Prior to joining OSPAR, he worked for the Defra on domestic and international policy development and implementation. For the last eight years of his career with Defra he implemented marine environment policies at a national, European, and international level. This included development of the UK’s Marine Strategy, marine litter policies, and 30by30 initiatives.

Dr Gwen Maggs

Gwen Maggs has a career in species recovery and landscape-scale conservation both in the UK and abroad. This has varied from species reintroduction projects in the Indian Ocean, invasive species policy with the IUCN and capacity development for the Post-2020 Global Biodiversity Framework. Gwen has worked on landscape recovery projects with the Cornwall Wildlife Trust for the past three years, working across landscapes with farmers and fishers, to improve local biodiversity and highlight that landowners, those at sea and local communities are the solution of nature recovery.

Roger Proudfoot

Roger Proudfoot is the Environment Agency’s Head of Estuaries and Coast and Chair of the UK Healthy Biologically Diverse Seas Evidence Group (HBDSEG). With 35 years’ experience of marine monitoring, assessment and management, Roger is currently focussed on measures to improve the status of estuaries and coast, including the flagship Restoring Meadow Marsh and Reef programme. He is keen to explore and understand what more we can do to restore some of the benefits that our marine ecosystem once provided. Roger’s most recent work includes Defra’s Natural Capital Ecosystem Assessment Programme, focussing on the land sea interface supporting the development of a range of new indicators, models and monitoring programmes as well as promoting Source to Sea system thinking, key to resolving some of the pressures and threats that our marine environment faces from land-based sources as well as directly from marine activities.

17:10 Closing words and symposium end

Poster abstracts

Authors presenting posters at the Seascape Symposium are in **bold**.

Advances in habitat-specific ecology related to up scaling restoration

Emma O'Donnell

Nature-based Solutions Initiative, Department of Biology, University of Oxford

1. Quantifying the nature-related risks and opportunities of marine dredging

Marine dredging is an important economic activity in the ocean due its use for maintaining ports and shipping channels, replenishing beaches and building coastal defences, and mining materials for construction and land reclamation. Marine dredging and land reclamation has also been posited as a solution to sea level rise and other climate effects. Furthermore, land reclamation has also increased significantly in the past 20 years. However, there are major environmental risks associated with dredging and the financial and economic consequences of these increased risks are under explored. To understand these risks, I will conduct a deep dive assessment on the financial and economic risks associated with the increase in marine dredging. Because of the essential role of dredging in maintaining the functionality of ports and channels, required for increasingly globalized economies and supply chains, it would be remiss and counter-productive to omit the economic and social benefits of marine dredging. There have been several case studies highlighting the potential for dredging in facilitating nature recovery or nature-based solutions, such as wetland replenishment with dredged material. I will also identify opportunities to employ marine dredging to alleviate risk through alternative use of dredged material as well as capture risk reductions benefits.

Cami Domy¹, Jim C. Bull,¹ Dylan Z Childs², Simon Baldwin³

¹*Swansea University*

²*University of Sheffield*

³*The Welsh Government*

2. Refining species-habitat modelling using *Zostera marina* restoration

Species-habitat association models are often used in conservation efforts, due to the intuitive nature of correlating species distribution with crucial habitat characteristics. However, these methods have limitations, including that species data utilised does not consider the changing needs of a target species throughout its life cycle. For restoration site selection, modelling is considered as accurate as local.

To address this, we suggest a framework for adapting species-habitat association models, using the example of the seagrass *Zostera marina*. First, we explore the interaction between early life history stages and crucial physical environmental factors, via literature review, expert elicitation and a mesocosm experiment. The interactions are then incorporated into a matrix population model, and the resulting population growth rates are mapped to identify potential areas for restoration.

This framework is adaptable to any species, marine or terrestrial, flora or fauna, and we hope this will improve the outcomes of restoration work through the improved identification of appropriate sites. We also hope that the identification of research gaps will ultimately lead to enhancement of *Z. marina* restoration.

3. REWRITE project: Addressing the Climate-Biodiversity-Society Crisis in Intertidal Soft Sediment Seascape using Rewilding approach

REWRITE aims to develop nature-based solutions for rewilding intertidal soft sediment (ISS) seascapes, including saltmarshes, seagrass meadows and mudflats dominated by microphytobenthos, to address biodiversity, climate adaptation, and societal needs. It focuses on three key challenges:

1. **Reducing Uncertainty:** Understanding ISS seascapes ecological and social dynamics to project future scenarios under restoration (active), rewilding, inaction, or business-as-usual approaches.
2. **Cascading Effects:** Exploring the impacts of CO₂ rise, sea level rise, and biodiversity loss on ecosystems to enhance coastal resilience.
3. **Societal Engagement:** Identifying cultural and social drivers to build support and manage trade-offs in rewilding strategies.

Innovative Methodologies include:

- Adapting rewilding to ISS seascapes, where definitions and frameworks remain underdeveloped.
- Mapping and modeling ecosystem services (biodiversity, carbon, flood protection, cultural values) using remote sensing and field data, with validation for ISS complexity.
- Co-developing scenarios with stakeholders that incorporate environmental, economic, and social constraints, assessed across scales.
- Capturing cultural and societal values through participatory methods, interviews, social media, and historical analysis to support inclusive rewilding.

Interdisciplinary Collaboration:

REWRITE unites 25 partners from eight European coastal nations plus Canada, the UK, and the USA. Using 10 demonstrator sites, it applies a “space-for-time” approach to co-develop robust, scalable scenarios for resilient ISS seascapes.

Zoe Morrall¹, George P Balchin², Jen Lewis², Nick Rogers², Dominic Longley³, Ian Hendy⁴, Gordon Watson⁴, Joanne Preston⁴

¹*University of Portsmouth*

²*Sussex IFCA*

³*Environment Agency*

⁴*University of Portsmouth*

4. Spatio-temporal variation in nearshore fish assemblages across estuarine habitats in the Solent: informing restoration and management

Understanding spatio-temporal variation in estuarine fish communities is essential for establishing ecological baselines and informing restoration efforts. We analysed 12 years (2007–2018) of seine net surveys from 15 sites across four catchments in the Solent estuarine system (southern UK), examining fish abundance, species richness, estuarine use functional guilds (EUFG), and fish estuarine association scores (FEAS). Using generalised linear mixed models and multivariate analyses, we assessed patterns across time, season, site, catchment, and habitat type. Surveys recorded 141,917 individuals from 55 species, with a significant temporal decline in overall abundance. Seasonal variation showed higher abundance and richness in autumn than summer, although functional composition remained stable. Spatial patterns were strong: Southampton Water supported the highest abundance, richness, and guild diversity, while the Isle of Wight had lower values. Littoral mixed sediment habitats had significantly higher abundance and richness than littoral mud, although mud habitats supported species with greater estuarine dependency (lower FEAS scores).

These results highlight the importance of long-term, spatially distributed monitoring for detecting ecological change. This study provides a critical multi-site, multi-year baseline for setting restoration targets and assessing future ecological responses across UK estuaries.

Hayley Craig, Zoe Morrall, Joanne Preston
University of Portsmouth

5. Advancing eDNA-based biodiversity monitoring for seascape-scale restoration

The Solent Seascape Project is the UK's first seascape-scale marine restoration initiative, aiming to restore and reconnect saltmarsh, seagrass, oyster reef, and seabird island habitats across a degraded coastal ecosystem. A five-year environmental DNA (eDNA) monitoring programme is in progress across 19 sites using a Before-After-Reference-Control-Impact (BARCI) design. Sediment and water samples are being analysed using multi-marker metabarcoding, alongside measurements of key water quality parameters. This molecular approach complements conventional biodiversity monitoring methods including seine netting, baited remote underwater video, and acoustic telemetry, enabling a multi-trophic, multi-habitat assessment of ecological change. eDNA data will be used to explore restoration-driven changes in community composition, ecosystem functionality, and connectivity across the seascape. By integrating molecular and traditional techniques across time and space, this work supports the development of scalable, non-invasive monitoring strategies to evaluate the effectiveness of large-scale marine restoration and inform future coastal management.

Olly Hicks
Algapelago

6. Every 5 hectares of Blue Forest are transformational

Algapelago is a regenerative aquaculture & ocean restoration start-up based in the South West. For our poster, we'd like to focus on one aspect of our Blue Forest Program. The poster will show how kelp and mussels are a harmonious duo, when cultivated together. And the outcome our proposed Blue Forest could have on water quality and biodiversity.

What is the Blue Forest Project?

There will be two images side by side: one of sugar kelp (*Saccharina latissima*), the other of blue mussels (*Mytilus edulis*). Over-layered would be 3 magnified circle lenses - showing close up visuals of the following 3 core benefits of cultivating these two species:

Magnifying Glass 1: (Water filtration) Mussels and kelp improve water and reduce pollution. They absorb nitrogen and phosphorus, preventing harmful algal blooms. They benefit from each other, with kelp hoovering up the mussel faeces. A single blue mussel can filter up to 65 litres a day!

Magnifying Glass 2: (Showing Carbon/Nitrogen Capture) Kelp absorbs CO₂, and mussels store carbon in their shells, contributing to blue carbon sequestration. Every 10 acres of Blue Forest is predicted to absorb 4 tonnes of carbon and 2.5 tonnes of nitrogen.

Magnifying Glass 3: (Biodiversity) Kelp provides a habitat for marine life, while mussels support juvenile species and boost the ecosystem. Every 10 acres of Blue Forest is predicted to increase available fish by more than 25 tonnes a year.

When explaining the poster, we can delve into why we're integrating these species into our sustainable aquaculture Blue Forest system, and talk about our scalable solution to drive climate action and ocean restoration efforts. This poster will visually show the benefits of just 5 hectares of The Blue Forest out at sea. With metrics including the gallons of water, carbon, and excess nutrients that the mussels and kelp will filter.

Serena De Lauretis¹, Davide De Battisti¹, Ferrante Grasselli¹, Laura Airoidi^{1,2}

¹Chioggia Hydrobiological Station "Umberto D'Ancona", Department of Biology, University of Padova, Uo CoNISMa, Chioggia, Italy

²NBFC, National Biodiversity Future Center, Palermo 90133, Italy

7. Meta-Analysis of Saltmarsh Restoration: Successes and Limitations of Diverse and Combinatorial Approaches.

Salt marshes provide multiple ecosystem services to humans, ranging from coastal protection to climate mitigation. Decades of anthropogenic activity have significantly degraded these habitats globally, resulting in increased attention toward their ecological restoration to reverse long-term decline. Yet, these restoration projects vary in their approaches, reflecting different local conditions and goals. Thus, a comprehensive assessment of the performance of such diversified methods is needed to understand which are the most effective for guiding future restorations. We performed a meta-analysis of the most used salt marsh restoration practices worldwide (i.e. Tidal restoration, fertilisation, planting, sediment addition, and combinatorial approaches) to quantify their effectiveness in restoring ecosystem services, physical conditions, and species composition. Most restoration methods, generally succeed in replicating natural reference conditions; however, the variability in outcomes remains high, underscoring the influence of unmeasured ecological and contextual factors. Contrary to expectations, combinatorial approaches often underperformed compared to single-targeted interventions, raising questions about the widespread assumption that combining restoration techniques inherently improves outcomes. These findings suggest that the refinement of multi-manipulation strategies will be crucial to avoid unintended and highly variable outcomes. Moving forward, tailoring approaches to site conditions, enhancing connectivity, and fostering cross-habitat facilitation will be key to achieving sustainable, long-term restoration success.

Dr Lydia Burgess-Gamble¹, Dr Glenn Langer, ¹ Max Haliwell¹ and Bethan Griffiths¹, Pippa Lewis², Ruth Lindsey³

¹*Jeremy Benn Associates Consulting*

²*Environment Agency, Hampshire and Isle of Wight Team*

³*Natural Dales Wool Products*

8. Can Sheep Help Restore Salt Marshes?

Farlington Marshes is a local nature reserve that is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), undeveloped land. The site is also adjacent to a Special Area of Conservation (SAC). The site covers 125 hectares (308 acres) of flower-rich grazing marsh and saline lagoon on the northern shore of Langstone Harbour between Portsmouth and Havant. The site has an existing 3.5km length seawall embankment which is being affected by erosion and wave overtopping.

Traditionally, erosion protection measures in estuarine environments rely on the use of coir rolls and brushwood bundles. Coir material is generally imported from East Asia and manufactured into rolls in Europe, which gives it a significant travel carbon footprint.

This project is trialling the use of a lower-carbon alternative - a sheep's wool product sourced and manufactured in the UK. The project aims to deploy woollen rolls to assess the materials performance in an intertidal environment.

Sheep's wool is a much under-valued product, it costs £1.20 to shear a sheep, yet the fleece is only worth 16 pence. If this project is successful, there is the potential to use the fleece from sheep farmed on salt marsh to restore the natural environment locally. This could help pay a fair price to farmers for their fleece, supporting ethical, circular-economy supply chains and reducing transportation emissions.

Olivia Philo¹, Pedro Beca-Carretero^{1,2}, Dagmar B. Stengel¹

¹*Botany and Plant Science, School of Natural Sciences, University of Galway*

²*Leibniz Centre for Tropical Marine Research, 28359 Bremen, Germany*

9. Investigating methods for the restoration of seagrass beds in Ireland

Eelgrass (*Zostera marina* L.) and Dwarf Eelgrass (*Nanozostera noltei* H.) seagrass meadows in Ireland have recently been demonstrated to be distributed more widely than previously reported. Fulfilling several valuable ecosystem services, ensuring that seagrass large-scale distribution is maintained and even extended is paramount in the wake of a changing climate and biodiversity loss. Seagrass restoration protocols relevant to an Irish context are therefore in urgent need of development, testing and innovation.

As a response, the objective of this project is to trial various methodologies for the restoration of seagrass meadows in both intertidal and subtidal habitats. Current focus is on the transplantation of *N. noltei* from donor sites to areas with previous reported existence of seagrass beds, using single shoots, sods, and biodegradable materials. Initial results suggest that laboratory cultivation may be a crucial stage in the restorative process of *N. noltei* seagrass meadows, with plants grown under laboratory conditions exhibiting significant increases in leaf length. Similarly, laboratory cultivation in the growth of *Z. marina* seedlings is also under assessment as an alternative restorative method. Results have the potential to make a significant contribution to seagrass restoration science.

This project is funded by the Irish Environmental Protection Agency (RESET-2023-NE-1224).

Community-driven conservation

Daisy Taylor¹, Ian Hendy², Ewan Trégarot¹, Pierre Failler¹, Cindy C. Cornet¹

¹*Centre for Blue Governance, Faculty of Business and Law, University of Portsmouth*

²*Institute of Marine Science, University of Portsmouth*

10. Understanding stakeholder engagement in marine and coastal Nature-based Solution: lessons from a UK case study

As nature-based solutions (NbS) gain recognition, stakeholder engagement must be integrated into their development and implementation. Existing frameworks often overlook key findings from case studies and grey literature. Stakeholder and community engagement is complex and time-consuming, requiring “engage-deliberate-decide” practices. Engagement is often under-reported, with research limited to short-term perspectives and neglecting pre-existing cultural norms. Through stakeholder experiences, this study examines the perceptions and engagement of stakeholders in Blue NbS. As NbS build on existing practices, a case study approach was followed, focusing on the Isle of Wight UNESCO Biosphere where culture, heritage and the environment are considered equal. Semi-structured interviews were conducted across multiple stakeholder groups. Although initial support exists, some stakeholders resist NbS-like interventions, and overcoming these negative perceptions and disconnect will be challenging. We argue that understanding stakeholder behaviour and uncovering the drivers behind their concerns early is key for success. Stakeholder fatigue and declining motivation is often linked to socio-economic pressures, requiring practitioners to design inclusive and sustainable engagement strategies. Findings show that meaningful engagement requires understanding current socio-economic challenges, local history and stakeholder dynamics. Further research should consider how communicating ecosystem services valuations can enhance engagement, encourage active participation and strengthen NbS value across the seascape.

Measuring and enabling connectivity

Caitlin Jenna Lamb¹, Steven Benjamins¹, Michael Burrows¹, Tavis Potts², Laura Steel³

¹*Scottish Association for Marine Science*

²*University of Aberdeen*

³*NatureScot*

11. Evaluating the resilience of the Scottish marine protected area (MPA) network in response to marine heatwaves

Establishing climate-resilient Marine Protected Areas (MPAs) is critical for safeguarding marine biodiversity. This study considered the resilience of Scotland's MPA network and developed stakeholder-led recommendations for climate adaptation. Combining social and natural science, we used statistical models to predict changing distributions of five PMFs (minke whale, basking shark, flapper skate, flame shell beds, and seagrass beds) with an iterative, systematic stakeholder engagement process (Delphi Method). The process showed the susceptibility of MPAs to climate change, identified key perspectives on climate resilience integration, and emphasised adaptive management, long-term monitoring and cross-sectoral collaboration. Recommendations included increased investment, promoting ocean literacy, and balancing regional and national policy approaches. Addressing socio-ecological limitations of Scotland's MPA network contributes towards the establishment of an effective global MPA network. By synthesising stakeholder insights and model projections, the project strengthens MPA network effectiveness amidst climate change both in Scotland and globally.

Professor Graham Underwood¹, Dr Nicola Slee¹, Professor Tom Cameron¹, Charlotte Worrall¹, **Sherece Kesner¹**, Dr Stephen Watson²

¹University of Essex

²Plymouth Marine Laboratory

12. From Structure to Value: Correlating Salt Marsh Connectivity with Natural Capital

Habitat connectivity is important for ecosystem functioning. This study investigates the relationship between structural connectivity of vegetated salt marsh patches and natural capital in the Blackwater and Colne estuaries, Essex. We correlated metrics of connectivity (area, distance, clumping, perimeter complexity) with natural capital values (carbon stores, carbon sequestration, nitrogen removal, wave attenuation, species richness). Our results show a strong positive relationship between salt marsh area and wave attenuation, and a moderate positive relationship between patch distance and species richness. These findings contribute to understanding how seascape connectivity may impact natural capital. Future work will focus on assessing multi-habitat connectivity and functional connectivity within the estuaries.

Will Manning

Environment Agency

16. Habitat Compensation and Restoration Programme (HCRP): 20 Years of Managed Realignments and Counting

In England, the first managed realignments were created in the 1990's. Established in the early 2000's, building on lessons learned and working with partners, the Environment Agency's (EA) Habitat Compensation and Restoration Programme (HCRP) (and its predecessor) has since helped deliver many of the large-scale and high-profile managed realignments across the country (e.g., Medmerry, Steart Marshes, Jubilee Marsh (Wallasea Island), etc.). The legal driver for these schemes has been 'compensation', for the predicted losses of designated sites due to the combination of Flood and Coastal Erosion Risk Management (FCERM) activities, sea level rise (SLR) and resultant 'coastal squeeze'. The HCRP has been a successful, strategic and cost-effective approach to ensuring FCERM legal compliance, through the delivery of widely acclaimed habitat creation sites. However, the wider 'land- and sea- scape' of legislation, policy, funding and the environment itself, has since changed dramatically. Now in the mid-2020's, we have started the 2 year "HCRP Improvement Project", reflecting on 20+ years of experience, to help address future challenges and make the most of opportunities that come with change. This poster provides a past reflection and a forward look of the HCRP and its ongoing support of coastal adaptation, for both people and nature

Principles and drivers of seascape restoration

Hannah Westoby, Roger Proudfoot, Eve Leegwater, Jon Davies

Environment Agency

13. ReMeMaRe: Supporting a seascape approach

ReMeMaRe (Restoring Meadows, Marsh and Reef) is an ambitious partner led initiative, aiming to increase restoration activity of seagrass meadows, saltmarshes, and native oyster reefs by 15% by 2043. Whilst initial focus has been on individual habitats (developing tools and guidance), moving forward ReMeMaRe is supporting partners to work at multi-habitat seascape scale. This includes, proactively encouraging collaboration opportunities through both our restoration potential maps, and funding of our project pipeline. As well as development of local restoration action plans to support decision making at local scale. However, active restoration is only part of the solution to improving our estuarine and coastal environment. For our habitats to thrive, we need the environmental conditions to be right to allow natural recovery to happen, as well as for restoration action to have greater success. A source-to-sea approach will help us achieve this. Allowing the complex relationships and flows between terrestrial, freshwater and marine ecosystems (water, biota, sediment, pollutants and materials) to be understood, and change how we manage our environment, to provide greater benefits for all. This poster will set out how ReMeMaRe aims to support seascape scale restoration, and why source-to-sea system thinking is critical to its success.

14. Establishing the state-of-knowledge and current trajectories of rewilding intertidal soft sediment seascapes

Rewrite EU aims to revitalise Europe's intertidal soft-sediment (ISS) seascapes through rewilding, promoting climate resilience, biodiversity, and societal benefits for the European shoreline. This requires understanding of the state-of-knowledge and current trajectories of rewilding ISS seascapes.

Data mining of all existing data relating to six functions delivered by ISS measures, across 10 demonstrator sites, in Europe and beyond (DMs) has been part completed.

Summary results:

Carbon sequestration and stocks: In total, 8 of the 10 DMs have more C data available.

Biodiversity and conservation: Some DMs have data sets for Biodiversity, but gaps exist.

Mitigation and adaptation to climate change (protection from coastal flooding): Ecosystem maps, wind data, tidal data (tidal range, low/high astronomical tide), and installed surface elevation tables (SETs) have been identified.

Cultural services: First selection of cultural ecosystem services that can be assessed across all DMs have been made, to include i) nature visitation through recreation and ii) nature access.

Seascape connectivity and fragmentation: Methods established for comparing physical differences in seascape structure before and after rewilding.

Governance and politics: How administrations look like politically and biologically, how much restoration has been carried out, and how these correlate.

Source-to-Sea approaches

Jon Dickson^{1,2}, **Maryann S. Watson**^{2,3}

¹Royal Netherlands Institute for Sea Research, Coastal Systems, Den Hoorn, Noord Holland, Netherlands

¹Marine TREES: Tree Reef Ecological Engineering Structures

³University of Groningen, Groningen Institute for Evolutionary Life Sciences, Groningen, Netherlands

15. Forest to sea: Tree reefs restore seascape linkages and habitat foundations

Before widespread landscape domestication, rivers exported vast amounts of driftwood to the sea, where much of it sank and formed critical hard substrate for shellfish reefs. In the Dutch Wadden Sea, a three-year experiment-turned-restoration-measure using artificial reefs made from waste orchard trees has demonstrated the ecological value of reintroducing wood into marine systems. These tree-reefs rapidly became biodiversity hotspots, supporting dozens of sessile species, including shellfish. Fish populations on these reefs increased sixfold compared to control areas, with fish being larger and more diverse. Within a year, predatory fish were spawning on the reefs.

Marine TREES is pioneering the large-scale production of tree-reefs, natural reef structures crafted from waste wood, aimed at restoring vital seascape functions. By fostering multiple fish guilds, tree-reefs enhance trophic complexity and provide elevated substrate for shellfish, reducing predation pressure on juvenile shellfish through ecological cascade effects. Their cost-effectiveness and scalability make them a promising tool to reestablish critical ecosystem processes at meaningful scales.

This poster explores the aquatic wood cycle and illustrates how engineered woody structures can help mitigate the impacts of altered sea- and landscapes by reinstating lost natural processes



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Society
of London**

www.zsl.org

Zoological Society of London
Regents Park
Outer Circle
London
NW1 4RY