ReMeMaRe Conference 2023

Restoring Estuarine & Coastal Habitats

Delegate notes

OCEAN & COASTAL FUTURES

Environment Agency

11th & 12th July 2023 | Scarborough Spa, England

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Access: Delegates can arrive from 10:30am **on Tuesday 11th July** and 08:15am **on Wednesday 12th July**. Delegates will need to access the venue via the 'Linkway Entrance' (around the Sun Court and into the Linkway). This will be signposted from the main entrance.

Timing: The conference needs to run on time to allow speakers their allocated time and for the panel debates. A bell will be rung before the start of each session – please take your seats when you hear this.

Refreshment breaks: Once you have collected your food, please move away from the serving table. Catering staff are on hand if you need anything, including extra drinks. All food is vegetarian or vegan. Special diets: These should be collected from the buffet area and are named.

Wine reception: At the end of day one, wine and soft drinks will be served from 17:30 and please leave by 19:30.

Delegate notes: An electronic copy of the programme and delegate notes, including speakers' abstracts, is available on the ReMeMaRe 2023 website. We will not be providing printed copies, but there will be screens showing the programme and reference copies of the Delegate Notes at the registration desk.

Networking: A delegate list is emailed with the joining instructions, to facilitate networking. You will also be able to talk to the speakers after each session around the stage area. **Q&A**: **Slido** will be used throughout the conference to facilitate Q&A and panel debates. You will be given a joining code each day, and do not need to download anything in advance. Slido can be joined through a laptop or smartphone.

Bookings: receipts: If you have any questions during the event about bookings or finances, talk to Diana Hunt at the registration desk.

Sponsors: logistics: please talk to Jayne O'Nions at the registration desk.

Conference outputs: Ocean and Coastal Futures Ltd. will host the delegate notes, speaker presentations and other conference outputs for ongoing open access here.

Valuables: If you have anything you value keep it with you i.e. do not leave laptops unattended.

Before you leave: Check you haven't left anything - please also take any leaflets or reports you have collected.

SPEAKERS ABSTRACTS

DAY 1 – Tuesday 11th July

Opening

Introduction — **Roger Proudfoot**
Estuaries and Coasts Planning Manager,
Environment Agency

Ministerial Address — **Trudy Harrison MP**
Parliamentary Under Secretary of State (Minister for Natural Environment and Land Us).
Further information online here

Welcome

Richard Flinton — **Chief Executive, North Yorkshire Council**
Further information online here

Wave Crooks — **Director, Seagrown Scarborough**
Further information online here

An Introduction to SeaGrown

Wave Crookes was brought up in a Scarborough fishing family and first went to sea on the family trawler in the North Sea at the age of 8. Since then he has worked all his life as a Royal Naval Officer, military combat frogman, deep-sea saturation diver and Merchant Navy deck officer. Whilst serving as Navigating Officer on-board the polar research vessel RRS James Clark Ross for British Antarctic Survey he met Professor Laura Robinson on an Antarctic Expedition. On return to the UK the pair decided to start a business combining their expertise in marine and subsea operations and marine science, founding SeaGrown in 2018. SeaGrown is the UK's first offshore seaweed farming company, working a licensed seaweed farm located 4 miles off the coast of Scarborough.

Contact: info@seagrown.co.uk

Matt Jones — **The Wave Project Scarborough:**
Changing young lives through surf therapy
Further information online here

Session 1

STRATEGIC LEADERSHIP
Setting and achieving ambitious targets

How do we deliver the ambitions for estuarine and coastal restoration?
Speakers will illustrate how far we've come & the need to build on this momentum to achieve ambitious restoration targets. They will offer insights into how strategic aims are capable of becoming a reality in this crucial decade.

Chair: Mike Elliott, Emeritus Professor in Estuarine & Coastal Sciences

Dr Robert Bradburne, Chief Scientist, Environment Agency
Working with the system

In 2005, the Millennium Ecosystem Assessment concluded that 60% of the services societies across the world were getting from nature were in decline, but that it wasn't too late to reverse that trend. Parliament was interested – MPs asked how the Government was going to respond. How was it going to take into account this "new" understanding that by not nurturing nature, we were degrading our own wellbeing?

Government listened. In the following years, our approach shifted enormously, and this is now changing the way the Environment Agency works around our coasts. We recognise the value that our coastal ecosystems provide, and so they can become part of our plans for making coastal communities more resilient and better places to live. We understand ever more about the multiple benefits that the different habitats offer, supporting fisheries and wider biodiversity, trapping carbon and nutrients, and protecting our coastline in the face of a changing climate and societal needs.

And so now we are re-investing in our coastal natural capital – and beginning to see the dividends this investment can bring. We're reconnecting and restoring saltmarshes, sea grass beds and oyster reefs, building them into our flood, coastal, and biodiversity efforts, and we're reaching out to communities and business to get involved in bigger, more ambitious restoration projects. No project at the coast operates in isolation, and so we are truly "working with the system", natural, economic and social, to deliver better places around the coast for people and wildlife.

Contact: Robert.Bradburne@environment-agency.gov.uk

Dr James Robinson, Conservation Director, WWT
Catalysing coastal restoration in the UK - leading from the front

Conservation organisations are in a unique position to respond to arguably the most pressing issues of time, climate change and biodiversity loss, while adapting to

changing societal pressures. They need to be leading from the front, acting as trusted sources of evidence and research, campaigners for change in policy, whilst also driving the reorientation of finance and investment towards conservation aims.

In this presentation, I will argue that the challenge of scaling up the restoration of coastal habitats in the UK requires this approach and that organisations like the Wildfowl & Wetlands Trust (WWT) need to step up to lead this type of blue recovery, working closely with key partners, within and outside governments. From raising awareness, to advocating for new policy, to demonstrating of the benefits through practical action, I will explain how the organisation has created and continues to execute a strategic approach to inspire coastal habitat restoration at scale.

As part of this work, I will introduce the new £21m partnership between WWT and Aviva that aims to support saltmarsh research and restoration in the UK. The project will involve research to help fill evidence gaps and provide a catalyst for further investment in saltmarsh restoration.

Contact: James.Robinson@wwt.org.uk

Dr Colm Bowe, Nature North & Liverpool John Moores University
Jim Wardill, RSPB & Nature North
Introduction to Nature North and the Thriving Northern Coast & Estuaries Programme

The North of England is rich in natural assets, however many of these remain in unfavourable condition. Nature North is a pioneering collaboration seeking to drive investment into nature recovery to power green growth and climate resilience in the North of England. It is seeking to embed nature and its benefits across policy areas to support green growth and climate resilience. To achieve its ambitions Nature North is working with two existing Investable Propositions: The Great North Bog and the Northern Forest, and creating five new *Investable Propositions* that will build on, scale up and connect nature recovery activities across the North of England. These investable propositions set out an ambitious vision to deliver nature recovery at scale. They provide an attractive at scale offer to funders, buyers and investors and bring together landowners, project developers and deliverers to provide a pipeline of projects. We describe emerging plans for engaging private sources of finance. We will set out how the Great North Bog and Northern Forest provide the 'art of the possible' in delivering regional scale programmes for nature recovery and how these have inspired the development of the new investable propositions, in particular the Thriving Northern Coasts and Estuaries programme.

Contact: ColmB@naturenorth.org.uk and jim.wardill@rspb.org.uk

Session 2

DRIVERS: Scaling up our experiences

Are the enablers in place to meet ambitious targets for estuarine and coastal restoration? Speakers will share their perspectives from Scotland, Wales, England and Northern Ireland, to present a UK-wide picture of the regulatory, planning & policy landscape influencing restoration. They will highlight the key drivers, the barriers & opportunities that come with this changing landscape and examples of progress being made.

Chair: Dr Aisling Lannin, Marine Management Organisation

Orlando Venn, Principal Advisor – Flood and Coast, Natural England
Restoring Estuarine and Coastal Habitats - Policy Opportunities and Challenges

One year on from the ReMeMaRe National Action Planning event, the policy landscape in which we operate continues to evolve apace, and with it the opportunities and challenges for intertidal habitat restoration.

We have seen the publication of the legally binding targets for the natural environment, a cornerstone of the Environment Act, which obligates current and future governments to short and long term commitments in environmental improvement. Further to this, there has been the publication of the new Environmental Improvement Plan - EIP23. This refreshed plan provides a delivery plan for halting and then reversing the decline in nature. It sets out further interim targets and provides further details on the wider measures such as Biodiversity Net Gain, Local Nature Recovery Strategies and farming schemes: tools working together to deliver the Nature Recovery Network and to protect 30% of all land and ocean by 2030. There are also new commitments such as the designation of Highly Protected Marine Areas and further nature recovery projects.

Recently the *Plan for Water* has been published. With its aim to transform management of the whole water system, deliver a clean water environment for nature and people, and address the multiple pressures which impact on our estuarine and coastal waters.

This presentation will examine the changes and question, what does this mean for creating new and restored habitat at the coast and, will the policy and strategy changes help deliver strategic outcomes in a place.

Contact: Orlando.venn@naturalengland.org.uk

Dr Cass Bromley, NatureScot
Restoration - a Scottish perspective

The activity and interest in marine and coastal restoration in Scotland has increased rapidly over the past couple of years, with new and potential projects regularly seeking advice from NatureScot. Many of the projects are community and citizen

science-led. Most projects are focused on native oysters, seagrass, sand dunes and/or saltmarsh. However, there is now also interest in other species e.g. blue mussels. This presentation will explore some of the developments in this field and also discuss changes to drivers, such as growing emphasis on blue carbon, corporate social responsibility and compensation/ mitigation, and wholescape projects. Also covered will be some of the developments within NatureScot and Scottish Government, including the guidance packages that have been produced. As the active projects start to look to their future growth, the presentation will also discuss the challenges of scaling up restoration, both in extent and across multiple features, associated implications, and the importance of continuing to ensure that any activities are appropriate and necessary.

Contact: Cass.Bromley@nature.scot

Dr Annika Clements, Marine and Fisheries Division, DAERA (NI)
Are we 'restoration ready'? The start of a journey in Northern Ireland

The Northern Ireland Climate Change Act came into effect last year, with a crucial 'nature-based solutions' clause specifically requiring that "*proposals and policies for meeting the carbon budget shall as far as is practicable, support nature based projects that enhance biodiversity, protect and restore ecosystems, and seek to reduce, or increase the removal of, greenhouse gas emissions or support climate resilience*". This, along with the development of a new NI 'Nature Recovery Strategy' - to implement the Global Biodiversity Framework targets at a local level – has provided the key overarching policies for coastal habitat restoration.

The NI Department of Agriculture, Environment and Rural Affairs (DAERA) has funded a number of projects that have helped 'set the scene' for coastal habitat restoration, including an initial 'restoration feasibility' study[i] (Strong et al., 2021) and two practical projects - native oyster nurseries[ii], and an eco-mooring system to reduce anchoring damage to seagrass in Strangford Lough[iii].

Coastal erosion risk management legislation is a significant gap in NI, but progress is underway with Nature-Based Solutions core to it. New funding avenues for habitat restoration are coming online, and mainstreaming coastal nature-based solutions across all policy areas is essential - as well as looking at new opportunities such as offshore wind compensation schemes. Finally, cross-border biogeographical considerations are crucial to getting the journey right here, which along with promoting diverse project partnerships should ensure effective scaling up of restoration. A DAERA-led, co-designed Blue Carbon Action Plan[iv], going out for public consultation this summer, will pull these elements together and ensure an evidence-driven approach to coastal habitat restoration.

[i] Strong, J.A., Mazik, K., Piechaud, N., Bryant, L., Wardell, C., Hull, S., Tickie, M., Norrie, E-M., McIlvenny, H. and Clements, A. 2021. Blue Carbon Restoration in Northern Ireland – Feasibility Study. 184pp. Available at: https://www.ulsterwildlife.org/sites/default/files/2021-05/Blue%20Carbon%20Habitat%20Restoration%20in%20Northern%20Ireland%20-%20A%20Feesability%20Study.pdf
[ii] https://www.ulsterwildlife.org/native-oysters
[iii] https://strangfordlough.org/news/pilot-scheme-on-strangford-lough-aims-to-stimulate-seagrass-growth-by-testing-advanced-mooring-systems/
[iv] https://www.daera-ni.gov.uk/news/poots-we-must-protect-our-blue-carbon-habitats

Contact: annika.clements@daera-ni.gov.uk

Dr Kate Griffith, Natural Resources Wales
Restoration and enhancement in Wales

Natural Resources Wales (NRW) have a legislative requirement to pursue the sustainable management of natural resources (SMNR) and a duty to maintain and enhance the resilience of ecosystems and the benefits they provide. For marine and coastal environments, enhancement is an overarching term we use to define actions that aim to improve the quality, size or geographic distribution of a habitat or species, and restoration activities are an example of such actions. Our view is that the condition and coherence of the Marine Protected Area (MPA) network is the foundation for delivering marine ecosystem resilience in Wales, so getting features across the MPA network into a favourable condition should be the priority focus of enhancement activities. This talk will outline the legislative and policy framework in Wales for delivering enhancement of marine and coastal habitats and species. It will also explain the work we are doing to engage with partners and work collaboratively to deliver enhancement activities, including restoration, that are most likely to deliver enhanced marine ecosystem resilience in Wales.

Contact: Katherine.Griffith@naturalresourceswales.gov.uk

Caroline Price & Dr Phillip Turner, The Crown Estate
Making space for nature recovery

The Crown Estate is a unique business whose purpose is to create lasting and shared prosperity for the nation. We work in partnership with UK and devolved governments, and a wide range of stakeholders, to support the long-term sustainable development of the seabed and coastline; supporting a range of industries, the net zero transition and nature recovery. As a business we recognise the need for restoration and within the Marine Business Unit we are working to provide the space for biodiversity and support a thriving marine and coastal environment. This presentation will outline our ambitions and the initial steps we have taken to support nature recovery, including: recent updates to our licencing process, investment in projects and independent research, as well as work to improve our evidence base and understanding of the opportunities for habitat creation and restoration in our areas of ownership. Through these examples we will highlight some of the opportunities we have identified and the challenges we are experiencing when trying to make space for nature recovery.

Contact: Caroline.Price@thecrownestate.co.uk and
Phillip.Turner@thecrownestate.co.uk

Session 3

ACTION: Practitioners' experience from the frontline

Showcasing practical action

Speakers will demonstrate a range of successful restoration initiatives for estuarine & coastal habitats and species - from local to seascape scale. Insights into the journey from vision to reality will offer inspiration to increase the pace & scale of restoration, as well as providing a horizon scan of the new wave of projects starting their journey.

Chair: Dr David Tudor, Blue Marine Foundation

Amelia Newman, Ocean Conservation Trust
Restoration of Zostera Marina within two SACs for LIFE Recreation ReMEDIES

LIFE Recreation ReMEDIES (Reducing and Mitigating Erosion and Disturbance Impacts affEcting the Seabed) is a partnership project, funded by the EU LIFE programme and led by Natural England in partnership with Ocean Conservation Trust, The Royal Yachting Association, Marine Conservation Society, and Plymouth City Council/Tamar Estuaries Consultative Forum. The project focus is the impact of recreational activities on sensitive habitats through, reducing recreational pressures, restoring the habitat and promoting awareness of these habitats and their importance.

Seagrasses are a unique marine plant in their own right, while also providing key ecosystem services and mitigating human impact on the environment. This importance is acknowledged by seagrasses being included as an Annex 1 habitat in the EU Habitat Directive. ReMEDIES represents' England's largest seagrass restoration effort to date, aiming to plant eight hectares across Plymouth Sound National Marine Park and the Solent Maritime Special Area of Conservation. A variety of restoration techniques have been trialled, yielding some very promising results as well as highlighting a range of challenges. ReMEDIES still has a year to go but the lessons learnt are already being transferred to wider restoration projects and pointing the way for methods to enable scaling up.

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Contact: Amelia.Newman@oceanconservationtrust.org

Mike Williams, FCRM Advisor (Habitat Creation), Environment Agency
Adapting to Climate Change – The Lower Otter Restoration Project

The Lower Otter valley, like so many estuaries, has been heavily modified over hundreds of years. In the case of the Otter, almost three quarters of the natural intertidal area was enclosed with an embankment at the start of the 19th century, converting it to low quality grazing pasture. The river was left with virtually no floodplain and when in flood would fill the area behind the banks for long periods. Infrastructure, including a road, footpaths and a cricket club, was regularly inundated and unusable. Climate change was exacerbating the problem with flooding becoming more frequent and the embankments were at risk from rising sea levels.

The Environment Agency, working with the landowner Clinton Devon Estates, is close to completing a managed realignment project that demonstrates that it is better to act pre-emptively rather than wait for inevitable failure. The Lower Otter Restoration Project will restore 55ha of inter-tidal habitat; reconnect the river to its floodplain; raise 600m of road above flood levels; improve access on 3.3km of footpaths; construct a 70m footbridge to maintain access along the South West Coast Path; return the Budleigh Brook to a natural channel; and safeguard a former landfill.

Much of the funding for the project has come from UK government through FCERM grant in aid, with additional funds and land provided by the Estate. We also secured ERDF funding through the Interreg France Channel England programme and have worked with a partner project on the Saane valley in Normandy, France. PACCo – Promoting Adaptation to Changing Coasts – has produced a freely available guide with useful information for others working on similar projects.

More information is available here:
Lower Otter Restoration Project
Promoting Adaptation to Changing Coasts (pacco-interreg.com)

Contact: mike.williams@environment-agency.gov.uk

Natasha Lough, Natural Resources Wales
Wales Native Oyster Restoration Project 2020-2023

In 2019, NRW secured funding through the European Maritime and Fisheries Fund (EMFF) to undertake native oyster restoration trials in the Milford Haven waterway, between February 2020 and March 2023 (the Wales Native Oyster Restoration Project (WNORP). The three-year project focused on the establishment and monitoring of several trial restoration plots to establish whether native oyster restoration is feasible and/or to identify any potential barriers to a more comprehensive and widescale restoration effort in the Milford Haven waterway or other potential areas around Wales. The aim of the WNORP is to address questions around the approach and feasibility of native oyster restoration in Wales, specifically assessing the influence of factors such as oyster density, deployment methodology, recruitment and survivability.

Approximately 20,000 juvenile native oyster, *Ostrea edulis*, were introduced across several sites and using different approaches between October 2020 – Feb 2021. The current talk summarises the findings and outlines the next steps for oyster restoration in Wales.

Contact: Natasha.Lough@cyfoethnaturiolcymru.gov.uk

Celine Gamble & Dr Alison Debney, Zoological Society of London
Creating steppingstones to seascape scale recovery

The Zoological Society of London (ZSL) is leading a variety of collaborative efforts to restore and recover marine habitats, aiming to achieve seascape scale recovery. This presentation focuses on ZSL's initiatives in creating steppingstones towards seascape scale recovery, highlighting project case studies that demonstrate progress, challenges, and the potential for scaling up restoration efforts.

The *Wild Oysters* project, a national collaboration led by ZSL, the Blue Marine Foundation, and British Marine, aims to restore Britain's seas by reviving native oyster populations. Working with marine industry stakeholders, local communities, and organizations across England, Scotland, and Wales, the project establishes restoration sites. The presentation will feature a brief summary of the progress achieved at these sites, highlighting the importance of local collaborative partnerships in achieving successful restoration projects.

The *Essex Native Oyster Restoration Initiative (ENORI)* will also be presented, featuring a summary of the work undertaken to date and next steps. This collaborative effort brings together oystermen, environmental conservation groups, academia, and government agencies. The shared vision is to establish self-sustaining native oyster populations in the Essex estuaries, benefiting the ecosystem, supporting sustainable fisheries, and enhancing biodiversity while acknowledging their cultural significance.

The *Restoring the Thamescape* project aims to restore seagrass, saltmarsh and native oyster habitat across the Greater Thames Estuary in a holistic and integrated way to create cleaner water, sequester and store carbon, increase biodiversity and reconnect communities with their local blue spaces. Our pilot project, focused in the Medway and Swale Estuary, Kent, has mapped and assessed nearly 40 hectares of intertidal seagrass meadows, confirmed the presence of residual native oyster populations, and has initiated seagrass restoration trials in 2024. The presentation will outline the progress so far and our future plans.

Drawing upon the lessons learned from these projects, the presentation will highlight how they serve as steppingstones towards seascape scale restoration. By showcasing the progress, challenges, and potential for scaling up restoration efforts, this presentation shares insights gained from ZSL's active restoration work, the preservation of vital marine habitats, and ultimately contribution to the broader goal of seascape recovery.

Contact: celine.gamble@zsl.org and Alison.Debney@zsl.org

Dr James Wood, North Sea Wildlife Trusts & **Samir Whitaker**, Ørsted
Wilder Humber

A collaborative new project between Ørsted, Yorkshire Wildlife Trust and Lincolnshire Wildlife Trust, the 'Wilder Humber' programme is designed to assess the impact and influence of combined marine and transitional habitat restoration in its natural succession chain. Trialling two demonstrator sites over ten hectares, we're implementing a restoration programme connecting sand dune, saltmarsh, seagrass and native oysters sites. This approach to Seascape restoration intends to address key questions over the suitability of single species or habitat restoration, or the potential enhancement available through combined approaches.

Supported by a comprehensive monitoring programme a key aspect of these demonstrator sites will be determining a series of proxies and measures of restoration success and its influence on the estuarine environment. Surveys encompassing measures for fish, avian, water quality, sediment, habitat complexity, geomorphology and ecosystem services are intended to generate a comprehensive baseline and on-going assessment of restorations impact. In addition the outputs and learnings from these sites will be used to develop a roadmap model for seascape restoration in the UK as well as inform projects in other geographies.

This presentation will briefly detail our restoration approach, novel techniques and monitoring measures. It will also consider the need to manage and finance such projects over the long term and introduce a few opportunities linking to emerging government policy and corporate biodiversity commitments.

Contact: james.wood@ywt.org.uk

Louise MacCallum, Blue Marine Foundation
The Solent Seascape Project - lessons from our first year

The *Solent Seascape Project* is a multi-habitat, multi-partner, multi-million dollar seascape scale marine habitat restoration initiative. Led by the Blue Marine Foundation, the Solent Seascape Project partnership includes eNGOs, regulators, harbour authorities and local councils. The project is focussed upon four key habitat types – oyster reefs, seabird nesting sites, saltmarshes and seagrass meadows – habitats already present in the Solent region but found in a degraded and fragmented state. Funded by the Endangered Landscapes Programme, the Solent Seascape Project is divided into five key workstreams – better protection and management of existing habitats, active restoration, scientific monitoring of the benefits of seascape scale restoration, policy advocacy and development of sustainable financial mechanisms, and community engagement. Project partners will work with Solent stakeholders to co-design a vision to restore the Solent seascape, tipping the balance from a degraded state to a naturally expanding, connected and productive ecosystem.

This talk will further describe the existing state of nature in the Solent and the anthropogenic pressures it faces. Attendees will hear more about the project's workstreams, achievements to date and the lessons project partners have learned about marine habitat restoration in the Solent during our first year.

Contact: Louise MacCallum, Solent Project Manager, Blue Marine Foundation
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Web: https://www.bluemarinefoundation.com/projects/solent-seascape-project/

DAY 2 – Wednesday 12th July

Session 4

CONNECTION

For people and nature - partners from catchment to coast

Connecting people, place and perspectives is essential to achieving better ecological outcomes for people and nature. Speakers will share systems approaches, examples of coastal coordination & the ambitions of the seascape statement.

Chair: Dr Natasha Bradshaw, Ocean & Coastal Futures

Matthew Service, AFBI [please define]
Soil to Sea - A Northern Ireland Perspective

In 2003 a programme of work was established to develop an ecosystem modelling framework to support the shellfish industry in Northern Ireland, with the goal of providing a dynamic modelling tool to help inform management decisions (Ferreira et al 2018).

The tools have been continuously developed to allow Ecosystem Health (Water quality and eutrophication) to be investigated through assessing the ecosystem services provided by the shellfish and other filter feeders. Integration of catchment models evolved through the enhanced application of the ecosystem model to include inputs from the catchment routed through the rivers to the coastal models. Recent developments have expanded on this work, linking catchment models (Soil Water Assessment Tool, SWAT) to the coastal models to look at the source and fate of (land based) nutrients and bacteria. The novel integration of outputs from Waste Water Treatment Works in the modelled catchments provide a clearer picture of potential sources and sinks for contaminants.

The SUCCESS (System for Understanding Carrying Capacity, Ecological, and Social Sustainability) modelling framework uses a catchment to coast approach and can partition organic and inorganic loading from disparate sources, resolve primary production, and simulate ecosystem responses. Bottom-up control due to reduction of land-based loads can result in a 40% reduction in shellfish harvest, and that top-down control of phytoplankton and organic detritus by cultivated and natural filter-feeders can reduce the percentile 90 of chlorophyll (i.e. the typical maximum) by over 20%. These results have important consequences for water quality and human use and illustrate the complexity of integrated coastal management in multi-use systems.

The capacity to analyse source apportionment from land, interactions at the open ocean interface, environmental effects, and key biogeochemical processes at the bay scale, as a digital twin of the soil-to-sea continuum, makes it an important toolset for policy-makers managing complex coastal systems

Reference: Ferreira, J., Corner, R., Moore, H.M., Service, M., Bricker, S., Rheault, R. (2018). Ecological carrying capacity for shellfish aquaculture—Sustainability of naturally occurring filter-feeders and cultivated bivalves. Journal of Shellfish Research, 37(3):1-18.

Contact: Matt.Service@afbini.gov.uk

Konstancja Woźniacka , Ecosystem Services Intern at Seafish
Evaluating the benefits of bivalve bio-extraction for water quality improvement - A Case Study in the UK

Water quality is a critical concern due to issues such as sewage pollution and agricultural runoff, leading to nutrient-rich waters and excessive marine plant growth, as well as depleted water oxygen levels. The project, funded by the Fishmongers Company and Seafish, in collaboration with the Agri-Food and Biosciences Institute (AFBI) and Longline Environment Ltd., aims to assess the value of bivalves' natural filtering abilities in removing excess nutrients from the water. The study focuses on the contributions of commercially important bivalve species, including blue mussels, Pacific oysters, Manila clams, and native oysters. Beyond their nutritional benefits and economic contribution, understanding the broader ecological role of bivalves can promote their sustainable cultivation as a food source and as a means of bioremediation. Here, the nutrient removal was assessed in two ways. The first approach in estimating the nitrogen removal by bivalves was through a function of their weight and nitrogen content. The second approach was through Farm Aquaculture Resource Management (FARM) model which uses diverse scenarios involving different shellfish species, geographical regions, and aquaculture practices.

By quantifying the economic benefits of bivalve bioextraction through avoided cost, this study demonstrates the potential for bivalve aquaculture to contribute to water quality improvement in a natural and cost-effective manner. The results have the potential to inform policy decisions, support the promotion of bivalve cultivation across the UK, and pave the way for sustainable seafood production practices that enhance ecosystem health. The findings of this research also provide the foundation for further work on valuing bivalve ecosystem services in the UK and contribute to the development of best practices for bivalve-related nutrient removal management programs.

Keywords: bivalve bioextraction, water quality improvement, ecosystem services, economic valuation, shellfish aquaculture, nutrient management, sustainable seafood production.

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Dr Andy Rees, Plymouth Marine Laboratory
Towards a catchment to coast understanding of the transport of material between land to the coastal sea

PML have been involved in research activities to investigate the transport of material from the River Tamar catchment to the Western English Channel since 2017 through

UKRI-NERC funded projects LOCATE (Land-Ocean Carbon Transfer – 2017 to 2022) and AgZero+ (Towards sustainable, climate neutral farming – 2022 to 2027).

We recognise that natural variability, climate change and anthropogenic perturbation act independently and synergistically. Under this matrix of pressures we seek to:

1) determine the nature and quantity of land derived carbon, nutrients and microplastics in estuarine and coastal waters
2) assess the contribution of agriculture to the transport of carbon and nutrients to coastal waters
3) understand the controls on the release of greenhouse gases CO_2, N_2O and CH_4 from aquatic systems between catchment and coast
4) investigate the use of nature-based solutions or ecosystem interventions as tools for mitigating against the effects of enhanced stressors of natural systems.
5) Determine the social and economic value of ecosystem services provided by the natural and managed environment.

Our approach combines regular observations and measurements throughout the catchment and out to 10km offshore which are integrated with both high resolution unstructured physical (FVCOM) and highly complex ecosystem (ERSEM) modeling of the system. Our long-term monitoring station L4 forms a part of our Western Channel Observatory and here we have over two decades of measurements which provide the base for our interrogation of changes over time. We have shown that estuarine waters are able to influence coastal waters at least up to 10km offshore and that nutrients and organic material supplied from freshwater contribute to the significant release of greenhouse gases from estuarine environments.

Contact: apre@pml.ac.uk 01752 633410

Dr Joanne Preston, Institute of Marine Sciences, University of Portsmouth
Developing the evidence base and consensus to achieve seascape scale restoration in temperate coastal ecosystems

Temperate coastal and estuarine biogenic habitats such as seagrass meadows, saltmarsh, kelp forests and oyster reefs, have been decimated globally. Societies understanding of the value and importance of these habitats is increasing as our dependence on the ecosystem services that they provide is brought into sharp focus by the dual climate and biodiversity planetary crises. Faced with a clear challenge to mitigate climate change impacts from increased GHG emissions, and reverse the global biodiversity loss trajectory, we need to maximise the ecosystem service gains from marine restoration actions.

To help achieve this goal, in Nov 2022 the UK's first symposium on ecological connectivity across temperate coastal habitats was held at the Zoological Society of London, with an explicit aim to provide a comprehensive review of the current state of science surrounding habitat connectivity in temperate coastal systems. The symposium served to initiate a seascape network of scientists, policy makers, restoration practitioners – forging new collaborations, facilitating knowledge

exchange across specialist habitat research groups and bridging communication gaps between scientists and policy makers. An overview of reach and impact is given, alongside an overview of the key outputs to be delivered from the symposium and associated workshop, and how these contribute to the aims of the ReMeMaRe Connectivity in Estuarine, Coastal and Transitional Ecosystem Restoration (ConnECTER) Special Interest Group (SIG) and the wider goals of scaling up coastal habitat restoration.

The Seascape Restoration Statement will be presented: a collective statement emerging from the above efforts, which advocates for a seascape scale approach to coastal habitat restoration, based on expert opinion, ecological theory, and evidence of the ecological connectivity across temperate biogenic coastal habitats. As a collective effort, we will also provide the timeline and mechanisms for consultation and feedback on the Seascape Restoration Statement, Report, and associated scientific evidence paper.

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Michael Thompson, Mott MacDonald
Nurturing nature-based solutions to support net gain across dynamic coasts

Biodiversity Net Gain (BNG) is a central way in which development can bring both ecological and societal benefits. However, there are challenges in how it is defined, how it can be put into practice in the marine environment, and how developments secure gains within the stipulated time frames that are legislated.

This talk aims to outline net gain in terms of the development process. It also seeks to share some of Mott MacDonald's experience in planning and delivering sustainable developments to date. We will look at the challenges around achieving BNG, and outline how Marine Net Gain (MNG) differs. A focus of the discussion is how Nature-based solutions (NbS) contribute to securing gains, in particular in relation to the rate of coastal change, and understanding what is needed to develop workable solutions.

Projects covered include coastal management schemes, touching on handling managed re-alignment, and wastewater treatment solutions with accompanying habitat creation. We will also discuss the link between net gain and compensatory habitats requirements, connectivity, and our current understanding of what, where, when and how these can be undertaken.

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Hellen Hornby, Project Development Manager, Groundwork
Revitalising our Estuaries – Grey to Green Coasts and Communities

Revitalising our Estuaries (RoE) was a rapid 18-month project that has delivered a programme of nature restoration and community engagement across the six major river estuaries in northeast England. The project was supported by Department for Environment, Food and Rural Affairs (Defra) and the National Lottery Heritage Fund (NLHF) through their Green Recovery Challenge Fund (GRCF).

Revitalising our Estuaries was delivered from September 2021 to March 2023, with a three-month extension granted to ensure completion of approved purposes through to the end of June 2023.

The aims of the project were to:

- Restore and improve 464 hectares of estuary habitat and riparian corridors connected to six estuaries covering the northeast coastline, creating six innovative channel or bankside estuary habitats through Nature-based Solutions.

- Connect people to nature by direct engagement with 6,000 local residents through educational visits, events, volunteering and citizen science activities and provide opportunities for 85,000 with improved access to nature

- Focus on increasing skills and employment opportunities for 38 young people in the region supported by four staff within Groundwork NE and Cumbria, increasing the resilience of the host organisation

The six estuaries and coastal areas covered by the project were:

- Wansbeck: Ashington and Choppington area
- Blyth: Port of Blyth and Bedlington Country Park
- Tyne: Newcastle Quayside, Gateshead and South Tyneside
- Wear: Sunderland (north bank)
- Tees: Hartlepool, Stockton, Middlesbrough and Redcar & Cleveland
- Esk: Whitby.

RoE has led the way in pioneering estuarine Nature-based Solutions (NbS) for habitat enhancement and restoration, impacting over 459 hectares of landscape. NbS are actions to protect, sustainably manage and restore natural or modified ecosystems, providing social and environmental benefits.

The project has improved nature across six costal estuary areas. This has been delivered through the completion of a habitat management project which was a key outcome from the consultation undertaken (mention when) with partners and landowners. Over £300,000 match funding from the Environment Agency, the Caterpillar Foundation, NE1 Limited, South Tyneside Council, Northern Directions, Northumbrian Water and Organon have enabled these improvements to take place.

A video summarising the project can be viewed here: https://youtu.be/59-69dC7Iu0

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Amy Pryor, Coastal Partnerships Network
Building a national framework for coastal coordination

Since 2021, the Coastal Partnerships Network (CPN) has secured funding through the Championing Coastal Coordination Fund to lead a national cross sector collaboration to develop a National Framework for Coastal Coordination (NFCC) for the whole UK inclusive of Devolved Administrations. The ongoing development is based on recommendations co-designed 2021-22 and include six High Level Objectives that form the component parts of the future NFCC:

- NFCC Leadership Group - a national cross-sector group formed to:
    - Oversee and inform the evolution and establishment of the NFCC
    - Be the Coastal Champions for their sector and engage others to diversify the group and secure support over the long term
    - Transboundary WG
- SMART Target and Delivery Prioritisation – developing the detail of what the NFCC will support delivery of across socio-economic and environmental targets.
    - Prioritising delivery of coastal habitat restoration and planning through Regional Demonstration Projects in the NW, NE and SE
    - Working with the RSPB and ALBs particularly the EA and Natural England on target setting
    - Coastal Data Explorer expansion and evolution
- Building Capacity Programme – developing a programme to support upskilling in both technical delivery and enabling collaboration across sectors.
- Coastal Communications Hub – a one stop shop for all coastal messages, resources and collaboration.
- Monitoring and evaluation – development of an appropriate approach to monitor and evaluate the impact of Coastal, Estuary and Marine Partnerships (CEMPs) and others. Crucial to proving the Return on Investment (ROI) in the social and knowledge capital of partnership working and how this leads to accelerated natural capital delivery.
- Advocacy through supporting the OneCoast Coalition and the Coastal Communities APPG. This provides a mechanism for synthesis of environmental evidence with socio-economic to shape future policy and achieve a more integrated approach for implementation and in government funding streams.

Links:

- CPN 3Cs Pilot Phase Final Recommendations Report 2021-22

OneCoast Coalition commissioned report summarising how the Levelling Up agenda is failing coastal communities and environments: Coastal Communities on the Edge

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Session 5

BARRIERS AND OPPORTUNITIES

Scaling up our experiences

Are the enablers in place to meet our ambitious targets for estuarine and coastal restoration? Speakers will share examples of new opportunities and progress being made to enable restoration in a changing landscape of rising ambition. They will highlight the key drivers, the barriers and opportunities that come with this changing landscape and examples of the progress being made.

Chair: Ben Green, Environment Agency

Eve Leegwater, Environment Agency
Enabling restoration through the regulatory system

With estuarine and coastal habitats gradually being lost on a global scale over the past few centuries, along with the added challenges of climate change, their restoration and enhancement has never been more important. Yet, restoration and recovery progress is slow and change is needed.

Whilst recognising the importance of good marine regulation and the improvements in service, feedback has told us that licensing and permitting costs for restoration activity can be prohibitive for Non-Governmental Organisations. Recent case studies suggest the relevant consents required for a project can cost 5-20% of project funds. Furthermore, the multiple layers of regulation can lead to significant delays in restoration activity taking place.

The UK Governments 25 Year Environment Plan (25YEP) commits to reversing the loss of marine biodiversity, restoring it where practicable. The 25YEP commitments are now supported by the Environment Act 2021, with planned actions set within the Government's Environmental Improvement Plan. This includes a target to restore or create in excess of 500,000 hectares of a range of wildlife-rich habitats outside protected sites, compared to 2022 levels, by end of 2042. To help achieve these targets and commitments, an enabling environment is needed through regulatory processes to promote estuarine, coastal, and marine habitat restoration for public and environmental good.

A good deal of supportive policy, legislation and targets already exists, but much more can be done to support restoration activity. This is especially clear where organisations are carrying out the work solely for environmental good and where the outcomes help achieve Government targets. However, to assist the enabling, restoration projects need to have the right information upfront, which can be achieved by following guidance and standards. A good example of this is set out through the restoration handbook series developed under the Restoring Meadows, Marsh and Reef initiative.

Various enabling solutions are explored at different scales of practicality and difficulty under current policy and legislation, from better guidance and training for case officers, to larger changes in the regulation process and even at policy level.

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Susanne Armstrong, ABPmer
Recent advances in the beneficial use of dredge sediment for restoration

Over the last few years, we have witnessed a flourishing of activity and interest in the beneficial use of dredged sediment for coastal habitat restoration. Several valuable and pioneering projects have been completed, and further initiatives undertaken to provide the information needed to deliver such projects. This includes initiatives promoted and supported by the national Beneficial Use Working Group, led by the Environment Agency ReMeMaRe team, including production of the new handbook and online data-portal.

This attests to the ever-growing desire, amongst all parties involved in dredging and habitat restoration, to make better use of the large volumes of sediment dredged from our ports and harbours every year. This paper will summarise the progress being made and highlight the value of

- Strategic resource mapping and applications to licence new inshore beneficial use sites (e.g. by the Solent Forum);
- Regular placement of dredged sediment alongside a vulnerable marsh by the Lymington Harbour Commissioners;
- Development and trialling of a new 'drag box' device developed by Land and Water Services and Earth Change.

These and many other initiatives have helped to change the way we think about where and how we can use dredged sediment. But change in this sector is not easy. There are many major, often very real, issues that restrict the amount of sediment that can be used and the locations for restoration. These issues can be practical, social, financial and environmental.

While these issues, and associated regularly challenges, are recognised, it is very clear that we can do more. To achieve that we must continue to do what we are

doing, including actively sharing the findings from projects and the new lessons learned to drive the delivery of more and larger initiatives.

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Evonne Maxwell, Jacobs
Nurseries and aquaculture – scaling up for restoration

In England, recent centuries, have seen the loss of seagrass meadows from up to 50% of the water bodies where it was once found, 85% of saltmarsh and over 95% of native oyster reef. ReMeMaRe has ambitious habitat restoration targets equating to restoration of approximately 5,325ha of saltmarsh, 550ha of seagrass and 100ha of native oyster beds by 2043. In order to meet these targets, there will need to be a significant increase in the scale of restoration activities and projects being undertaken, which may result in increased requirement for sustainable saltmarsh, seagrass and oyster source material such as seedlings and spat.

Through a combination of desk study, online questionnaires and telephone interviews with parties currently involved in the saltmarsh, seagrass and oyster sector, this study reviewed the existing nursery and hatchery facilities in the UK, along with a few international examples, exploring the different methods, processes and set-ups currently used for production of saltmarsh, seagrass and oyster source material. An assessment was undertaken of the feasibility of upscaling nursery and hatchery facilities to meet anticipated demand, presenting the advantages, disadvantages and relative costs of various options. Recommendations are provided for a way forward with nurseries and hatcheries supporting restoration efforts.

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Peter Barham, MBE, Chair SUDG
Net Gain - an opportunity for marine industries

The Seabed User & Developer Group (SUDG) represents oil and gas, renewable energy, marine aggregates, ports, subsea cables, recreational boating and carbon capture. Marine industries make an essential contribution to the UK economy, critical infrastructures and the move to net zero. Members have a common interest and commitment to sustainable development and we believe that sustainable win-win solutions are possible from what are sometimes seen as competing needs. We are committed to working with Government, its agencies and other stakeholders, such as The Wildlife Trusts and RSPB, to develop cost-effective regulation and marine management that benefits both industry and the environment.

No one will argue that we are in a biodiversity crisis which affects the coastal and marine environments as much as everywhere else. We have had over fifty years of environmental legislation aimed at protecting the environment, but for many reasons we are still seeing deterioration. This cannot go on. We have been working with Government and its agencies while they develop approaches to net gain and

our current position is that industry widely supports the opportunity to contribute to delivering net gain and recovery and there are already many examples where this is happening voluntarily. What is critical is that the positivity of industry to net gain must be maintained so that we can work in partnership on delivering real conservation and not 'greenwash'. To do so requires net gain to be simple and effective, we must avoid undue bureaucracy and it must also be proportionate. It must also be recognised that industry cannot be alone in delivering recovery and that there is a huge role for others as well. This talk looks at some of these points in further detail.

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Zahra Ravenscroft, Environment Agency
Tees Tidelands - A coastal restoration BNG case study

The Tidal Tees Estuary is a complex matrix of industry and nature. In the current 6-year Environment Agency capital programme we have committed over £30 million to deliver projects that seek to provide flood resilience to the communities and industry on Teesside. These projects take a nature-based approach, re-naturalising the estuary by removing tidal structures and breaching coastal defences. The programme supports the FCRM strategy which sets out a plan of action to ensure we are a nation ready for, and resilient to flooding and coastal change – today, tomorrow and to the year 2100.

The 3 long terms ambitions are:

- Climate Resilient Places
- Today's growth and infrastructure in tomorrow's climate
- A nation ready to respond and adapt to flooding and coastal change

Delivering coastal restoration in a changing policy landscape provides new challenges. Zahra will highlight these challenges, and the process applied by integrated project delivery teams to work with DEFRA, Natural England, and local planning authorities to overcome and pioneer ways of working.

Specifically, a placed- based approach to biodiversity net gain and natural capital assessment will be summarised.

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Adam Rowlands, RSPB Suffolk Area Manager & Anglian Eastern RFCC Conservation Representative
East Coast Flyway - Tentative UNESCO Natural World Heritage Site

Adam will be presenting the exciting prospect of an East Coast Flyway (Humber-Thames) Natural World Heritage Site (NHWS), recognising the importance of our coastal wetlands and providing a framework for their positive future management. The East Coast Flyway (ECF) is globally important for migratory waterbirds and for its

nearly contiguous complex of ecologically connected and immensely variable coastal wetlands. The ECF was added to the UK Tentative List following a review, some ten years since the last, led by the Department for Culture, Media and Sport advised by an Independent Panel. This resulted in the ECF addition, just one of five new sites added to the list now totalling seven sites to be considered for UNESCO NWHS status. One very important aspect of the potential inscription is that we do not see this as an additional layer of protection, as our 21 coastal SPAs from the Humber to north Kent already benefit from legal protection. What the framework of a World Heritage Site will bring is the framework to positively manage future change through common understanding of the Outstanding Universal Value, greater collaborative working and the ability to make sound decisions in the context of the network of sites comprising the East Atlantic Flyway, stretching from southern Africa to the high Arctic. NWHS status provides significant opportunities for nature-based tourism, development of education programmes to pass understanding of the Outstanding Universal Value to future generations, maintenance of sustainable fisheries and a potential draw for inward investment.

Web: East Coast Flyway | World Heritage UK

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POSTERS

Gordon J. Watson, Jonathan Richir, University of Portsmouth
Two decades of water quality data: The mining of governmental databases to see if things have really got better.

Successful coastal management requires extensive water quality monitoring for nutrients released from terrestrial agriculture and human sewage. Reducing these inputs is essential for achieving clean and healthy seas now, but most importantly, habitats that are targets for restoration require good water quality to be healthy and thrive. If poor water quality (a key driver for the loss and degradation of these habitats) has not improved then the success of restoration will be in doubt. For over 20 years relevant data (e.g. nutrients, turbidity) have been collected by agencies (e.g. Environment Agency) from hundreds of sites. These are then placed in publicly-accessible repositories. However, these data-sources are extremely challenging to work with due to a) database size (several million data points), b) frequent changes in sampling techniques; c) inconsistent data coding and d) limited site-specific data. Using big data approaches we will present data on temporal changes in water quality using Langstone Harbour, as a case study. The results will inform decisions on the location of future restoration projects within the Solent.

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Oliver Thomas, Marine Research Plymouth.
Magic meadows: A case of Intertidal seagrass restoration without intervention

Over the past 20 years intertidal seagrass meadows, unlike subtidal seagrasses, have been recovering both across Europe and within the UK. One such example of this is observable In the Tamar estuary in Southwest England. Here over the past 7 years the intertidal seagrass *Zostera noltei* has successfully colonised bare mudflat and established two new stable meadows. There is no historic evidence of seagrass at either site, and both instances seem to have occurred without any direct anthropogenic intervention. Yet despite their resurgence there is still scant evidence detailing the underpinning functions, nature and magnitude of ecosystem services provided by UK intertidal seagrass meadows.

As well as examining the drivers behind restoration within the Tamar, this PhD project explores two data poor areas: Blue carbon storage and biodiversity value of intertidal *Zostera noltei* meadows. We utilise the newly formed Tamar meadows to gain an understanding of the services provided by restored meadows, and how these compare to bare sediment control sites and older more established meadows in the Southwest. Early data suggests that these meadows are important refuges for

ecologically sensitive species of macrobenthos, play an important role in carbon storage over time, and whose restoration is potentially related to improvements in upstream water quality.

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Environment Agency, Coastal and Estuarine Assessment Team
Saltmarsh extent change and zonation in England

The latest mapped saltmarsh extent from Environment Agency monitoring in England (2016-2019) is 35,504.85 ha. This is an overall increase of 2342.75 ha (7%) compared with the baseline (2006–2009) figures. At a national scale, there were gains of 869.64 ha of saltmarsh within restored/created sites, including Hesketh, Steart and Medmerry. The largest positive net change outside of the realignment and tidal exchange sites were recorded in the Humber (26.2%) and Thames (8.3%) HCRP regions. The region with the greatest net loss was South Wessex (-2.5%).

The report is available here: https://www.gov.uk/government/publications/the-extent-and-zonation-of-saltmarsh-in-england-2016-2019

The latest saltmarsh extent and zonation inventory: https://www.data.gov.uk/dataset/0e9982d3-1fef-47de-9af0-4b1398330d88/saltmarsh-extent-zonation

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Environment Agency, Coastal and Estuarine Assessment Team
Seagrass monitoring in the Lower Thames

The EA began monitoring seagrass for the Water Framework Directive in 2007. Local Thames Area teams survey for: areal extent (at the >5% cover level), average % cover using 1m x 1m quadrats placed randomly in each seagrass bed and species diversity. Overall there have been substantial gains in seagrass extent for the Lower Thames possibly in response to brighter, warmer summers that favour photosynthetic activity and also due to water quality improvements and from sensitively managing impacts from activities in the estuary. For the three sites, total extent has increased from 119 ha to over 167 ha since 2008.

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Elizabeth Hopley, Coast and Freshwater Team, Natural England.
Interagency Coastal Geomorphology Group.

A cross-agency group designed to encourage the sharing of research, understanding of best practice guidelines and facilitate the discussion of cross-cutting themes centred around coastal geomorphology.

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Environment Agency and Natural England
Draft Marine and Coastal Habitat Restoration Principles

The 10 overarching principles set out in the poster have been developed by the Environment Agency and Natural England as part of **the Restoring Meadows, Marsh and Reef Initiative (ReMeMaRe).** They are aimed to support anyone looking to undertake restoration (habitat enhancement or creation) in the estuarine, coastal, and marine environments.

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Cass Bromley, Corallie Hunt, NatureScot***Marine and Coastal enhancement projects in Scottish waters***

This poster will present maps showing the locations of active restoration projects; together with projects which are in the planning stages and are aiming to commence restoration work.

Contact: Cass.Bromley@nature.scot

Cass Bromley, Corallie Hunt, NatureScot
NatureScot's Marine and Coastal Enhancement Guidance

This poster will present the guidance package that NatureScot has developed to help practitioners navigate planning and setting up restoration projects.

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Charlotte Johnson, Natural England
Marine Restoration Potential: Mapping the Restoration and Recovery Potential for Marine Habitats

MaRePo is a proof of concept study to map the restoration potential of English threatened and declining marine habitats. The project produced maps of the current and historic extents of kelp, native oyster, maerl, horse mussel and sea pens, and created basic modelled restoration potential maps for these habitats in English waters out to 200 nm from shore.

It will supply evidence to support Natural England and Defra's work programmes on Marine Net Gain and Offshore Wind Enabling Actions programme (OWEAP). It will also provide an essential foundation for both potential marine habitat compensation and Marine Net Gain.

MaRePo is a partnership project funded by Natural England and The Crown Estate's Offshore Wind Evidence and Change (OWEC) programme.

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Will Manning, Environment Agency, **Jo Preston**, University of Portsmouth, **Graham Underwood,** University of Essex.
The ConnECTER Special Interest Group

Connectivity in Estuarine, Coastal and Transitional Ecosystem Restoration (ConnECTER)" Special Interest Group (SIG) was established as part of the "Restoring Meadow, Marsh and Reef (ReMeMaRe)" initiative (pronounced 're-memory'). The principal aims of the SIG are to better connect the community of academic and research scientists to temperate, estuarine and coastal restoration practitioners and facilitate upscaled and accelerated seascape scale restoration, by identifying and addressing gaps in our scientific knowledge and evidence base.

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Steve Colclough, Institute of Fisheries Management
Citizen science approaches for measuring natural capital within essential fish habitat inshore ecosystems.

Work for the IFM 2022 citizen science programme began before the award of the contract from Natural England. This meant that the groundwork for some surveys sites was done ahead of us starting the development of a wider programme for NE. This extra time gave us the opportunity to add in extra surveys for groups in areas that we hadn't surveyed before.

A multi-method fish survey strategy was developed in 2021 (recognised by the IFM as Best Practice) and delivered at a small number of sites with the support of partner organisations. The programme for 2022 included 11 estuaries and 13 different sites. The suite of methods employed included a 15m by 2.7 m micromesh seine net (3mm knotless mesh), an intertidal push net 1.5m by 2m (1mm knotless mesh) and small winged fyke nets (reducing knotless mesh 10,8,6.5 mm with 3m wings at 10mm knotless mesh). At least two of the methods were deployed at each site. Reports of each survey programme will be developed for the client base over the winter. The IFM have the agreement of all clients to freely share both data and reports with any other interested parties. IFM obtained all of the necessary legal consents and permissions unless stated otherwise. IFM provided full risk assessments for all sites unless stated otherwise.

Fish data from all sites bar the Medway and Thames accompanies each survey report. The data from the Medway and Thames surveys was collected by the Living River Foundation and Thames Estuary Partnership respectively. This data has been requested and will be supplied at a later date.

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Zoe Morrall, University of Portsmouth.
Maximizing data gathering for small fish surveys and eDNA sampling in the Solent: A collaborative approach.

The Solent estuarine strait, situated between mainland England and the Isle of Wight, is facing degradation due to human activities and climate change. To address this, the Solent Seascape Project (SSP) was launched in January 2023, the first of its kind in the UK, aimed at initiating seascape scale restoration and recovery through collaboration and partnership working.
The University of Portsmouth is working with the Environment Agency (EA), Southern and Sussex Inshore Fisheries and Conservation Authority (IFCA), and Local Harbour Authorities (LHAs) to enhance data collection for small fish surveys in restored seagrass meadows, saltmarshes, and oyster reefs within the Solent region. The primary objective of this study is to ground truth a suite of environmental DNA (eDNA) sampling techniques across these diverse sites.

Over a period of five years, small fish netting surveys, along with water and sediment sampling for eDNA analysis, will be conducted every six months at replicated habitat and reference sites across the Solent. This will provide data on the abundance, species diversity, geographical distribution and morphometrics of small fish species on a temporal and spatial scale. The fish survey data will be used to ground truth the marine eDNA fish sampling assays and compare the efficacy of each approach. This will aid in the development of accurate and efficient assessments of fish populations in temperate coastal habitats at small to regional seascape scales. Furthermore, the eDNA data will be used to inform and support the development of biodiversity credits.

Based on initial findings, future plans for 2024 involve expanding the project in collaboration with FISH Intel and Angling for Sustainability. This expansion will include fish tagging and the deployment of receivers on restored oyster reefs, seagrass meadows, and saltmarsh channels to study habitat utilisation and connectivity for commercially and ecologically important species. The movements and interactions of these tagged fish will be used to assess the effectiveness of habitat restoration efforts to create essential fish habitats and provide baseline data on structural and functional ecological connectivity across temperate seascape habitats.

The results of this collaborative effort will provide valuable information for sustainable management of key fish species and inform our understanding of the relationships between habitat structure, type, and inter-habitat distance on fish populations, and ecosystem connectivity across the Solent seascape.

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Judy Power, Tees Rivers Trust
Tees Rivers Trust

The Tees Rivers Trust is a charitable organisation founded in 2008, involved in the restoration of the River Tees from the source to the mouth.

In the estuary, Tees Rivers Trust focuses on recreating and restoring estuarine and coastal habitats using the TERI facility. The current projects focus on seagrass planting and oyster restoration.

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John Aldridge, Benjamin Cowburn, Cefas
Modelling tools to support coastal and estuary remediation

The CPM model was developed with funding from the Environment Agency to predict possible changes in phytoplankton and macroalgal biomass resulting from reductions in nutrient loading. The model has recently been extended to include seagrass, saltmarsh and mussel components allowing the consequences on nutrient and carbon cycling to be evaluated for a larger range of remediation options.

An example is given of the use of the model for predicting the effect of remediation by direct removal of macroalgal cover. Prolific growth of green macroalgae species driven by anthropogenic nutrient inputs can impact on the quality of coastal and estuarine environments by covering large areas with opportunistic algae, leading to a decrease in biodiversity and reducing invertebrate food supplies to seabirds and wildfowl. In model scenarios shown here, the physical removal of macroalgal biomass is predicted to give relatively short term benefits as the system can restore itself over a timescale of 1-2 months. This appears to be because macroalgal growth

in this scenario is nutrient limited. Removal of macroalgal biomass leads to enhanced nutrient availability, an increase in growth rate for the remaining macroalgae, and relatively rapid replacement of biomass. The effect on recovery of the timing of removal (mid-spring or mid-summer) and sensitivity to the macroalgal annual growth cycle are explored using the model.

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Lucy McMahon, University of York
Maximising blue carbon stocks through saltmarsh restoration.

Political discourse around coastal wetland restoration and blue carbon management strategies has increased in the past decade, yet carbon storage has neither been a reason for restoration, nor a criterion to measure the success of current saltmarsh restoration schemes in the UK. To maximise climate change mitigation through saltmarsh restoration, knowledge on the key drivers of carbon stock variability is required. This poster will summarise research from a paper recently published in the journal Frontiers in Marine Science. Restored saltmarshes of similar age, paired with adjacent natural marshes as references, were used to identify drivers of carbon stock following managed realignment within the Blackwater Estuary, Essex. From surficial soil cores (top 30 cm), carbon stock was measured alongside environmental characteristics. We found that carbon stock between natural and restored sites were similar after ~ 30 years when restored sites were above mean high water neap (MHWN) tidal levels. Elevated marsh platforms likely provide suitable conditions for the development of mature plant communities associated with greater capture and production of organic carbon. Restored sites elevated below MHWN tidal levels were observed to have a carbon stock 2-fold lower than those situated above MHWN tidal levels. As blue carbon is anticipated to become an important facet of saltmarsh restoration, we recommend that sites above MHWN tidal levels are selected for managed realignment or that preference is given to coastlines with a high sediment supply that may rapidly elevate realignment sites above MHWN. Alternatively, elevation could be artificially raised prior to realignment. Restoration schemes aiming to maximise climate change mitigation should also encourage the establishment of key plant species (e.g., *Atriplex portulacoides* in this study) to enhance carbon stocks. However, the overall goal of restoration ought to be carefully considered as trade-offs in ecosystem services may ensue if restoration for climate change mitigation alone is pursued.

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Nick Reid, Carol Peirce, Environment Agency.
Risk and Opportunity – Implementing Medway Estuary and Swale (MEAS) Flood and Coastal Erosion Risk Management Strategy
Background

The Environment Agency and our delivery partners are starting a 10-year programme of flood and coastal erosion risk management work in the Medway Estuary and Swale area.

The MEAS area covers 120km of tidal frontage, 11,000ha of SPA- and Ramsar-designated habitat, and 17,300 homes at flood risk.

What are we doing?

We have 19 hold the line and managed realignment schemes stretching across the tidal Medway and Swale and around the Isle of Sheppey that will protect communities, preserve wildlife and enhance habitats. Alongside the projects, we will explore options for and implications of stopping maintenance of defences.

Some of our projects will create saltmarsh and grazing marsh and we will explore nature-based solutions. Given the scale of this programme, we are thinking on a landscape-scale, looking for opportunities to enhance the environment, achieve multiple benefits and deliver on our ambitious targets for Biodiversity Net Gain and carbon.

How can people get involved/ find out more

We need to build partnerships with people and organisations who can bring innovative thinking and access to funding. The poster will highlight some of the potential opportunities that the programme presents and ask attendees to get in touch with us if they

- would like to learn more
- may be able to partner with us to help us deliver more for the environment
- have experience or advice to share
- have ideas for research opportunities

Contact: nick.reid@environment-agency.gov.uk

Nick Brodin, Berwickshire and Northumberland Marine Nature Partnership
Alex Kaars Sijpesteijn, Durham Heritage Coast
Coastal Restoration Planning on the North East coast

To deliver maximum benefits, coastal habitat restoration should be delivered in a strategic and integrated way. Local coastal partnerships are ideally placed to facilitate this by bringing together stakeholders to share knowledge and to collaborate on achieving local restoration ambitions. As part of the Coastal

Partnerships Network's 3Cs-funded National Framework for Coastal Coordination (NFCC) project, work has been taking place in North East England to produce a Regional Coastal Plan.

The work is being led on by the Coastal Network for Berwickshire and North East England. Workshops with partners have identified opportunities to expand or restore a wide range of coastal habitats including seagrass, saltmarsh, wet grassland, and dune. Participants requested that, in addition habitat creation and restoration, the final Plan should also capture measures to reduce pressures on existing habitats and improve their condition. The workshop discussions also flagged the vital role of local information sharing, skills development, and capacity building when delivering habitat restoration. Work on the Plan is ongoing and the next steps are to refine the information gathered, agree collaborative actions for delivery, and to integrate proposals with other coastal activity.

Contact: Nick.Brodin@northumberland.gov.uk

Peter Morgan, University of Portsmouth***Are Laminaria ochroleuca moving northwards? A spatial assessment of the ecosystem structure and function of kelp forests along the Southwest coast of the UK.***

We are using a transect which runs from Falmouth, Cornwall to Dover, Kent. We are investigating the North-Eastern range limits of the species and the resultant impact on the crucial function of kelp forests.

Contact: peter.morgan2@myport.ac.uk

Ryan Smith, School of Geography, Queen Mary University of London
MoRPh Estuaries Pro Tool

MoRPh Estuaries Pro is a field-based method for assessing and monitoring the physical habitat of estuaries. MoRPh Estuaries is complementary to MoRPh Rivers, making it easy to survey a river from the source to the sea with an integrated approach. The MoRPh Estuaries Pro Indices, which will form the basis of an Estuary Condition Assessment, have been developed, tested, and refined through field surveys at a variety of estuary field sites around the UK. In this poster, the method and development and testing of the indices is outlined.

Contact: ryan.smith@qmul.ac.uk

Chloe James, Lily Pauls, Natural Resources Wales
Restoring saltmarsh in the Severn Estuary - Polders at Rhymney Great Wharf

The Nature Networks programme is a three-year programme (2022-2025) funded by Welsh Government which aims to address the nature emergency in Wales through

increasing biodiversity, improving the condition of protected sites and enhancing the resilience and connectivity of our habitats and species. This is across terrestrial, freshwater and marine environments.

One of the marine projects forming part of this programme is the creation of saltmarsh at Rhymney Great Wharf (Cardiff) through polders. This project is building upon previous polder work carried out over 20 years ago in the area and seeks to restore and extend the saltmarsh to benefit biodiversity and improve the resilience of the SAC, SPA and Ramsar sites present. The environment in the Severn Estuary, with its extreme tidal range and sediment movements, presents challenges to the design of a long-term viable scheme. This project seeks to use the experience from other polder work in Europe and best available evidence to create a scheme which will be feasible, sustainable and managed long-term for biodiversity benefits.

Contact: lily.pauls@cyfoethnaturiolcymru.gov.uk

Hellen Hornby, Groundwork NE & Cumbria
Saltmarsh Restoration at Hebburn

200m of brushwood barriers have been installed on the existing saltmarsh at Prince Consort Road, Hebburn by Groundwork NE & Cumbria as part of the Revitalising our Estuaries project. This will help slow the flow of the river Tyne, allowing mud and sediment to build up, and in turn allow the native saltmarsh plant species to expand across the site.

Contact: hellen.hornby@groundwork.org.uk

Ocean & Coastal Jobs and Events

Advertising your vacancies, events & services through CMS

The **CMS Email** service continues to provide an engaging and cost-effective opportunity to advertise job vacancies, training courses/conferences and reports/publications to a wide audience.

Adverts are circulated to our 7,600+ contacts from the marine and water sectors who have strong experience of environmental, social and industry & issues. From June 2022 to May 2023, we circulated 357 adverts and have received very positive feedback from our clients:

"Using CMS advertising service was a great success for me. Their mailshot reached exactly who I wanted to tell about my event. All tickets were booked within 24 hours. I couldn't believe it! The process is quick and simple, the service is excellent. Will use again and would recommend to anyone who is looking to engage with the marine and water sector."
Tracey Hewett, Worklifemindfulness (June 2023)

"The quality of applications we received for our consultancy role was an order of magnitude better than the expensive, non-specialist platforms we previously used for equivalent roles. We were delighted with the response and service we received."
Daniel Jones, Uplift (April 2022)

"I used CMS to advertise for an important national coastal specialist role. The process was quick and easy and the advert reached all corners of the globe. I had a fantastic response with many high quality candidates to choose from."
Robert Rhodes, National Trust (September 2021)

How your advert is promoted
There are three main elements to our service:

1. The main service is provided by direct mailing your advert to our Jobs/Water/Marine contacts who have signed up to receive our mailings (between 3,900 and 5,700 subscribers)
2. Your advert is uploaded to the CMS website
3. The details are promoted again in the CMS Newsletters every Tuesday and Thursday; these mailings reach 7,600+ contacts. Your advert remains in the Newsletters until the application period closes.

Feedback
After the closing date we provide feedback on the click and open rates for both the direct mailing and the weekly publicity in the CMS Newsletters.

Cost
Our price remains very competitive; the cost is £180.00 plus VAT per advert

If you have any questions or would like to discuss further, please email or call Jayne.

Jayne O'Nions: jayne.onions@coastms.co.uk | 07759 134801

More great reviews from our customers:

"We've been advertising the Challenge of Science Leadership training course and it's derivatives with CMS for over 10 years and have developed a great relationship with the team over that time. They are always quick to respond and are flexible in their approach. We always get participants on our courses that have signed up because they received a mailout from CMS. I think that is a clear indicator of success."
Dr Martin Bloxham, Director, The Barefoot Thinking Company Ltd (June 2023)

"We recently advertised a training course with CMS and it was very effective – almost a third of our participants heard about the course through CMS. It is very straightforward to submit an advert and the CMS team are extremely helpful and efficient."
Imogen George, Dialogue Matters (October 2022)

"Great service. Received some very good applications. Communication with CMS was excellent and they are always very helpful."
Diana Fu, Brown & May Marine Ltd (May 2022)

"We've advertised a few times for ecological positions through CMS and have always received a good response from well qualified applicants. It represents excellent value for money."
Andy Webb, HiDef Aerial Surveying Ltd (December 2021)

"We have advertised a number of vacancies with CMS, they always provide an excellent service and are very helpful."
Sarah Murray, North Eastern Inshore Fisheries & Conservation Authority (February 2023)

The CMS news and advertising service is part of Ocean & Coastal Futures Ltd