



ReMeMaRe Conference 2024 Restoring Estuarine & Coastal Habitats

10 – 11 July 2024





ReMeMaRe Conference 2024

Restoration in Action Session Chair: Karen Daglish, South Tyneside Council

- Richard Unsworth, Project Seagrass
- Amelia Newman, Ocean Conservation Trust
- Maria Hayden-Hughes, Bangor University
- James McLean, Land and Water Family of Companies
- Will Manning, Environment Agency



ReMeMaRe Conference 2024

Restoration in Action Session

Richard Unsworth, Project Seagrass 10 years of seagrass restoration

experiments across the UK





Lessons from 10 years of seagrass restoration experiments - A whistle-stop tour

Dr Richard Unsworth Associate Professor, Swansea University Chief Scientific Officer, Project Seagrass

Saving the World's Seagrass For People, Planet & Biodiversity



PROJECT SEAGRASS

Seagrass restoration is new to the UK





Seagrass restoration is new to the UK







Collecting seagrass seeding shoots doesn't cause damage





Rees et al. In Prep

Habitat Suitability Modelling Not a Silver Bullet









Pen-y-Chain East 🖨 Pen-y-Chain West 📄 Y Gamlas



We need to talk about failure







Feedbacks appear from every angle





Unsworth et al. 2024 Rest Ecol

Water quality is hampering seagrass recovery

Swansea University Prifysgol Abertawe



Nutrients may not always be in the right place





Applying the marginal gains concept







Engagement with ALL stakeholders is critical





projectseagrass.

Seagrass restoration is difficult but is working











ReMeMaRe Conference 2024

Restoration in Action Session

Amelia Newman, Ocean Conservation Trust LIFE Recreation ReMEDIES: Restoration of Zostera marina along the UK Southern Coast







LIFE Recreation ReMEDIES: Restoration of *Zostera marina* along the UK Southern Coast

Amelia Newman

Ocean Conservation Trust

Seagrass Aquaculture Technician Lead

Andy Cameron, Miriam Cattermole, Fiona Crouch, Jasmine Gardiner, Caitlin Napleton, Mark Parry, Muriel Plaster, Hazel Selly, Jess Taylor, Fiona Tibbet



LIFE Recreation ReMEDIES (LIFE18 NAT/UK/000039) is financially supported by LIFE, a financial instrument of the European Commission.

Objectives



Improve the condition of Annex 1 marine habitats of European importance

1.Protect and reduce recreational pressures.

2.Demonstrate restoration and management techniques of Zostera marina.

3. Promote awareness and inspire better care by recreational users.



A Power Plant



One of the most valuable habitats on the planet

- Carbon capture
- Nitrogen removal
- Coastal protection
- Biodiversity hotspot
- Fisheries support
- Iconic species

conservation trust



ocean conservation trust





Restoration



LIFE Recreation





ocean conservation trust

LIFE Recreation ReMEDIES End of Project Conference

Seed Bags



LIFE Recreation

FDIFS



Seed Mat Technology







LIFE Recreation

FDIFS

Lab Monitoring

Average Canopy Height Over Time

LIFE Recreation



Number of Weeks

ocean conservation trust



SMT Monitoring

LIFE Recreation

Restoration

conservation trust



ocean conservation trust

HMS OCTOPUS





R

LIFE Recreation

FDIFS



Restoration



Mat Location with seagrass 2023/24

Mat Location without seagrass 2023

Mat Location 2022

VNAZ Makers

Licence Area

ocean

trust

conservation


Restoration

+ Cage location

- Mat Location with seagrass 2023/24
- Mat Location without seagrass 2023
- Mat Location 2022
- VNAZ Makers
- Licence Area



CENC

50

0

100

200 m



Restoration

LIFE Recreation

Restoration

LIFE Recreation ReMIDIES

Still to come



Monthly monitoring of both SMT and HMS for the rest of the year

ReMEDIES Final Project Report
 ReMEDIES Restoration Best Practice Guide
 ReMEDIES End of LIFE Conference 01/10/24 Plymouth

Expanding techniques to Blue Meadows (OCT)

conservation trust

Thank you for listening

Amelia Newman amelia.newman@oceanconservationtrust.org

Andy Cameron, Miriam Cattermole, Fiona Crouch, Jasmine Gardiner, Caitlin Napleton, Mark Parry, Muriel Plaster, Hazel Selly, Jess Taylor, Fiona Tibbet

saveourseabed.co.uk





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NATURAL



ReMeMaRe Conference 2024

Restoration in Action Session

Maria Hayden-Hughes, Bangor University The Wild Oysters Project: Charting progress through early monitoring results and future scaling







The Wild Oysters Project:

Chartering progress through early

monitoring results & future scaling

Maria Hayden-Hughes (she/her)

Research Lead, Bangor University

ReMeMaRe Conference, 11th July 2024











Why restore native oysters?







©2020, Native Oyster Network – UK & Ireland, Native Oyster Restoration Alliance.





BLUE MARINE FOUNDATION

Native

Oyster

One oyster can clean **200 litres** of water per day!

2

©Luke Helmer

The Wild Oysters Project Overview

Restoration hubs	located in	n North	East I	England	and
North Wales				-	

• Key activities:

× ×

- Seabed restoration plan development
- Oyster nurseries set up in marina locations
- Outreach & engagement







Oyster nursery monitoring

Monthly monitoring with the support of 500 local volunteers



9 BSc/MSc student projects

Monitoring data collected

Parameter	Sample size	Method	Frequency
Mobile biodiversity	12 biodiversity nurseries monitored	1mm mesh net around nursery. The contents rinsed into 1mm mesh sieve, into tray for identification.	Monthly, all year
Sessile biodiversity	9 Oysters randomly selected oysters per biodiversity nursery	Rinsed, images taken of dorsal and ventral side. BIIGLE used for analysis	Monthly, all year
Mortality	All oysters at all sites	Observational	Monthly
Larval monitoring	40 oyster submerged, at least 20 oysters opened and checked per restoration hub	Oysters submerged in 5% MgCl ₂	Weekly, June to September



Oyster nursery monitoring Results

Oyster growth

- Clear growth over the two years of shell measurement data
 - See Figure 1 for mean shell area per sample date over two years.

Oyster survival

- High average annual survival rate= 78%
- Mortality rates highest during summer months linked to spawning, see Figure 2
 for % mortality over time, split by marina location.

Larval monitoring results

- Spawning linked to 15°C seawater temperature threshold
- In total, estimated 500 million larvae have been released
 - In 2022, 2.2 million larvae released per oyster
 - In 2023, 1.8 million larvae released per oyster

Oyster filtration

- Filtered approximately 149 million litres of water
 - ~60 Olympic sized swimming pools
 - 200L of water filtered per oyster (Thomas et al., 2022)

Uttley, M., Hayden-Hughes, M., Tinlin-Mackenzie, A., Gamble, C. (eds) (2023). The Wild Oysters Project: Native Oyster Nursery Science Report. The Blue Marine Foundation.





Figure 2. Percentage of oyster mortality (black line), and the number of oysters spawning per month (blue bar) at Conwy Marina.

Oyster nursery monitoring Results

Mobile biodiversity

- Over 86 different species recorded within biodiversity nets. The most common taxa included: amphipods, shrimps, and shore crabs.
- 84 sightings of the Critically Endangered European eel
- Diversity varied seasonally, with the highest diversity observed during June & July

Sessile biodiversity

- Dominant taxa included: barnacles, keel worms, sea squirts, blue mussels, and hydroids.
- Dorsal side displayed higher abundance and richness of epifauna than ventral side of the shell.



Uttley, M., Hayden-Hughes, M., Tinlin-Mackenzie, A., Gamble, C. (eds) (2023). The Wild Oysters Project: Native Oyster Nursery Science Report. The Blue Marine Foundation.

6		Botrvllus schlosseri						
4		True Crab						
		Filamentous Macroalgae						
		Red Faunal Crust						
		Ostrea Juvenile						
		Sponges						
		Amphipoda Tubes						
A MAR		Red Erect Fine Branching Macroalgae						
		Branching Hard Bryozoan						
		Erect Hydroid						
	ŋ	Nudibranch						
-	Тах	Faunal Turf						
ζ,		Carcinus maenas						
		Branching Hydroid						
		Mytilus edulis						
C		Hydroid						
15		Orange Faunal Crust						
0.0		White Faunal Crust						
•		White Encrusting Hard Bryozoan						
× 29		Spirobranchus sp.						
•		Ascidians						
•		Acorn Barnacle						
•		0	%	20%	40%	60%	80%	100%
•				Percer	ntage of 1	ົotal Abເ	Indance	

Ventral Dorsal

Figure 3. Percentage of the total abundance of each taxa observed living on the oyster shells occupying either the dorsal or ventral she surface (n=862).



Restoration activities Tyne & Wear, Summer 2023

- Reef size of 75m by 100m, with a target reef height of 10cm.
- 750 tonnes of cultch, including Scallop shell and local stone, deployed off Whitburn Bay.
- 10,000 mature native oysters deployed within 25m x 25m box in the middle of the reef site at 16 per m² density







Restoration activities Conwy Bay, 2023/2024

- Target reef size of 75m x 100m, reef height 0.5m
- 650 tonnes of local limestone gravel deployed
- Method of deployment led to uneven distribution of material & unforeseen delays
- Next steps in 2024
 - 97 tonnes of Scallop shells and 50 tonnes of cockle shell and oyster deployment planned





Project learnings

- **Cultch storage and deployment** is costly, time consuming and challenging, and local logistical availability can be limiting.
- Marine Licensing & seasonality: Acquiring marine licenses are costly and time consuming and restoration activities are weather dependent. Include seabed levelling into MLA.
- Engaging on oyster reef deployment: Quarterly local working group meetings have been beneficial and vitally important. Use a variety of meeting formats, engagement methods to share information.
- Engaging with local fishers: involving fishers in planning provides valuable insights; engagement should be ongoing, and strategically prioritise on-the-ground interactions, utilise contact networks, and partner with fishers if feasible.
- **Oyster nurseries** are an effective engagement tool but time and capacity requirements should be revised in any similar projects.



Legacy & funding



Stronger Shores Partnership led by South Tyneside Council, with funding from the UK Government FCRIP. Funding three years of work at Tyne & Wear site:

- Scaling up seabed restoration work adding more oysters onto the reef, adding an additional site
- Detailed monitoring programme better understanding the benefits of native oyster restoration and wider marine habitat restoration.



Mewn Partneriaeth â Llywodraeth Cymru In Partnership with Welsh Government



Mewn Partneriaeth â Llywodraeth Cymru In Partnership with Welsh Government

Nature Networks Fund for three years to continue the Conwy Bay site and plan for seascape scale recovery across the SAC by:

- Continue oyster restoration activities trailing different cultch techniques, pilot oyster survival trials
- Consolidate existing work and update and groundtruth habitat suitability assessments
- Increase our local engagement work aiming to reach STEM groups and underrepresented communities, organise a knowledge exchange, workshop







Diolch | Thank you

CHANGING PLACE

CHANGING LIVES



THE WILD OYSTERS PROJECT PACT AND EVALUATION REPORT 2020-2024

ZSL Scotty Storest Storest

REPORT

DECEMBER 2023









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Wild.Oysters@zsl.org

30 @Wild_Oysters

@wild_oysters_project



ReMeMaRe Conference 2024

Restoration in Action Session

James Maclean, Land and Water Group Beneficial reuse of sediments for large scale saltmarsh restoration and the pressing need for support from environmental credits



Business Case for Nature Recovery at Scale

ReMeMaRe Conference 2024 James Maclean Chief Executive Officer The Land and Water Group





Progress to date – Itchenor (2.5ha loss pa!)





History

- Since 1946 59% loss (252 hectares)
- Eutrophic Negative feedback loop
- Itchenor; 8 hectares loss since 1946
- 2023 first 2000m2 fullscale trial

Lessons

- Shrinkage 10-15% (up to 500mm/year 1)
- Samphire year 1 (natural recolonisation)
- Henk, Isha, Jocelyn, Kathleen
- No sediment in channel



The Business Case for Nature Recovery "How Do We Do It?"



- Drag-Box technology works, is scalable no fluidisation in situ
- No containment natural gradient = no structure required
- Low impact on mudflat benthic population, Instant adoption by wading birds
- BuDS = Savings on dredging cycle times, **mitigates off-shore disposal** and weather risk.



Scaling Saltmarsh Restoration – Lymington





Lymington

- The Principle of the "Deponie"
- Breaks inter-dependency between the dredging program & environmental constraints
- 200 hectares Scaleable with wide benefits (Carbon, Nutrients, Natural flood defence, Green space, Species Diversity)
- Strong partnerships TCE, LHC, HIOWT, EC, L&W, Boaters, Public etc



The Business Case for Nature Recovery "A New Route to Revenue for Depleted Saltmarsh"

Region-¤

Humber¤

Irish-Sea¤ Isle-of-Man¤

Other¤

Scotland¤

Severn¤

Solent¤

Northern-Ireland[¤]

Changing Legislation – New Economic Drivers

- The Environment Bill Bio-Diversity Net Gain (BNG) *Its NOT MUDFLAT!
- Habitats Directive Nutrient Neutrality, Water Neutrality
- Net Zero Carbon Codes (Peatland, Woodland, Saltmarsh)
- Stacked benefits

Public Perception -

- 'Dumping at Sea (BUWG/APBMer)
 Thames/Essex#
 Wales#
 Total#
- Surfers Against Sewage
- Water Company Profits Vs Obligations

CEDA – Drive Change

- 1. Committed to change Support
- 2. Reuse = Default? Its NOT MUDFLAT!



Average Annual (m³) · 2020 · to · 2022 ¤

3,625,203¤

1,538,215¤

1,400¤ 87,677¤

2,982,972p

1,674,537¤

3,601,501¤

871,390¤

8,011,454¤

99,122¤

Quantity (m³) · 2020 · to · 2022 ¤

10,875,609¤

4,614,645¤

4,200¤

263,031¤

8,948,917¤

5,023,611¤

10,804,503¤

2,614,170¤

24,034,362¤

297,367¤





ReMeMaRe Conference 2024

Restoration in Action Session

Will Manning, Environment Agency Habitat Compensation Restoration Programme





Northey Island Blackwater Estuary, Essex 1991, 0.8 ha Image: <u>omreg.net</u>

HCRP: Planning Framework and Legislative Driver

"A nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100"

 Shoreline Management Plans (SMPs) and Flood and Coastal Erosion Risk Management (FCERM) Strategies provide the planning framework for activity

HCRP creates compensatory habitat, for the loss of designated sites predicted to occur due to FCRM activity at the coast

- HCRP provides Natural England and Defra with confidence that FCRM meets its legal obligations
- The HCRP is a 'critical enabler' and without it, the FCRM Investment Programme (coastal) would be at risk of legal non-compliance



HCRP: Coastal Squeeze

• The majority of losses are due to coastal squeeze, defined as (EA, 2021):

"The loss of natural habitats or deterioration of their quality arising from anthropogenic structures or actions, preventing the landward transgression of those habitats that would otherwise naturally occur in response to sea level rise in conjunction with other coastal processes. Coastal squeeze affects habitat on the seaward side of existing structures"





HCRP: Primary and Secondary Compensation

- "... Coastal squeeze affects habitat on the seaward side of existing structures."
 - Intertidal 'Primary' compensation (e.g., saltmarsh and mudflat)
- Primary compensation, can cause the loss of other designated habitat located <u>behind</u> existing structures
 - 'Secondary' compensation (e.g., freshwater grazing marsh)



HCRP: Structure

• Area HCRPs:

- Leads develop and deliver the HCRP pipeline
- National HCRP:
 - 'Strategic oversight' and support



HCRP: Reporting

- **5 Year Update Reports** submitted to Defra, which provide the **'balance sheet'** for HCRP delivery:
 - 2013, Historic review
 - 2018, Baseline (hosted on SMP Explorer)
 - 2023, Latest report (hosted on SMP Explorer)
 - 2028, next 5 Year Update Report





HCRP: **Delivery to Date**

- Successfully compensated for predicted losses of protected sites identified within the c.2005 2025 SMP planning horizon (Epoch 1) and FCERM strategies
- To date, the HCRP has created:
 - 1,601 ha of intertidal habitat
 - 468 ha of freshwater grazing marsh
 - 292 ha of other coastal habitats









Medmerry Sussex Coast 2013, 302 ha Image: <u>omreg.net</u>

80.

Steart Marshes Parrett Estuary, Somerset 2014, 262 ha Image: <u>omreg.net</u>

Jubilee Marsh (Wallasea Island) Crouch and Roach Estuary, Essex 2015, 165 ha Image: <u>omreg.net</u>

Lower Otter Otter Estuary, Devon 2024, 55 ha Image: Lower Otter Restoration Project
HCRP: Current Status of Pipeline

SMP Epoch 1 (c.2005 – 2025):

On track to meet legal requirements

SMP Epoch 2 (c.2025 – 2055):

- Number of proposed schemes in the pipeline at various stages of development
- Update of SMPs will update the HCRP compensation need and revision of the pipeline

ACTION: Scan QR Code > Visit SMP Explorer > Find relevant Coastal Group(s) > ENGAGE



Longer term losses and areas of compensation predicted





Estuarine and Coastal Habitat Creation: Change



Improving HCRP Delivery: Project

- Aim:
 - Create the tools, guidance, data and governance needed to support and improve development, delivery and strategic oversight of the HCRP, to fulfil FCRM compensation legal obligations and where possible, support wider estuarine and coastal ambitions for the EA and UK Gov



The Habitat Compensation and Restoration Programme (HCRP)

help embody coastal adaptation, build climate resilience and apply the Lawton Principles of bigger, better and more connected

Moors at Arne (artist impression) Poole Harbour, Dorset *Est. 2026/27FY*, 144 ha



ReMeMaRe Conference 2024

Panel Discussion

Chair: Karen Daglish, South Tyneside Council

- Richard Unsworth, Project Seagrass
- Amelia Newman, Ocean Conservation Trust
- Maria Hayden-Hughes, Bangor University
- James McLean, Land and Water Family of Companies
- Will Manning, Environment Agency

Slido for extra questions QR code or www.slido.com Code: **4741966**



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COASTAL FUTURES