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## Native Oyster Network – UK & Ireland Conference

### Posters



## PEARLS OF WISDOM FROM THE DELIVERY OF THE WILD OYSTERS CONWY BAY PROJECT: EDUCATION AND ENGAGEMENT PROGRAMME

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### PROJECT OVERVIEW:

The Wild Oysters Project Conwy Bay aims to improve the health of coastal waters by restoring native oyster habitat at Conwy Bay in North Wales, while engaging a wider range of people with the historical and natural heritage of oysters in the area. The project is a collaboration between the Zoological Society of London (ZSL) and Bangor University, funded by the Nature Networks Programme, delivered by The National Lottery Heritage Fund in partnership with the Welsh Government.

### EDUCATION & ENGAGEMENT PROGRAMME

**Aim:** To increase the knowledge and awareness of native oysters and the ecosystem services they provide, and for people to feel a sense of stewardship towards the marine environment.

**Formal education programme:** We have created a **free education programme** for pupils aged 8-11 (KS2), 11-14 (KS3) and HE, aiming to inspire the next generation of marine stewards, including:

- Lesson plans, workshop PowerPoint presentations, activity worksheets, site visits at marina sites (Oyster Safari)
- Linked to the Welsh curriculum




**Education programme: Learning objectives**

- Students to have a greater knowledge and awareness of native oysters and the ecosystem services they provide
- Students to have a greater knowledge and understanding of marine habitats in the UK and the marine environment resulting in increased ocean literacy
- Students to have increased awareness and understanding of their local Wild Oysters project
- Students are inspired to care for the marine environment and become marine stewards


### CITIZEN SCIENCE PROGRAMME:

We have a dedicated team of volunteers who assist with oyster nursery surveys one day a month (usually 4 to 5 hours per day). These surveys included:


- Biodiversity Net Surveys: Recording mobile marine animals.
- Photo Surveys: Recording sessile animals on oysters
- Oyster Health and Reproduction Surveys: non-destructive inspections



To access the **2023 Native Oyster Nursery Science Report** published by our former partner, **Blue Marine Foundation**, scan the QR code:




To access the **2020-2024 Impact and Evaluation Report**, scan the QR code:



### LOCAL COMMUNITY ENGAGEMENT:

To promote long-term stewardship of the Wild Oysters restoration site at Conwy Bay, we engaged with local communities through:

- Monthly volunteering sessions at oyster nursery marina sites.
- Online media engagement (website & social media)
- Participation in local maritime food festivals and events
- Beach cleans in collaboration with local organisations
- Hosting celebration events i.e. "Gŵyl Wylstrys yr Hydref/Autumn Oyster Fest."




### INCLUSIVITY STRATEGY:

Our approach focused on **creating accessible, inclusive opportunities for all members of the community**, with particular focus to **women and girls in STEAM** (Science, Technology, Engineering, Arts, and Mathematics) and **underserved ethnic minority groups**.

**Key aspects of this strategy included:**

- **Bilingual Resources:** Educational materials were provided in both Welsh and English
- **Reducing Barriers to Participation:** We supported transport and accessibility to ensure diverse participation
- **Interactive Tech:** Virtual reality headsets showcased Wales' marine biodiversity and highlighted the importance of healthy coastal ecosystems in any location
- **Co-Designed Events:** Tailored outreach through EDI-focused speakers at the 'Accelerate Action: Careers in Marine Science' evening talk for women and girls in science, oyster clay-building workshops with North Wales Africa Society, and hands-on oyster monitoring with Pobl i Bobl refugee group



### LESSONS LEARNT AND NEXT STEPS:


- Establishing a **local working group** with key representatives meeting every quarter ensures **community involvement in decision-making and to address any queries**
- Using a **closed Facebook and WhatsApp group for volunteer communication** is effective, widely used, and encourages engagement. Online mechanisms like [Volunteersignup.org](https://volunteersignup.org) reduce administrative tasks

### ENGAGEMENT IMPACT:

- **3,303 students** were reached via our **formal education programme** through in-person and online sessions
- **Trained over 209 citizen scientists**, contributing **over 1,008 volunteer hours**
- **Meaningful engagement with 10,082 members of the general public** to date through organising or collaborating with community events

To be released in summer 2025 production of a:

- Outreach & Engagement monitoring and evaluation report
- Technical Science Report of restoration activities
- Impact and Evaluation report 2023-2025







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Ulster  
Wildlife

# BRINGING NATURE BACK: NORTHERN IRELAND EUROPEAN NATIVE OYSTER RESTORATION



Ulster  
Wildlife

By Cara Bradley (Marine Conservation Officer) and Jessica Mather (Graduate Marine Conservation Assistant)

## BACKGROUND

- *Ostrea edulis*, also known as the European Native Oyster, is a bivalve (consisting of a hinged pair of half-shells).
- Categorized as a Priority Species in the UK and Northern Ireland (NI) [1], ecosystem type classified as collapsed on the International Union for Conservation of Nature's (IUCN) Red List of Ecosystems [2].
- Populations were once vast in NI, and they were the food of the working class throughout the late 1800s/early 1900s.
- The combined effects of overfishing, disease (*Bonamia ostreae*), coastal development, industrial pollutants, and invasive non-native species (INNS) led to their localised extinction.
- In 2020 individuals were found on the shores of Belfast Lough confirming that an unassisted recovery had taken place [3].
- Suggested that environmental conditions for re-establishment were right.

## BENEFITS

When left undisturbed, European Native Oysters form highly complex 3D reefs which provide many ecosystem services [4]:

- **Increased water quality** – removes pollutants out of the water column.
- **Biodiversity enhancement** – provides food and shelter for a variety of species.
- **Cultural value** – were once an integral part of coastal communities in NI.
- **Increased fish production** – provides a nursery and feeding ground for fish.
- **Increased oyster population** – provides more suitable substrate for oyster larvae (spat) to settle on and grow.

## METHODS

Ulster Wildlife's process of setting up and establishing a European native oyster nursery:

**Pre-approval and licensing** – decide location, gain permissions, apply for a Section 14 Aquaculture permit.

**Nursery setup** – order and install nursery cages and operational equipment.

**Oyster pickup** – collect oysters from Loch Ryan Oyster Fishery Company (Scotland) and complete vet inspection.

**Bio-security** – scrub oysters and place in fresh water for 24 hours to ensure no organisms and INNS are present.

**Installation** – put oysters into cages and monitor their survival weekly (mortalities of >10% are reported to DAERA).

**Monitoring** – set up a volunteer group to collect metamorphic data (length, width, depth, weight) allowing growth and spawning cycles to be tracked.



Figure 1. Map of Ulster Wildlife's network of European native oyster nurseries across NI.

## FUTURE WORK

- Continue intertidal surveys of wild European native oyster populations – Belfast Lough completed Summer 2024, Larne Lough Summer 2025.
- Conduct remotely operated vehicle (ROV) surveys mapping historical reefs in Belfast Lough.
- Seabed deployment in Belfast Lough (location tbc).
- Trial spat-on-shell as a method of reintroduction at scale.
- Open new nursery each year until 2028 adding to network of European native oyster nurseries.

## REFERENCES

1. DAERA (2019) List of Northern Ireland Priority Species. 2019. <https://www.dema.gov.uk/consultations/2019/northern-ireland-priority-species-2019>. Accessed 18/11/2023.
2. de Longh, P., & M. J. (2019). The European native oyster, *Ostrea edulis*, in the context of the EU Biodiversity Strategy for 2030. *Journal of the Marine Biological Association of the United Kingdom*, 99, 1–10.
3. de Longh, P., & M. J. (2020). The European native oyster, *Ostrea edulis*, in the context of the EU Biodiversity Strategy for 2030. *Journal of the Marine Biological Association of the United Kingdom*, 100, 1–10.
4. de Longh, P., & M. J. (2020). The European native oyster, *Ostrea edulis*, in the context of the EU Biodiversity Strategy for 2030. *Journal of the Marine Biological Association of the United Kingdom*, 100, 1–10.





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## Ecological and societal benefits of combined restoration along coastlines

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<sup>2</sup>Botany and Plant Science, School of Natural Sciences, University of Galway



### INTRODUCTION

Coastal ecosystems are subject to many human pressures such as habitat destruction, overfishing, and increased pollution and eutrophication<sup>1</sup>. This has led to the decrease and loss of some habitats, including oyster reefs and seagrass beds in Ireland. As both habitats provide many ecosystem services (e.g., increased biodiversity, increased water quality, sediment stabilisation, wave attenuation, carbon sequestration and acidification buffering)<sup>2,3</sup>, it is important to evaluate the possibility of restoring these habitats as nature-based solutions.

Restoration efforts are often done in isolation but as habitat connectivity promotes resistance, recovery and biodiversity in an undisturbed system, there have been calls for multi-habitat restoration efforts<sup>4</sup>.

This research aims to:

1. Identify and evaluate if suitable sites for combined restoration occur along our coastline
2. Test the feasibility of restoring oyster and seagrass beds together in selected sites of known historic co-occurrence of both species in the Dublin Bay area
3. Test the effects of manipulating oyster bed densities on ecosystem functioning and biodiversity

Suitability

Feasibility

Manipulation

### SUITABILITY

Objective: Model possible sites for oyster and seagrass restoration on both a regional and a local level.

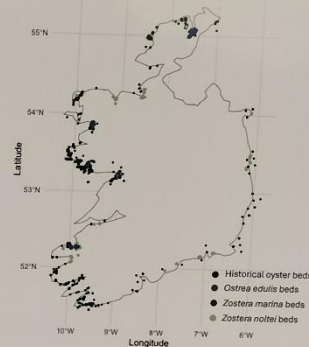
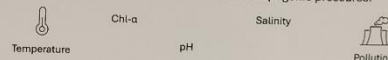


Figure 2. Historical oyster beds<sup>5</sup> and existing oyster reefs and seagrass beds in Ireland.

Species distribution models (SDM) are being used to evaluate the suitability of co-restoration of seagrass beds and oyster reefs in Ireland. Models on a large scale will show the general distributions and areas. Equally, models on selected local scales will include more localised environment variables and anthropogenic pressures.



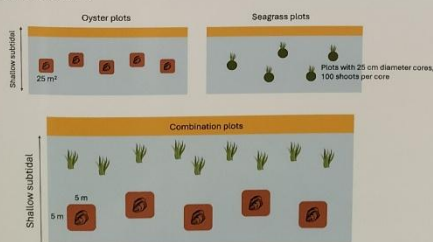
### FEASIBILITY

Objective: Study the impact of co-restoration on ecosystem services, biodiversity and ecosystem functioning.

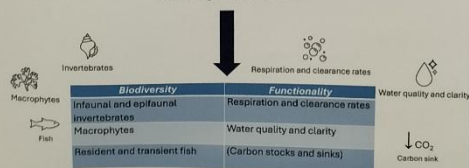
Field studies are planned to test the feasibility of co-restoration of seagrass beds and oyster reefs in Malahide Estuary and Rogerstown Estuary, areas which historically housed both habitat types.



Oyster, seagrass and combination plots will be evaluated to study if a combined approach will benefit biodiversity and ecosystem services. Oyster plots will be 25 m<sup>2</sup>.



Monitoring for 12-18 months

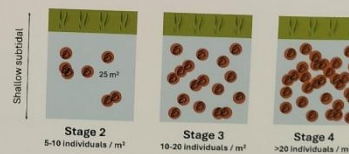


#### Acknowledgements:

RESET is a collaborative project between University College Dublin and University of Galway funded by the Environmental Protection Agency and aims to evaluate the use of native oyster reefs and seagrass beds as nature-based solutions for enhancing Blue Carbon and ecological services in Ireland.

### MANIPULATION

Objective: Study the effects of manipulating oyster densities in a combined restoration approach on ecosystem services, functioning and biodiversity.



Stages 2, 3 and 4 are functioning oyster habitats with stage 2 being very fragile<sup>6</sup>.

These stages should also have oysters of varying sizes (and therefore age), an aggregation of several well-established individuals as well as a 3D configuration, an elevation.<sup>6</sup>

Field studies on the effect of manipulating oyster densities in combination restoration will be held at two sites; Malahide Estuary and Rogerstown Estuary. Oyster plots will be 25 m<sup>2</sup> and associated seagrass densities will be standardised.

The plots will be monitored for both biodiversity and functionality benefits over a period of 12-18 months:







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IRISH RESEARCH COUNCIL  
An Chomhairle um Thaighde in Éirinn



# Oisre Conamara

## Remnant native oyster (*Ostrea edulis*) beds in Ireland are OSPAR habitats and reference biotopes for ecological restoration

The decline of native oyster (*Ostrea edulis*) populations has led to the loss of extensive ecosystems associated with these important ecosystem engineers.

### Authors

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### Introduction

Native oyster (*Ostrea edulis*) reefs once widespread ecosystems found across European coasts<sup>1</sup>, have now become universally collapsed<sup>2</sup> primarily due to overexploitation<sup>3</sup>, habitat degradation, and disease<sup>4</sup>. Native oyster reefs are on the OSPAR list of threatened/declining species/habitats<sup>5</sup> and should be protected as biogenic reefs, Annex I habitats<sup>6</sup> due to their biodiversity and ecosystem services<sup>7,8</sup>. Despite their importance, many remnant oyster reefs, particularly in Ireland remain under-recorded or misclassified as "mixed sediment dominated by polychaetes community complex"<sup>9</sup>, resulting in inadequate conservation measures. This study investigates some of the last remaining native oyster beds in Ireland, assessing their ecological metrics and potential as reference habitats for restoration.

### Objectives

1. Establish the extent of remnant native oyster beds in Kilkieran and Bertraghboy Bay (Connemara, Ireland) as reference ecosystems
2. Quantify biodiversity and describe associated faunal assemblages
3. Re-colonisation trials of historical oyster beds (sanctuaries and sustainably managed beds)
4. Establish food web dynamics of natural and restored oyster habitats

### Methodology

1. Seabed video & acoustic surveys to establish the extent and fragmentation of oyster beds
2. Transect surveys using video/photo-quadrats to estimate epifaunal communities, oyster and shell density, and fish use
3. Removal quadrat surveys assessing oyster population structure, recruitment & infaunal biodiversity (compared to non-oyster controls)
4. Translocation & cultch restoration trials based on baseline surveys and habitat suitability models
5. Food web studies stable isotope analysis (SIA) of representative trophic guilds sampled in native oyster beds and controls

### Findings

Multiple surveys of remnant reefs, classified as mixed sediment but locally known as oyster beds, were conducted using video transects and destructive sampling. Despite prior exploitation in certain areas, we identified locations that support habitats meeting the metrics for healthy oyster reefs<sup>10</sup>:

- **Density:** Relatively high density in certain areas (estimated 5-20 sometimes up to 100 individuals/m<sup>2</sup>)
- **Aggregation:** 2-7 oysters per clump
- **Recruitment:** Spat observed in all surveyed beds
- **Elevation & Shell availability:** Relatively high shell accumulation creating structured reef habitats that support essential ecosystem functions
- **Bioecosis:** Rich faunal and macrophyte communities associated with oysters

### Recorded data

Especially red filamentous seaweed (characteristic of typical *O. edulis* OSPAR biotope). So far, identified pink paint weeds, *Polysiphonia* spp., *Gelidiella calcicola*, *Griffithsia corallinoides*, *Plumaria plumosa*, *Plocamium* spp., *Ceramium* spp., *Dasya hutchinsiae*, and *Dasyatisphonia japonica* (invasive). Nearby maerl beds facilitate oyster and species recruitment, but colonial epifauna (ascidians, sponges, hydroids), suspension feeders (reef-building Serpulid polychaetes), queen scallops, and variegated scallops have been found within oyster clumps. Numerous crustacean (e.g. *C. maenas*) and fish species (sand gobies, black gobies, elasmobranchs, flat fish) were also recorded.



Fig. 1. Frequency distribution of native oysters in Kilkieran and Bertraghboy Bays, compared based on size.

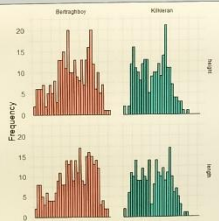


Fig. 2. Frequency distribution of native oysters in Kilkieran and Bertraghboy Bays.

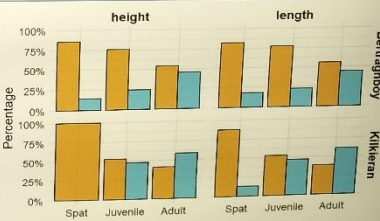


Fig. 3. Percentage of native oysters in Kilkieran and Bertraghboy Bays that have been recorded as part of clumps, separated based on size classes (clump = 2 or more oysters).

### References

- (1) Airoldi, L., Balata, D. & Beck, M.W. (2008) The Gray Zone: Relationships between habitat loss and marine diversity and their applications in conservation. *Journal of Experimental Marine Biology and Ecology*, 33, 8-15. (2) Beck, M.W., Brumbaugh, R.D., Airoldi, L., et al. (2015) Oyster reefs at risk and recommendations for conservation, restoration and management. *Bioscience*, 65(2), 107-116. (3) Culloty, S.C. & Mulcahy, M.F. (2007) *Bonania ostreae* in the native oyster *Ostrea edulis*: A review. *Marine Environment and Health Series*, No. 29. Galway, Ireland: Marine Institute. (4) Coen, L.D., Luckenbach, M.W., & Breitburg, D.L. (2007) Ecosystem services related to oyster restoration. *Marine Ecology Progress Series*, 341, 303-307. (5) European Council Directive (1992) "Council Directive 92/43/EEC". (6) NPWS (2014) Conservation Objectives: Kilkieran Bay and Islands SAC 002111. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. (7) OSPAR Commission (2008) Background document for *Ostrea edulis* and *Ostrea edulis* beds. OSPAR Commission. (8) Thurstan, R.H., Hawkins, J.P., Raby, L. & Roberts, C.M. (2015) Oyster (*Ostrea edulis*) restoration and ecosystem transformation in the Firth of Forth, Scotland. *Journal of Nature Conservation*, 25(3), 203-211. (9) de Engelsen, P.S.E., Bore, O., Dehney, A., et al. (eds.) (2021) European Native Oyster Habitat Restoration Monitoring Handbook. London: The Zoological Society of London. (10) de Engelsen, P.S.E., Airoldi, L., Coen, L.D., et al. (2024) European native oyster reef ecosystems are universally collapsed. *Conservation Letters*, 17(3068).