THE CHANGING USE OF IRELAND'S OCEAN: *MEASURING AND MONITORING THE IMPACTS ON OUR MARINE BIODIVERSITY AND ECOSYSTEMS*

RESEARCH CALL 2024 - TERMS OF REFERENCE

Research Programme:	**Marine Research Programme**
Research Theme(s):	**Marine Biodiversity, Ocean Renewable Energy, Marine Spatial Planning**
UN Sustainable Development Goal:	**14 Life Below Water**

BACKGROUND

The Irish Government is committed to achieving 30% Marine Protected Area (MPA) coverage of Ireland's Maritime Area by 2030, in line with the Programme for Government, the EU Biodiversity Strategy for 2030, and a number of International initiatives such as the UN post-2020 Global Biodiversity Framework

"Marine Protected Areas (MPAs) can support economic activity associated with the sea; for example, by conserving areas of particular importance to marine ecosystems and ensuring that human activity is kept at a level that will sustain biological diversity, natural productivity, human health and well-being. MPAs can also help reduce the effects of climate change and ocean acidification by ensuring that marine ecosystems are healthy and resilient, and that the marine environment can act as a natural carbon storage system."

Marine Protected Area designations in Ireland[1] fall under the Marine Strategy Framework Directive, Article 13(4). A general scheme of a Bill for Marine Protected Areas was published in 2022 and a draft Bill is in the late stages of completion. Significant efforts to identify potentially suitable areas for MPAs has been conducted by the Marine Protected Area Advisory Group through sensitivity analysis studies of the Western Irish Sea and the Celtic Sea. Lists of features and the status of the evidence base for their protection can be found in the appendices of these reports.

These features include species and habitats (not protected under the Birds and Habitats Directives) as well as ecosystem services. As identified in the Irish Sea and Celtic Sea sensitivity analysis reports, there is a need to further develop the evidence base for some features that may be considered for protection.

[1] Lead Responsibility of the Minister/Department of Housing, Local Government and Heritage.

In addition, the Irish Government has made significant progress towards the establishment of Offshore Wind Farms in Irish waters. The awarding of Maritime Area Consents (MACs) in 2023 to seven participating projects (Oriel Windfarm; Arklow Bank II; North Irish Sea Array; Codling Wind Park; Sceirde Rocks; and the Dublin Array offshore wind farm, which comprises both Kish Bank and Bray Bank projects) represents the start of an expansion in the offshore renewable energy sector, which is required to achieve the Irish Government target of 5 GW of capacity in offshore wind by 2030.

The draft South Coast Designated Maritime Area Plan for Offshore Renewable Energy (SC-DMAP) will also contribute to these targets. It is the first sub-national maritime spatial plan for Offshore Wind proposed by the State. It provides a plan-led approach for the sustainable development of offshore wind and considers environmental protection and existing marine users and activities.

Progress towards the meeting these marine conservation and energy targets must also take account of the activity of established blue economy sectors, notably seafood production (fisheries and aquaculture) and maritime transport. These sectors are important stakeholders as existing users of maritime space and competing demands for space and co-existence will be a key challenge within the broader scope of the National Marine Planning Framework.

PROJECT RATIONALE

There remain critical gaps in the knowledge and evidence base to inform policy and planning decisions on managing the growing and competing use of maritime space over the next number of years. Applications are now being sought for a multi-disciplinary, multi-institute programme of research underpinned by the collection, discovery, rescue, reuse and analysis of marine environmental (biological/biodiversity/habitat, physical, biogeochemical, geological) and socio-economic data to address these knowledge and evidence gaps. This research should aim to enhance the evidence base to support the selection of features that may be protected under MPA designations. While MPA-LIFE-IRELAND will be the principle mechanism for the delivery of MPAs in Ireland, there is an opportunity for existing national datasets to be reused and value added to complement this initiative (e.g. INFOMAR seabed and sediment data).

Research surveys carried out on the national research vessels (Celtic Explorer and Tom Crean) provide both historical and current data (e.g. biological - fish stocks, oceanographic - temperature, salinity, turbidity and environmental - harmful algal blooms, nutrients, hazardous substances) that can be repurposed and expanded in the coming years to address data gaps. Similar to the biological and physical data being collected, there are also a number of marine and maritime social, and economic data collection and research programmes that can be further utilised for marine policy and planning purposes. This includes the analysis and valuation of ecosystem services associated with our marine and coastal areas.

With respect to Ocean Renewable Energy (ORE), the potential research challenges include supporting decision-making in relation to planning, zoning and site selection for ORE installations; impacts of new structures on fish and fisheries (e.g. migratory routes, breeding and feeding grounds); potential for co-location of aquaculture with ORE structures; transition

in ports infrastructure to service ORE installation and maintenance, etc. The research can also provide guidance where gaps in current data collection should be addressed to meet the long-term data requirements.

RESEARCH OBJECTIVES

Applications should propose a programme of research supported by comprehensive provision of relevant data and evidence to enhance our ability to manage use of the marine space with competing interests such as ORE, MPAs, seafood production, maritime transport, recreation and other marine and maritime activities. The work should deliver innovative solutions to help resolve conflicts, support decision-making and inform planning by optimising the space available to each relevant sector in the context of growing competition for space and Ireland's legislative and policy requirements.

"*The Changing Use of Ireland's Ocean: Measuring and monitoring the impacts on our marine biodiversity and ecosystems"* aims to address gap in knowledge under four research focus areas that have been identified as outlined below. **Proposals can address all four areas or can address a subset of these.**

1. Integrated marine survey methods on marine biota and ecosystem functioning

The waters surrounding Ireland are highly productive and provide a habitat for hundreds of species of invertebrates and fish, 35 species of sharks, as well as 24 species of whales and dolphins. Improvements in survey methods of our marine habitats will enable us to better understand Ireland's marine ecosystems functioning in order to recommend policies to protect and monitor our marine biodiversity.

Research challenges include further investigation of biodiversity changes and loss of marine species in Irish waters due to climate change (focus on particular species and taxa) and consequences on food-webs; impacts of climate change on fish and fisheries; integrated ecosystem assessments; biological observing tools and technologies; digital and data services in support of biodiversity monitoring and reporting.

Applicants are asked to consider the following:

- Building on current and previous work, catalogue the existing data and information held and identify priority gaps to undertake data collection in areas that are potential MPAs locations.

- Review international practices and make recommendations for survey methods and approaches best suited to Irish waters, for example methods of converting seabed maps with bathymetric data to biological maps for new "marine biodiversity maps".

- Carry out off-shore surveys and data collection *in-situ* using traditional (ship-based) and advanced automated technology (drones, gliders and unmanned vehicles).

- Review current data provided to national and EU repositories, such as The National Biodiversity Data Centre, MarinePlan.ie and Ireland's Marine Atlas, Home | European Marine Observation and Data Network (EMODnet) (europa.eu), and other data portals and dashboards such as Ireland's Ocean Economy Dashboard, and consider value-added opportunities for reuse of these datasets

2. Advancing biological and ecological data collection frameworks for establishing baselines, management and decision-making

Marine ecosystems are dynamic, with species' abundance and distribution changing seasonally and over long time periods. Ecological monitoring taking systematic, repeated measurements of environmental conditions using the same methods in the same places over time to enable the development of long-term time series and identification of trends. Long-term data is extremely valuable in understanding changes in ecosystem health brought on by climate change, invasive species, anthropogenic pressures, and more frequent storm events.

Research proposals should address the following objectives with detailed questions under these objectives to be defined in consultation with policy makers and governance stakeholders, for example:

- Provide an analysis of the existing biological and ecological data and time series for Irish waters, and identify how baselines can be established for areas that are potential MPA locations.

- Recommend data collection priorities for monitoring programmes for MPAs and identify ways to optimise the provision of critical data and evidence that reduces cost and maximizes impact.

- Consider how Ecosystem Services Valuation, including the work currently being carried out by the CSO Central Statistics Office and the Marine Institute using the System of Environmental-Economic Accounting—Ecosystem Accounting[2], can be incorporated as a tool for stakeholders and decision makers in marine spatial planning.

- Explore the linking of economic models (e.g. Input-Output models) and ecological models to examine economic impacts of changes in the ecosystem(s).

3. Use and deployment of new/advanced technologies and modelling tools for biological & ecosystem monitoring

The technology used to collect oceanographic data in Irish waters has progressed significantly with an array of equipment and tools employed e.g. data-buoys, drones, gliders, hydrophones, remote satellite sensing, underwater TV, etc. However, there is for a need to continually advance and develop sensor and platform technologies to assist with data collection, and to create efficiencies with data collection and analysis.

[2] https://seea.un.org/ecosystem-accounting;

In addition to sensors recording physical and chemical data, novel technologies such as *in-situ* biosensors can be used to detect an expanding range of biological, biodiversity and ecosystem variables that enable a more affordable and systematic approach to the provision of essential ocean variables in the biolical domain.

Applicants are asked to consider the following:

- Design and development of advanced technologies and tools to support planning and management of marine activities (including aquaculture, fisheries, greenhouse gas reduction from shipping and other emitting activities including noise).

- Infrastructure deployment and maintenance of sensor instrumentation to record and relay real-time results of essential biological, biodiversity and ecosystem variables

- Validation, deployment and software training requirements for these novel technologies and instrumentation for automated detection.

- How technology and tools could be used to enhance organisational cooperation between domains e.g. atmosphere, biosphere, oceanic, etc. and integrate data collected more efficiently.

- Demonstrate how new *in-situ* technology and tools can effectively meet the national long-term monitoring requirements, while causing minimum disturbance to the marine environment, due to low maintenance requirements.

4. <u>Adopting nature based solutions to the development of Irish ports, harbours and other strategically important coastal infrastructures</u>

The recently adopted EU Nature Restoration Law includes legally binding restoration targets for various ecosystems across the EU. The text includes the overarching objective for area-based restoration measures on 20% of the EU land and sea area by 2030, as well as time-bound restoration obligations for natural habitats, covering terrestrial, coastal, freshwater and marine ecosystems.

With respect to "marine ecosystems" the proposal contains the following specific targets: *restoring marine habitats such as seagrass beds or sediment bottoms that deliver significant benefits, including for climate change mitigation, and restoring the habitats of iconic marine species such as dolphins and porpoises, sharks and seabirds.*

EU member states are expected to submit National Restoration Plans to the Commission within two years of the Regulation coming into force, showing how they will deliver on the targets. Research proposals should address the following objectives:

- Working with Irish ports, harbour authorities and other local coastal interest groups (e.g. BirdWatch Ireland, Irish Whale and Dolphin Group, etc.) present issues, evaluate and refine potential Nature-Based Solutions to inform medium to long-term management and planning.

- Consult with the key actors in Ireland (including government departments[3]) to develop proposals for implementation of nature based solutions in Irish coastal areas impacted by commercial activities including areas in the vicinity of important coastal infrastructure (e.g. ports & harbours, sea walls, coastal defences, etc.), including indicators and targets with the estimated associated costs and potential impacts focusing on "*restoring the habitats of iconic marine species such as dolphins and porpoises, sharks and seabirds*." This could also include the development of guidance and toolkits for the integration of nature-based solutions in Irish coastal areas.

PROJECT DELIVERABLES

The following research outputs are expected:

- Peer reviewed open access journal articles published over the period of funding (suggested target being 10 to 12 in total with the majority published by 2028-2029).

- €1 million in grant-aid secured during the grant term from externally sourced competitive research funding (national, EU and international).

- All data to be open access, processed and quality controlled to international standards and delivered to Marine Institute data portals and other relevant national/international data centres.

- Delivery of expert advice, data/information and policy briefs for relevant Government Departments and Agencies including Department of Housing, Local Government and Heritage (DHLGH); Department of the Environment, Climate and Communications (DECC), and the Department of Agriculture, Food and the Marine (DAFM).

- Production and dissemination of innovative communications products to inform policy and broader societal stakeholders on the project and on some of the key issues and research findings associated with this work (social media posts, videos, podcasts, etc.)

- Successful completion of at least two MSc/PhDs during the programme and evidence of promotion of early career researchers with diversity, gender and inclusion considered as part of the recruitment process.

- Evidence of other research outputs to include conference posters and presentations, multidisciplinary activities and stakeholder engagement.

[3] Lead Responsibility of the Minister/Department of Housing, Local Government and Heritage.

ADDITIONAL SPECIFIC REQUIREMENTS FOR THIS PROJECT

- Throughout the lifetime of the research project(s), it is also anticipated that the researcher(s) will actively seek additional sources of other funding (national, European and/or international), continuing to build links with other research groups and organisations and to strengthen Ireland's research capacity and capability.
- Applicants can also apply for ship-time access via the Marine Institute's annual call.
- The successful applicant(s) should collaborate closely with key stakeholders and end users including Government Departments (DECC, DHLGH& DAFM) and their Agencies (NPWS, MARA, SEAI, EPA, MI) in order to provide policy advice. It is recommended that this collaboration should begin at the proposal development stage to enable co-creation of research goals that will achieve maximum uptake and impact with potential end-users. Direct engagement with the Marine Institute is also welcome.
- It will be a requirement that approved projects establish a project **Steering Committee** comprising of domain experts and key stakeholders that will meet regularly (circa every six months) with an initial workshop to brainstorm issues to be scheduled once the call results are announced. Applicants should demonstrate how they will ensure that the composition of the Steering Committee can be flexibly managed to meet changing national/international strategic priorities during the project term. The final composition of the Steering Committee will be determined as part of the Grant-Agreement negotiation process.

INTENDED IMPACTS

The research outputs should inform evidence-based policy in the areas of *MPA designation, monitoring and management, Ocean Renewable Energy and Marine Spatial Planning.* Research should be carried out in close cooperation with relevant national policy makers across relevant Government Departments to ensure relevance and value of the work from a public policy perspective. Research and knowledge outputs should be tailored to inform and support national policy and management across are range of sectoral and legislative fields.

This funding will contribute to further developing research capacity in Ireland, and should lead to enhanced visibility (through high impact peer reviewed publications and conference presentations) and contribution of Irish research to international research efforts and programmes, through greater involvement in EU research projects and international working groups (e.g. ICES, OSPAR, OECD), and through targeted and tailored communications outputs.

CALL BUDGET

The amount of funding available to the research project(s) will be up to a maximum of €1,500,000 (€1.5 million) for three to five years commencing in early 2025.

Funding is expected to support a team of up to five researchers (post-doctoral researcher, research assistant, MSc/PhD students, or equivalents) in a consortium of three partner organisations. Please refer to Section 3 of the Guidelines for Applicants for further details.

APPLICATION PROCESS AND KEY DATES

Applications must be made through the Marine Institute's online research grant management system RIMS (please refer to the Guidelines for Applicants).

The Marine Institute will aim to answer any queries or provide clarifications in relation to the call and application process, and potential applicants should email funding@marine.ie to submit their queries or clarifications.

The application closing date will be **Tuesday, 15 October 2024 (extended by two weeks).** Applications will be reviewed by international/national experts and scored on the criteria as stated in the Guidelines for Applicants, particularly scientific excellence, impact and strength of the proposed team.

Important Dates:

Call opening:	31 July 2024
Closing date for applications:	15 October 2024 (extended by two weeks)
Expected announcement of results:	Early December 2024
Expected start date:	April/May 2025

ADDITIONAL INFORMATION/REFERENCE MATERIALS

- Ecological Sensitivity Analysis of the Celtic Sea (2024)
- Ecological Sensitivity Analysis of Irish Sea Main Report (2023)
- Irish Ocean Climate and Ecosystem Status Report Marine Institute (2023).
- Impact 2030 - Ireland's Research and Innovation Strategy Department of Further and Higher Education, Research, Innovation and Science (2022).
- Expanding Ireland's Marine Protected Area Network – Department of Housing, Local Government and Heritage (2021)
- Maritime Area Planning Act 2021
- Ireland's Climate Action Plan
- European Green Deal
- EU Common Fisheries Policy
- National Marine Planning Framework
- Marine Protected Areas 2020: Building Effective Conservation Networks
- General Scheme of Marine Protected Areas Bill 2022 (www.gov.ie)
- ICES Working Group on Offshore Wind Development and Fisheries
- EU Nature Restoration Law
- EU Biodiversity Strategy to 2030
- Guidelines for the integration of the Socioeconomic impact of MSP
- Brock J. Bergseth, Adrian Arias, Michele L. Barnes, Iain Caldwell, Amber Datta, Stefan Gelcich, Sam H. Ham, Jacqueline D. Lau, Cristina Ruano-Chamorro, Patrick Smallhorn-West, Damian Weekers, Jessica Zamborain-Mason, Joshua E. Cinner (2023), Closing the compliance gap in marine protected areas with human behavioural sciences https://doi.org/10.1111/faf.12749
- Sarah Flynn, Will Meaney, Adam M. Leadbetter, Jeffrey P. Fisher & Caitriona Nic Aonghusa (2021) Lessons from a Marine Spatial Planning data management process for Ireland, International Journal of Digital Earth, 14:2, 139-157, DOI: 10.1080/17538947.2020.1808720
- Luke M. Brander, Pieter van Beukering, Lynn Nijsten, Alistair McVittie, Corinne Baulcomb, Florian V. Eppink, Jorge Amrit Cado van der Lelij, The global costs and

benefits of expanding Marine Protected Areas, Marine Policy, Volume 116, (2020), 103953, ISSN 0308-597X, https://doi.org/10.1016/j.marpol.2020.103953

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- Friedlander AM, Golbuu Y, Ballesteros E, Caselle JE, Gouezo M, Olsudong D, et al. (2017) Size, age, and habitat determine effectiveness of Palau's Marine Protected Areas. PLoS ONE 12(3): e0174787. https://doi.org/10.1371/journal.pone.0174787
- OECD (2017), *Marine Protected Areas: Economics, Management and Effective Policy Mixes*, OECD Publishing, Paris, https://doi.org/10.1787/9789264276208-en.
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- Addison, P. (2011). A global review of long-term Marine Protected Area monitoring programmes: Volume 1: Main Report, Volume 2: Appendix 1–4, JNCC Report No. 455. JNCC, Peterborough, ISBN 0963-8091.
- Kelleher, G. (1999). Guidelines for Marine Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK. xxiv +107pp.