RESEARCH & INNOVATION CALL 2025 - TERMS OF REFERENCE

Research Programme:	**Marine Institute - Marine Research Programme**
Research Theme(s):	**Multiple themes**
UN Sustainable Development Goals:	**14 Life Below Water, 13 Climate Action, 9 Industry, Innovation and Infrastructure, 7 Affordable and Clean Energy**

BACKGROUND

Ireland's new Research and Innovation Call in marine science and policy is informed by priorities identified through engagement with the Marine Research Funders' Forum (MRFF) and the national marine research and innovation community, including discussions at the 2024 Ocean Knowledge 2030 conference. The Ocean Knowledge 2030 Conference served as a pivotal forum for shaping Ireland's marine research priorities, bringing together diverse stakeholders to identify key opportunities, challenges, and collaborative pathways for advancing marine science and innovation. This coordinated approach reflects a shared ambition to strengthen Ireland's position as a leader in marine research, knowledge, and technology.

This call will support the alignment of marine research and innovation activities with national and EU-level strategies and policy frameworks. It aims to optimise research impact, enable sustainable and equitable use of ocean space, and contribute to the development of a sustainable, climate-neutral blue economy.

RATIONALE

As Ireland moves into the next phase of its renewed marine research and innovation agenda, the Marine Institute has undertaken an assessment to translate a broad set of identified priorities into a focused selection of research topics. This process aimed to guide targeted investments that address key national priorities.

Potential topics were identified for inclusion in the call based on four criteria:

1) **Funding Gap:** Research topic is not already being funded by the Marine Institute or other funders (National, EU or International).

2) **Strategic Alignment**: Aligns with national strategic priorities.

3) **Timeliness/Urgency:** Research is a priority or addresses an urgent need.

4) **Suitability to Call:** Fits the budget and general criteria of the MI call proposed.

With an available budget of €1.4 million, the call will support two project types with different maximum budgets and timescales. These are: a) Desk-Studies of 9 to 18 months duration requesting up to €150,000 in grant-aid funding; and 2) Medium-scale Projects of 24 to 36 months duration requesting up to €300,000 in grant-aid funding (circa €100,000 per annum).

Nine topics have been selected for inclusion in the 2025 call as follows:

Topic No.	Title	Funding Instrument	Duration & Max Funding
1	Ecosystem Approach to Fisheries Management in the Celtic Sea	Desk Study	12-18 months, up to €150,000 pro-rata
2	Marine and Maritime Resilience and Digital Readiness	Desk Study	12-18 months, up to €150,000 pro-rata
3	The High Seas Biodiversity Treaty – Implications and Obligations for Ireland	Desk Study	12-18 months, up to €150,000 pro-rata
4	Coastal Passenger Boat Experiences – Transition to Sustainability	Desk Study	12-18 months, up to €150,000 pro-rata
5	Baseline Study: A Plan-led Approach to Aquaculture	Desk Study	9-12 months, up to €120,000 pro-rata
6	Protein Production Capacity and Food Security from Fisheries and Aquaculture	Desk Study	12-18 months, up to €150,000 pro-rata
7	Decarbonising Shipping and Green Ports	Medium-Scale Project	24-36 months, up to €300,000 pro-rata
8	Reducing Environmental Impacts of Offshore Renewable Energy	Medium-Scale Project	24-36 months, up to €300,000 pro-rata
9	Advanced Ocean Data Analytics and Modelling Infrastructure	Medium-Scale Project	24-36 months, up to €300,000 pro-rata

RESEARCH OBJECTIVES

1. **Ecosystem Approach to Fisheries Management in the Celtic Sea: Exploring sea basin scale ecosystem interactions on commercially exploited species.**

   [Desk-based study (12-18 Months)]

This topic will examine how ecosystem interactions at a sea basin scale impact the productivity of commercial fish stocks in the Celtic Sea. The Ecosystem Approach has long been accepted as a necessary approach to manage the long-term sustainability of commercially exploited fish. This approach has been variously called Ecosystem Based Fisheries Management or the Ecosystem Approach to Fisheries Management (EAFM). EAFM requires detailed stock assessment data and appropriate temporal and spatial resolution of ecosystem productivity drivers, which is readily available for the Celtic Sea. With biodiversity pressures and changing ocean conditions, there is urgency to move beyond single-species approach to more holistic perspectives. A desktop study can examine international developments and regional data to provide some understanding of the

drivers of change in the Celtic Sea and their interactions with commercially exploited fisheries resources in that sea basin. The study should deliver valuable information and assessment to inform Marine Institute's role of providing science advice for sustainable fisheries. Key research questions to be addressed include:

- Investigate why in the last decade the stock size and productivity of certain fish stocks in the Celtic Sea (e.g. cod, whiting, haddock, herring) have decreased, despite a general reduction in fishing pressure. Potential drivers could include climate and oceanographic changes, food-web alterations, indirect effects of other fisheries etc.
- Meta-analysis of productivity/stock-recruitment dynamics across all Celtic Sea fish stocks.
- Ecosystem modelling to understand the sensitivities to the identified factors and the likely future trajectory. Are the changes likely to persist? Why are some species affected and others not? Are there other species that are vulnerable to similar declines based on their life history traits under current trends?
- How could this knowledge be incorporated into existing fisheries advice and management frameworks to ensure sustainability? What knowledge and data gaps remain to be filled?

2. Marine and Maritime Resilience and Digital Readiness

[Desk-based study (12-18 Months)]

This study will explore how Ireland's marine and coastal sectors - including ports, shipping, aquaculture, offshore energy, and environmental monitoring - are increasingly dependent on digital systems and automated technologies. The focus will be on assessing opportunities and risks related to this digital transition, identifying best practices in operational resilience, and supporting preparedness for unplanned disruptions. The research should draw on international civilian frameworks and case studies to examine governance, training, and coordination mechanisms that can enhance digital readiness, particularly for smaller operators. Sensitive security-related assessments (e.g. threat modelling or infrastructure vulnerability audits) are explicitly out of scope. The study should contribute actionable insights to support marine digitalisation in a safe, inclusive, and sustainable manner, and align with national priorities in research and innovation, the blue economy, and maritime transport. Research questions include:

- What is the current landscape of digitalisation in Ireland's marine sectors (ports, shipping, offshore energy, aquaculture, environmental monitoring)? What systems are emerging (e.g. AI navigation, sensor networks), and how digitally dependent are these operations?
- What international frameworks, standards, or case studies exist around cyber-resilience in civilian maritime operations (e.g. EU Agency for Cybersecurity - ENISA, IMO guidance, Baltic/Scandinavian port systems)?
- What governance or coordination mechanisms could help to create an improved, consistent digital offering across Ireland's marine sectors (e.g. inter-agency collaboration, voluntary best practice networks, education/training needs)?
- How can research institutions support innovation in secure-by-design digital tools, smart systems, or data-sharing platforms without exposing sensitive systems or data?

3. The High Seas Biodiversity Treaty – Implications and Obligations for Ireland

[Desk-based study (12-18 Months)]

This topic aims to address the implications for Ireland of the new High Seas Biodiversity Treaty[1] under the United Nations Convention on the Law of the Sea (UNCLOS). Ireland is a signatory to the treaty but has not yet fully ratified it (although there is full intention to do so). Implementation of the treaty will align strongly with Ireland's international (UN and EU) commitments on protecting marine biodiversity and ocean governance and addresses an urgent policy need following the treaty's adoption. A desktop study should assess the impacts and obligations for Ireland arising from the BBNJ Agreement and identify how Irish marine research can support its implementation. The study should examine impacts from a legal, policy, social and economic perspective as well as the implications and obligations for Marine Scientific Research. Potential research questions or issues include:

- What legal and scientific obligations will Ireland incur under the BBNJ treaty, and what domestic research capacity is needed to meet them?
- To what extent do Irish research institutes and industry based in Ireland carry out activities utilising marine genetic resources and/or digital sequence information derived from marine genetic resources originating in areas beyond national jurisdiction?
- What options could Ireland pursue to support successful implementation of the BBNJ Treaty, both domestically and internationally?
- What additional capacity-building or technology transfer initiatives could Ireland offer to assist least developed countries under the BBNJ framework, and what resources would these require?

4. Coastal Passenger Boat Experiences – Transition to Sustainability

[Desk-based study (12-18 Months)]

Tourism and recreation activities in marine and coastal waters are a vital component of the economy of peripheral coastal regions, islands and coastal communities. In 2023 marine and coastal tourism in Ireland generated an estimated turnover of €1.6bn and employed more than 21,000 people[2]. An important aspect of this sector is the revenues generated from tourism occurring in coastal areas, as well as water-based activities also referred to as 'on-water experiences'. This includes coastal passenger boat tourism such as island tours and transportation, as well as excursions linked to coastal sightseeing and wildlife watching. In line with Ireland's climate and environmental obligations and targets, it is imperative for this sector to progress towards a climate-neutral and sustainable business model, reducing carbon emissions and environmental impacts.

To inform policy and planning in relation to carbon reduction strategies, a sector-wide analysis is needed on the energy usage and needs associated with water and ground transportation directly linked to marine tourism activities. The study should provide a baseline analysis on the nature, scale and spatial distribution of transportation activities linked to marine and coastal tourism, and the associated energy usage and greenhouse gas emissions. Research should assess the challenges, barriers, opportunities and benefits regarding the necessary transition to low-emission, sustainable transportation options. and propose policy options and measures to promote and underpin this transition.

[1] https://iucn.org/sites/default/files/2024-01/iucn-bbnj-treaty-policy-brief.pdf
[2] Ireland's Ocean Economy, 2024. http://hdl.handle.net/10793/1999

Specific research questions to be addressed include:

- Updated inventory of coastal passenger boats[3] used in tourism, including spatial mapping and valuation of this activity.
- Estimated energy consumption and emissions by coastal boating activity type and region (as baseline).
- Policy roadmap with short-, medium-, and long-term interventions.
- Gap analysis of available data and monitoring frameworks.

5. Baseline Study: A Plan-led Approach to Aquaculture

[Desk-based study (9-12 Months)]

The EU has identified the potential for growth in aquaculture production, and in 2021 published Strategic Guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030[4]. The Guidelines set out four inter-related primary objectives for the development of the aquaculture sector across the EU:

- building resilience and competitiveness
- participating in the green transition
- ensuring social acceptance and consumer information
- increasing knowledge and innovation

The Guidelines are supported by a Commission Staff Working Document regarding the planning of space and access to water for marine aquaculture[5]. Each EU Member State is required under the Common Fisheries Policy to prepare multi-annual national strategic aquaculture plans.

Ireland's National Strategic Plan for Sustainable Aquaculture Development 2030 sets out a range of actions to support the development and growth of Irish aquaculture production. It is aligned with the objectives of the EU Guidelines referenced above. Objective 1 of the plan, 'Building resilience and competitiveness,' includes actions related to access to space for aquaculture. Ireland's National Marine Planning Framework sets out Ireland's approach to managing its maritime activities. This includes (for aquaculture) objectives, marine planning policies, key issues for marine planning, interactions with other activities and sustainability.

A baseline study is now required to understand how plan-led approaches to aquaculture have been implemented in other jurisdictions with a similar planning and regulatory framework to Ireland, and the ways in which such an approach has facilitated the development of the sector.

The key objectives of this research are to:

- Review the use of plan-led approaches to aquaculture in other jurisdictions, with a particular focus on EU member states
- Assess the degree and manner in which such approaches have supported the development of the aquaculture sector in those jurisdictions, in particular growth in production volumes and production values
- Identify the opportunities and efficiencies that a plan-led approach has afforded in improving social acceptance, ensuring compliance with relevant EU regulations, and in

[3] Coastal Passenger Boat Audit Report - Fáilte Ireland (2023)
[4] EUR-Lex - 52021DC0236 - EN - EUR-Lex
[5] SWD_2024_Space marine aquaculture.pdf.

reducing the regulatory burden for both the public administration of the sector for and operators themselves.

Note: this is a baseline study. Recommendations in relation to the implementation in Ireland of any of the approaches examined are out of scope.

6. Protein Production and Food Security from Irish Fisheries and Aquaculture

[Desk-based study (12-18 Months)]

Ireland's seafood sector is pivotal to the nation's economy and food security, encompassing both capture fisheries and aquaculture. Total GDP of Irish seafood production in 2024 was estimated to be worth €1.24bn, with fishing accounting for €461m, aquaculture €211m, and processing €947m[6].

The seafood sector faces numerous challenges such as fluctuating production volumes, environmental sustainability concerns, and evolving market demands and competition. In line with the EU's food production strategy (Farm to Fork[7]), this topic focuses on a comprehensive analysis of the sectors current limitations, barriers, opportunities for growth, and identification of strategies to enhance the sector's contribution to national, EU, and global food systems via sustainable and circular seafood production.

This research aims to:

- Evaluate the contribution of the seafood sector to food security and nutrition by modelling the protein, nutrient, and food output of Ireland's capture fisheries and aquaculture sectors (e.g. meals produced, amounts of protein, omega-3 fatty acids, minerals, etc.)
- Identify and detail constraints and opportunities affecting production capacity, e.g., environmental regulations, technological advancements, market access, resource availability, valorisation, etc. taking into account EU and international experience and best practices
- Assess the contribution of the seafood sector to national, EU and global markets, detailing final market destinations of all landings (national and non-national) originating in Irish ports, Irish landings into foreign ports, including mode of transport/associated emissions, product type, etc.
- Recommend policy interventions: propose evidence-based policy measures to enhance and promoting sustainable domestic production aligning with national food security objectives and international commitments.

Expected outputs: Comprehensive report: A detailed document presenting findings from evidence synthesis, gap analysis, comparative benchmarking and material flow analysis of seafood flows and product fates.

- Policy brief: A concise summary highlighting key insights and actionable recommendations for policymakers and knowledge transfer to industry.
- Stakeholder workshops: Organise sessions to disseminate findings, gather feedback, and foster further collaboration among industry stakeholders.
- Data Repository: Develop a centralized database of relevant data and analyses to support ongoing research and policy development.

[6] BIM Business of Seafood (2024)
[7] European Commission (2020) Farm to Fork Strategy

- Dissemination resources: materials (reports, summaries, infographics) which communicate these complex topics and results in an accessible manner.

7. Decarbonising Shipping and Green Ports

[Medium-scale study (24-36 Months)]

Shipping is one of the least carbon-intensive ways to transport goods, generating 2.9% of global anthropogenic CO_2 emissions in 2018. In the EU, ships generated 13.5% of all greenhouse gas (GHG) emissions from transport in that year, substantially less than road transport (71%) and aviation (14.4%)[8]. As a heavy transport sector and one of the most internationalised of industries, sustainability and the need to deliver a better environmental performance is, nonetheless, a key driver of change in the maritime sector.

The 'Fit for 55' package, a set of legislative measures introduced in 2023 under the EU Green Deal, includes the FuelEU regulation, which seeks to transition the EU maritime sector towards carbon neutrality. This transition is already underway and will have significant implications for ship size and design; for ports and shoreside power infrastructure; and for skills and training of existing workers and new entrants to the sector.

A medium-scale research study should inform how Ireland must prepare for this transition and for upcoming international regulations (e.g. on ship emissions and ballast water) and ensure ports can support new fuel technologies. Proposals should support technology assessments, operational studies, and policy analysis. Key research questions include:

- What are the expected benefits (emission cuts, noise reduction) versus technical and economic challenges of deploying green port initiatives (such as shore-side electrification or digital traffic management) in Ireland's major ports?
- How can extreme weather and climate change impacts be factored into ship design, and port design and operations (for example, preparing vessels and harbours for more frequent storms or higher wave conditions) to ensure long-term resilience?
- How can potential solutions be scaled across the national ports' network and across the ports of Ireland's trading partners, so that green shipping corridors, with common technologies can be advanced.

8. Reducing Environmental Impacts of Offshore Renewable Energy (ORE)

[Medium-scale study (24-36 Months)]

Ireland has set specific targets to achieve close to 37 GW off offshore wind energy production by 2050 through the construction of offshore wind developments in our maritime area. Building a new offshore energy infrastructure at scale brings with it complex and interconnected technological, environmental and social challenges. The state-led offshore energy transition will require a substantial knowledge and evidence base to aid policy, planning and management.

Proposals are invited to undertake integrated research and monitoring studies to better understand the deleterious and beneficial impacts (including cumulative impacts) of ORE installations and infrastructure development on marine biodiversity, ecosystems and habitats, addressing aspects such as underwater sound, electromagnetic fields, habitat impacts, marine refugia potential, migration pathways, and artificial reef effects and their expected future dynamics in the context of climate change. A medium-scale, multi-year project will enable in-depth field studies, monitoring, and modelling of impact scenarios.

[8] https://www.eea.europa.eu/publications/maritime-transport/

Research questions include, *inter alia*:

- How do offshore wind farms and other renewable installations affect marine ecosystems and biodiversity over time – for example, through underwater noise, electromagnetic fields, habitat modification, or collisions with birds and mammals – and what mitigation or nature-inclusive design measures can reduce negative impacts?
- Can offshore renewable energy structures produce environmental co-benefits (for instance, acting as artificial reefs or fisheries exclusion zones that enhance biomass), and how might these be quantified and incorporated into planning and licensing decisions?

9. Advanced Ocean Data Analytics and Modelling Infrastructure

[Medium-scale study (24-36 Months)]

This topic proposes a major R&I effort to boost Ireland's ocean prediction and data analysis capabilities using cutting-edge technologies. It aligns closely with national research and innovation strategies (e.g. Impact 2030) and climate initiatives, by improving our ability to model ocean/climate dynamics, seabed and coastal change, and ecosystem trends. There is a clear national priority and urgency for enhanced predictive tools, including better ocean models, AI-driven analytics, and user-focused data visualizations that will directly support climate adaptation, marine spatial planning, and disaster response.

While some components (such as operational forecasting) already exist, many advanced tools (e.g. high-resolution digital twins, AI for big marine data) are not yet fully developed in Ireland. A two/three-year project would allow collaboration across institutes (oceanographers, computer scientists, etc.) to deliver significant technology innovation within a realistic timeframe. Research questions and tasks include:

- How can we leverage artificial intelligence and machine learning to improve the efficiency of reporting? For instance, what are the requirements for automating the analysis of large marine datasets (from remote sensing, drones, or other long-term monitoring) to improve predictions of ocean conditions, coastal flooding, marine heatwaves or harmful algal blooms?
- What new or enhanced digital platforms can be used to support planning and management? For example, a "digital twin" simulation of Ireland's marine and coastal systems offering an interactive 4D visualisation, enabling policy makers to explore climate change scenarios, seabed dynamics or biological trends in real time?
- In what ways can improved data integration (across oceanographic, ecological, and socio-economic data streams) and high-performance computing be harnessed to increase forecast accuracy and lead-time for critical events (storms, coastal erosion hotspots, ecosystem shifts), thereby informing early warning systems and climate services?

PROJECT DELIVERABLES

Depending on the topic and nature of the research required, research outputs of the following type can result from this call:

- Literature reviews including industry reports as well as academic research, where appropriate
- Evidence synthesis and analysis, including identification of gaps in knowledge.
- Review of policies, policy options, and policy opportunities and supports.
- Foresight analysis.
- Proposals may also include laboratory analysis, vessel surveys, and data-based analysis or modelling experimental work.
- Peer reviewed open access journal articles and industry reports published over the period of funding.
- 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 briefings for relevant Government Departments and Agencies including Department of Agriculture, Food and the Marine (DAFM), Department of Climate, Energy and the Environment (DCEE), Fáilte Ireland, EPA, CSO, etc.
- 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.)
- Evidence of other research outputs to include conference posters and presentations, multidisciplinary activities and stakeholder engagement.

ADDITIONAL SPECIFIC REQUIREMENTS

Throughout the lifetime of the research projects funded, it is also anticipated that Principal Investigators will actively seek additional sources of 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.

- Where relevant, applicants for medium-scale studies may 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 (DAFM, DCEE, DoT, etc.) and their agencies (BIM, SFPA, NPWS, MARA, SEAI, EPA, Met Éireann, CSO, MI, IMDO, etc.) to ensure research is aligned with policy needs.
- 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 technical staff and teams is also welcome and in some cases advisable.

INTENDED IMPACTS

This funding call supports research and innovation that accelerates the transition to a sustainable and climate-neutral blue economy, strengthens the knowledge base for a healthy marine environment, informs marine policy and enhances Ireland's societal relationship with the ocean. It is designed to guide and align investments with national and international priorities, ensure research delivers maximum value to users and stakeholders, and advance Ireland's position as a leader in marine research and technology.

The research outputs should inform evidence-based policy in the topic areas. 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 €1,400,000 (€1.4 million) for projects ranging from 9 to 36 months commencing in early 2026. The Marine Institute expects to fund a maximum of 6-8 projects, subject to the quality and quantity of proposals received.

Please refer to the Guidelines for Applicants for further details on eligibility, costs covered, etc.

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, 7 October 2025**. 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:	7 August 2025
Closing date for applications:	7 October 2025
Expected announcement of results:	Early December 2025
Expected start date:	March to June 2026

ADDITIONAL INFORMATION/REFERENCE MATERIALS

- Impact 2030 - Ireland's Research and Innovation Strategy Department of Further and Higher Education, Research, Innovation and Science (2022).
- Ireland's Climate Action Plan
- European Green Deal
- EU Common Fisheries Policy
- Farm to Fork Strategy - European Commission
- National Marine Planning Framework
- Maritime Area Planning Act 2021
- The South Coast Designated Maritime Area Plan for Offshore Renewable Energy (SC-DMAP)
- ICES Working Group on Offshore Wind Development and Fisheries
- EU Nature Restoration Law
- EU Biodiversity Strategy to 2030
- Fit for 55 legislative package, the FuelEU Maritime Regulation (Regulation (EU) 2023/1805)
- Coastal Passenger Boat Audit Report - Fáilte Ireland (2023)