



# Attachment 4.6: Consistency of the Proposed Maritime Usage With the Marine Strategy Framework Directive (MSFD) and Ireland's Marine Strategy

A MISSING-Link between continental shelves and the deep sea: Addressing the overlooked role of land-detached submarine canyons.

Dr Michael Clare, National Oceanography Centre, Southampton

## 1. Introduction

The Marine Strategy Framework Directive (2008/56/EC) establishes the EU framework for achieving and maintaining Good Environmental Status (GES) of marine waters through 11 qualitative descriptors covering biodiversity, food webs, seafloor integrity, contaminants, marine litter, underwater noise and ecosystem function. Ireland implements the MSFD through its national Marine Strategy, including:

1. Initial Assessment and GES Determination,
2. Monitoring Programmes, and
3. Programmes of Measures.

This document was prepared by Dr Michael Clare, Dr Isobel Yeo, Professor Veerle Huvenne, Dr Rob Hall, Mr Alan Evans and Mr Guy Dale-Smith.

**Dr Michael Clare** is a Principal Researcher and the Mission Network Lead for Hazards and Pollution at the National Oceanography Centre, Southampton, where he has worked since 2015, before which he was a specialist in Offshore Survey and Marine Geohazards for Fugro. His work focuses on sediment-transport dynamics, submarine geohazards and deep-sea systems. He has served as Marine Scientific Adviser to the International Cable Protection Committee since 2020. Dr Clare has led and co-led offshore monitoring campaigns in submarine canyon settings, including work in Congo and Whittard canyons that deployed moorings instrumented with Acoustic Doppler Current Profilers (ADCPs) to record turbidity currents and bottom-current variability. He is also involved an expert in the acquisition, processing and integration of multibeam bathymetry, side-scan-style acoustic seafloor mapping and sub-bottom profiling with moored and seabed sensors to characterise seafloor processes and risks to infrastructure.

**Dr Isobel Yeo** is a Senior Researcher at the National Oceanography Centre, specialising in Marine Geohazards, with over 15 years experience working in Marine Geology research. Her work has focused on using hydrographic survey methods and bottom sampling to map hazardous phenomena and sampling of rocks and sediments to characterize hazards and recreate timelines. She has extensive experience working with Autonomous Underwater Vehicles (AUVs) and Remotely Operated Vehicles (ROVs) to acquire data and samples across all seafloor depths. She has worked closely with AUV teams, including on mission design and execution. She has been the Chief Scientific Officer on three expeditions (two onboard British Vessels) and has participated in 20 scientific seagoing expeditions.

**Professor Veerle Huvenne** is a Principal Researcher at the National Oceanography Centre, Southampton. She has over 20 years of experience in marine habitat mapping and benthic ecology, her work spans cold-water corals, submarine canyon systems and deep-sea benthic communities. She has participated in more than 25 international expeditions—often acting as Chief Scientist or scientific lead—and has spent in excess of 900 days at sea. Her work uses multidisciplinary approaches to integrate geological, geophysical and biological methods (e.g., ROV/AUV video imagery, sediment cores, multibeam bathymetry, sidescan sonar and habitat classification) to characterise complex deep-sea ecosystems and the dynamic processes that govern them.

**Dr Rob Hall**, Professor in Physical Oceanography at the Scottish Association of Marine Science. Dr Hall holds a PhD in Physical Oceanography and has over a decade of experience in shelf-sea and deep-ocean fluid dynamics, internal tide and wave processes, sediment transport and mixing, drawing on both observational deployments (including autonomous underwater vehicles and gliders) and numerical modelling. He has expertise in marine hydrodynamics, sediment transport and benthic-habitat interactions in the Celtic Sea

**Mr Alan Evans** serves as Head of Marine Policy at the National Oceanography Centre (NOC) in the UK and acts as a Marine Science Policy Adviser, bringing over two decades of experience in marine science, technology, and policy underpinned by a strong geoscientific background. At NOC, he leads the organisation's engagement with the global marine community through participation in international fora, bilateral partnerships, collaborative projects, and interactions with national governments—including UK Overseas Territories—and regional institutions. His expertise includes extensive application of the United Nations Convention on the Law of the Sea (UNCLOS), covering baseline and maritime-zone definition, continental-shelf delineation beyond 200 nautical miles, the mandate of the International Seabed Authority (ISA), and the enabling of marine scientific research and technology transfer. Internationally, Alan serves as the Alternate Head of the UK delegation to UNESCO's Intergovernmental Oceanographic Commission (IOC-UNESCO), where he chairs the Group of Experts on Capacity Development. He also contributes as a technical expert on the ISA Partnership Fund Board and previously advised the ISA/UN-OHRLLS "Women in Deep-Sea Research" initiative. Additionally, he represents NERC-UKRI at the European Marine Board, where he is vice-Chair.

**Mr Guy Dale Smith** serves as Head of Research Ship Operations at the National Oceanography Centre (NOC) in the UK, where he leads the planning, execution and oversight of marine research vessel campaigns and associated infrastructure, drawing on extensive maritime and operational experience. With a deep background in ship-based science support, Guy manages not only the logistics and safety of ocean-going missions but also the strategic alignment of NOC's fleet with scientific goals, ensuring that vessel operations maximise research impact while adhering to rigorous standards of marine safety and efficiency. His role spans coordination across multidisciplinary teams, vessels and international collaborations, forging strong relationships with science teams, engineering groups and external stakeholders to support downward-looking research in challenging marine environments.

## **2. Consistency with MSFD and Marine Strategy**

The proposed deep-sea scientific research activities in the Whittard Canyon and Gollum Channel systems are fully consistent with, and supportive of, the objectives of both the MSFD and Ireland's Marine Strategy in the following ways:

### **2.1. The project directly generates environmental data needed for MSFD assessments and GES reporting**

The project will produce high-quality datasets on:

- Biodiversity and benthic communities (via MPUS video transects and AUV imaging),
- Hydrography and water-column dynamics (via gliders, CTD/VMP profiling),
- Seafloor substrate, morphology and integrity (via coring, multibeam mapping, AUV surveys),
- Pollutants and anthropogenic particles including microplastics and contaminants (via sediment traps, water sampling and analysis),
- Organic carbon and nutrient transport pathways (via mooring instruments and sediment traps), and
- Suspended sediment and particle transport in deep-water canyons.

These data directly address major MSFD descriptors, including:

- D1 – Biodiversity
- D4 – Food webs
- D6 – Seafloor integrity

- D7 – Hydrographical conditions
- D8 – Contaminants
- D10 – Marine litter, including microplastics
- D11 – Underwater noise (the project produces only low levels of noise, but provides contextual data useful for understanding natural background conditions)

In doing so, the project enables improved MSFD assessments by filling major knowledge gaps in deep-sea Irish waters and contributing evidence needed for ongoing “GES determination”, “monitoring”, and “programmes of measures”.

## **2.2. The project can strengthen Ireland’s MSFD Monitoring Programme**

Ireland’s MSFD Monitoring Programme (2014 and ongoing updates) highlights deep-sea habitats, canyon systems, pollutants, sediment transport, benthic communities and microplastic pathways as areas with insufficient scientific data.

This project directly addresses these gaps by:

- Establishing systematic year-long mooring measurements in deep-sea canyon settings;
- Obtaining seafloor samples and imagery in locations where almost no baseline environmental data exist;
- Characterising water-column and seafloor processes that govern carbon, nutrient and pollution transfer to the deep sea.

As such, the project provides information that Ireland is currently required to monitor under the MSFD but cannot obtain without dedicated research.

## **2.3. The project improves understanding of deep-sea ecosystems that underpin MSFD Descriptor 6 (Seafloor integrity)**

The deep-sea Whittard Canyon and Gollum Channel are ecologically significant features hosting vulnerable habitats, including cold-water coral structures and canyon-associated benthic assemblages.

The project supports MSFD objectives by:

- Mapping and documenting seafloor morphology and habitats;
- Measuring sedimentation rates and disturbance;
- Assessing natural turbidity and sediment fluxes;
- Establishing baseline conditions against which future pressures (e.g. fishing impacts, climate-driven change, future industrial activity) can be assessed.

This directly enhances Ireland’s ability to determine whether deep-water habitats maintain their structure, function and productivity, as required under D6.

## **2.4. The project contributes to MSFD objectives on pollutants and marine litter (Descriptors 8 & 10)**

A core aim of the project is to characterise:

- Pathways of microplastics,
- Movements of anthropogenic particles,

- Distribution of pollutants,
- Transfer of contaminants from shelf seas to deep basins.

MSFD requires Member States to assess and manage contaminants and litter to ensure they do “not cause harm to the marine environment”. The project directly informs these requirements by providing rare deep-sea measurements necessary to:

- Track pollutant transport mechanisms;
- Identify accumulation zones within canyon systems;
- Provide new baseline reference data for Ireland’s D8 and D10 indicators.

This also strengthens Ireland’s Programme of Measures aimed at reducing marine pollution.

## **2.5. The project supports ecosystem-based management and Marine Spatial Planning**

MSFD explicitly requires an ecosystem-based approach to managing human activities. Ireland’s Marine Strategy and National Marine Planning Framework depend on robust environmental baseline information for offshore waters.

Because deep-sea Irish waters (particularly submarine canyons) remain poorly understood, the project:

- Provides data necessary to assess cumulative pressures,
- Helps identify sensitive habitats,
- Supports future marine protected area designation and management under Ireland’s forthcoming MPA legislation,
- Improves the evidence base for maritime spatial planning (Directive 2014/89/EU).

Thus, the research improves Ireland’s capacity to meet MSFD requirements for long-term ecosystem protection and sustainable use.

## **2.6. The project is low-impact and fully compatible with MSFD “Good Environmental Status” objectives**

The activities:

- Are temporary,
- Use only non-explosive, non-invasive scientific equipment,
- Have no permanent footprint,
- Generate minimal underwater noise,
- Do not significantly disturb biota, and
- Have a very small spatial footprint relative to the scale of the deep-sea environment.

Therefore, the project does not introduce pressures that would conflict with achieving or maintaining GES.

## **3. Conclusion**

The proposed maritime scientific research project is fully consistent with the objectives of the Marine Strategy Framework Directive and Ireland’s Marine Strategy because it:

1. Provides essential environmental data directly required by MSFD descriptors and national monitoring obligations;

2. Addresses major knowledge gaps in deep-sea Irish waters;
3. Supports GES assessment and reporting for biodiversity, contaminants, seafloor integrity, marine litter and hydrographical conditions;
4. Strengthens Ireland's ecosystem-based management and marine spatial planning;  
and
5. Does not introduce pressures that would hinder achievement of Good Environmental Status.