# BIM EMFAF Work Programme Project Report 2022

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| **BENEFICIARY:** | Bord Iascaigh Mhara |
| **PROJECT REFERENCE NUMBER:** | 22/SIS/DIS-BG010-BR042 |
| **NAME OF PROJECT:** | **Sustainable Development of Mesopelagic Resources** |
| **IMPLEMENTATION PERIOD:** | 1st January to 31st December 2022 |

## Project Scope

The global human population growth is driving demand for food, including marine proteins and lipids. Mesopelagic organisms represent the largest unexploited resource left in the world's oceans, with a recent biomass estimate of around 10 billion metric tons - 10 times larger than previous estimates. Our knowledge of the mesopelagic community in terms of biodiversity, the drivers of its biomass, its role in carbon sequestration, and its interactions with the epipelagic community, including commercial fish stocks, has major gaps. The main reason for these knowledge gaps is the lack of methods to observe and sample the relatively small organisms living at depths between 200m and 1000m. Both BIM and the Marine Institute's Fisheries Ecosystem Advisory Services have been involved in MEESO (https://www.meeso.org/), a €6m H2020 funded project focusing on mesopelagics. In total, 19 research partners from 10 European countries are participating in the project which is running from 2019 to 2022. Scientists within MEESO have been researching relevant topics to improve our understanding of the mesopelagic zone and are seeking to establish whether commercial exploitation can take place, whilst taking account of the sensitive and complex ecosystems involved.

Within the MEESO project, the Marine Institute (MI) is utilising the acoustic data collected during scientific surveys to determine the abundance of principally Mueller's pearlside (Maurolicus muelleri). In addition, the MI has been using new approaches to further understand the biology of mesopelagic fish. This includes eDNA, which is being used to identify the organisms in the mesopelagics layer and Stable Isotope Analysis (SIA), to quantify their trophic levels. BIM's focus has been on enhancing engagement and knowledge transfer between MEESO participants and Irish pelagic stakeholders (fishers, processors, net manufacturers, and engineers). Both virtual and in-person workshops have been delivered and further events are planned within MEESO.

Irish pelagic stakeholders have expressed keen interest to assess the sustainable development potential of mesopelagic fisheries. There is however a significant amount of further scientific work that is required at a national level over the coming years to establish whether it is appropriate to commercially exploit mesopelagic resources. The MI and BIM have collaborated within MEESO and there is potential to further develop this collaboration and build on this significant knowledge base.

The parties are both committed to further assessing the abundance of Mueller's pearlside (*Maurolicus muelleri*) and other mesopelagics resources and enhancing understanding of their biology. In addition to robust scientific assessments, coherent industry engagement is essential to ensure that the science drives any development, and this must be on a precautionary basis.

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## Objectives

In pursuit of these objectives, the MI will provide analytical and technical support in relation to the following key areas:

- Carry out a dedicated scientific survey off the west coast of Ireland to focus on acoustic assessments of Mueller's pearlside (*Maurolicus muelleri*) and other mesopelagic resources.
- Collect mesopelagic samples and carry out eDNA analysis to understand species compositions.
- Conduct Stable Isotope Analysis to quantify trophic levels.
- Assess performance of proposed net designs to target mesopelagic resources.

## Outcomes

BIM and the Marine Institute organised a dedicated acoustic survey on the RV Tom Crean during September 2022 – the Multi-disciplinary mesopelagic Scouting Survey (M2S2). This survey comprised three separate mini surveys at known key areas of concentration of the target species (*Maurolicus muelleri*). Each mini survey was conducted as a "hippodrome" study, involving repeated transects over the main area of concentration to quantify both temporal and spatial variability together. During the mini surveys the vessel carried out targeted pelagic sampling and collected eDNA water samples at appropriate depths. The design and the data collected have been used to start designing the geostatistical analysis.

The MI has been collaborating with ATU to develop eDNA approaches to understand the biology of the mesopelagic fish, and the mix of species characteristic of the mesopelagic zone. Limited sampling was possible in 2022 on the blue whiting survey, and more extensively on the M2S2 survey. Preliminary work has allowed sequencing of water samples. This obtained 1.5 million reads and one of these matched *M. muelleri*, the main target species. This was very promising, although there were concerns about cross-contamination from other fish material on board. The M2S2 survey allowed these issues to be resolved, and analyses are ongoing. The MI and BIM have developed a three-year project to build on previous work (MEESO H2020 project), including the 2022 M2S2 survey. This will allow a more coherent understanding of mesopelagics off the Irish coast and in the future an appraisal of whether or not these resources can be sustainably fished.

## Summary of Project Spend

| Summary of Spend | |
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| Total Approved Costs | €232,535.00 |
| Total Eligible Expenditure | €232,535.00 |
| EMFAF Eligible Expenditure | €116,267.50 |
| Exchequer | €116,267.50 |

Report by: Michael Gallagher

Date: February 2023

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