



MRes Project: Enhancing the Benthic Impacts Tool to incorporate key subtidal mud species for application in North East England

Supervisors: Fabrice Stephenson (Newcastle University)

Framework: Induction for the MRes is in September 2025, the first semester October-December inclusive is largely taken up with taught modules, preparation for the project (NES8005) will be completed in January-February (including formal proposal for summative assessment), data gathering and analysis will be in the period March-June, with July to mid-September devoted to writing up. The main outputs are a research paper, a literature review and oral presentation due by mid-September. The research paper is assessed by External and Internal Examiners who are not involved in project supervision.



Duration of Research Project: Intensive work during January-September 2026

Figure 1 Subtidal mud within Coquet to St Mary's MCZ.

The Project: Inshore subtidal mud habitats along the Northumberland coast support diverse benthic communities, including ecologically, functionally and commercially important species such as *Nephrops norvegicus*, slender sea pen (*Virgulia mirabilis*), white furrow shell (*Abra alba*), Baltic tellin (*Macoma balthica*), striped venus clam (*Chamelea gallina*) (JNCC, 2004; Tillin et al., 2010). As such, parts of the mud habitat



Figure 2 Coquet to St Mary's MCZ habitat map with subtidal mud feature highlighted in red.

has been designated as a protected feature of Coquet to St Mary's Marine Conservation Zone (MCZ). These habitats may be sensitive to anthropogenic pressures including bottom-towed fishing gear (Hiddink et al., 2006). The Northumberland Inshore Fisheries and Conservation Authority (NIFCA) are the statutory regulators for fishing activity with their jurisdictional area and must manage fishing activity in line with the conservation objectives of the MCZ.

The Benthic Impact Tool models the impacts and recovery from bottom towed gear on different subtidal sediment habitats (MMO, 2021). The current tool was developed to be used across a large geographical range and requires further locally specific information for higher confidence in use in the inshore sediment habitat in the North East coastal area to more effectively inform management in these soft sediment environments.

This project aims to modify the tool's input parameters to better reflect the sensitivity, recovery potential, and functional roles of species associated with local inshore subtidal mud habitats. Incorporating local

data and expert knowledge will allow for more accurate impact assessments and support evidence-based decision-making for management of the inshore otter trawl fishery operating within the Northumberland IFCA district.

Project aims:

- 1. Species Identification: Review existing datasets to establish presence of key species
- 2. BIT adaptation: Modify the BIT parameters with information on local species updating depletion rates and recovery rates
- 3. Scenario testing: Run simulations using historical fishing activity data and hypothetical management scenarios to test the sensitivity and decision-support utility of the adapted tool.

4. Management integration: Recommend pathways for integrating the adapted BIT into NIFCA's management planning processes and inform adaptive fisheries management.

Expected outcomes:

- A version of the BIT adapted for the benthic communities of Northumberland's inshore mud habitats.
- A regional sensitivity and recovery database for characteristic mud taxa.
- A series of scenario-based outputs to support spatial decision-making.
- Contribution to sustainable fisheries governance in MPAs in the North East.

Eligibility: You need at least an upper 2.1 BSc degree in a relevant subject, have an excellent grounding in statistics, and have good knowledge and preferably experience with R statistical software.

To Apply:

For any enquiries related to the project please contact Dr Fabrice Stephenson (<u>fabrice.stephenson@newcastle.ac.uk</u>). For any enquires about the MRes course, please contact Professor Pip Moore (<u>Pip.Moore@newcastle.ac.uk</u>).

To apply, please use the application portal (<u>https://www.ncl.ac.uk/postgraduate/degrees/4857f/#how-to-apply</u>).

References:

Hiddink, J.G., et al. (2006). *Cumulative impacts of seabed trawl disturbance on benthic biomass, production, and species richness in different habitats.* Canadian Journal of Fisheries and Aquatic Sciences, 63(4), 721–736

JNCC. (2004). *Marine Habitat Classification for Britain and Ireland, Version 04.05.* Joint Nature Conservation Committee

MMO. (2021). Assessing the sensitivity of benthic habitats and species to demersal fishing activities using the Benthic Impacts Tool. Marine Management Organisation Research Report MMO1180.

Tillin, H.M., et al. (2010). Assessing the sensitivity of subtidal sedimentary habitats to pressures associated with marine activities. Marine Life Information Network (MarLIN) and Defra