

Cullen Fellow: Modelling the food web in the Irish Sea in the context of a depleted commercial fish community (PhD Award)

Background

The management of Irish Sea fisheries is currently challenged by a lack of recovery in some fish populations (cod, whiting and sole) despite large reductions in fishing effort. Total mortality remains very high for gadoid stocks in the Irish Sea. There have also been significant changes in growth rates, productivity and maturity for various species. A key requirement would be able to develop models to address these issues in a multispecies and ideally whole ecosystem context. Two modelling approaches have been identified; Ecopath with Ecosim - EwE), and Multispecies fish community modelling. EwE has been widely used around the world to address similar fisheries and ecosystem management questions. The other approach has been developed for use in the North Sea.

Proposal

We propose a **three- year PhD project** to investigate the dynamics of the food web based around the commercial fish species in the Irish Sea. The project will aim to:

- Develop an updated Ecopath with Ecosim (EwE) model for the Irish Sea, based on existing models and populated with new data from surveys, and landings. The trophic interaction between functional groups data would be updated using expert judgement from a range of industry, NGO and science stakeholders.
- Part of the PhD will be to compare findings with other multi-species models used internationally.
- Develop scenarios with stakeholders to investigate the possible food web based explanations for the unusual high mortality, as well as the changes in growth rate, productivity etc.
- Determine, if possible, the explanatory factors underpinning the recovery failure in the Irish Sea commercial fish stocks, and to propose mitigating management actions on the basis of these findings. It is possible that the explanation for the issues seen for Irish Sea commercial fish species are not food web or ecosystem based, however, the models will still be valuable in describing the Irish Sea food web and ecosystem, and in eliminating such explanations. As such this will make a good PhD, as the outcomes are valuable regardless of outcome.

Outcome

Outcome for the project will be most importantly, a PhD for the candidate that will well place them for work in multi-species fisheries and food webs that is the likely track for fish stock management over the next decade. The Marine Institute will also be able to deploy one or more state-of-the-art food web models with which to help determine management approaches for the Irish Sea, and underpin advice in this region.

Specific Requirements

The Fellow should have a background in marine ecology, and in particular modelling (ideally multi-species) and trophic relationships within the ecosystem. The fellow should be mathematically and computationally literate and experienced. The host institution must have proven experience in developing and refining Ecopath models.

The applicant must be from a HEI who can award a higher degree and may be located outside the island of Ireland.

Financial Details

The Fellowship award will be up to €24,000 per annum. This amount comprises a maintenance award of €16,000 to the student as well as payment of fees to the host institution. The maximum fees payable to the college will be €6,000 per annum. The Fellowship award includes a travel budget of up to €2,000 for the sole use of the student and is payable on a reimbursement basis direct to the host institution at which the postgraduate student (Fellow) is registered.

Marine Institute Co-Supervisor(s)

Prof David Reid, FEAS