

## Proposal Outline

<b>Topic</b>	Impacts of Climate Change on Commercial Fish Stocks in Irish Waters
<b>Research Theme</b>	Bioresources – Wild Resources
<b>Background and Rationale</b>	<p>Climate change can be expected to impact on fisheries through a number of different pressures, and mechanisms (Heath et al 2012). The most obvious pressures would be temperature and acidification, although there would also be expected changes in salinity, sea level and extreme weather events. There may also be second order effects such as changes in the plankton abundance etc. impacting on the food web. The mechanisms of action could include changes in the abundance distribution, productivity, spawning and nursery areas, migration routes and phenology (cyclic and seasonal behaviour – spawning time, migrations etc.). For fisheries (excluding shellfish), the main pressure is likely to be via changes in temperature, while for shellfish fisheries, acidification will also be important.</p> <p>With a focus on distribution/migration and temperature effects, it is key that Ireland is something of a biodiversity cross roads. There are both northern (Boreal) and southern (Lusitanian) biogeographical affiliations within common commercial fish species in Irish waters. For example, cod, haddock and herring are all boreal species, and are generally found at the southern end of their range in the Celtic Sea. Equally there are Lusitanian species in the same waters. An analysis was carried out on changes in species diversity in Irish waters as part of the <a href="#">Irish Ocean Climate and Ecosystem Status Report</a> (Nolan et al 2009). The analysis for fisheries showed that boreal species were persisting in the Celtic Sea, but also Lusitanian species were becoming more prevalent. The opposite was true in NW waters where boreal species were declining, with no concomitant rise in Lusitanian species (Lynam et al 2010).</p> <p>Given the progression of climate change effects, it is important to revisit this work and map any changes that have occurred since, and then use IPCC climate projection scenarios to determine what is likely to happen, and possible adaptation planning.</p>
<b>Scope of Research (Scientific/ Technical Challenge)</b>	<p>A key element of this fellowship will be to carry out habitat suitability analyses in terms of temperature, depth and substrate, for instance, to identify the current ecosystem preferences by species, and then project these into the climate change scenarios for the near to medium term.</p> <p>The fellowship will also include aspects such as breeding and recruitment success or failure in the context of a changing ecosystem, as well as nursery ground use. It should also consider changes in migrations and movements e.g. mackerel migration</p>

	<p>where the fish have moved much further north and west in the summer months in recent years.</p> <p>The fellow will be expected to revisit the Lynam analysis, and also draw on the body of emerging work on climate change and fisheries, identify the key changes in fish distribution etc. and the key changes in the physical, chemical and biological oceanography in Irish waters.</p> <p>A key part of the work is to carry out some form of risk analysis, identifying the most impacted species and fisheries and where appropriate identify adaptation mechanisms (ref inter-sectoral Climate Change Adaptation approach led by the Department of Agriculture, Food and the Marine).</p> <p>The fellow would ideally be a qualified marine ecologist with oceanographic modelling skills.</p>
<p><b>Expected Impact</b></p>	<p>There should be considerable opportunities for this fellowship to leverage other complementary funding, such as an upcoming H2020 call <i>BG-10-2020 Fisheries in full ecosystem context</i>, in addition to future opportunities under Horizon Europe.</p> <p>The fellow will produce policy briefs for stakeholders including DAFM, and publish their research findings as widely as possible through peer-reviewed papers, conference presentations, articles, etc.</p>
<p><b>Specific Collaboration</b></p>	<p>The fellow will be based in Fisheries Ecosystems Advisory Services, Marine Institute and located in Newport, but will also be supported by close collaboration with the oceanographic modellers working in the Institute.</p> <p>The fellowship would also allow scope for collaboration with other national and international research organisations including CEFAS, in particular <a href="#">Dr Chris Lynam</a> (author of the 2010 paper).</p>
<p><b>Location of Fellow</b></p>	<p>Post-Doctoral Fellow will be based full-time in the Marine Institute Newport Research Facility</p>
<p><b>Duration and Funding Available</b></p>	<p>3-5 years</p> <p>€100,000 per annum maximum (e.g. €400,000 for 4 years duration)</p> <p><b>Note:</b> Reduced overheads rate of 15% as based in the Marine Institute</p>

## References

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ICES Journal of Marine Science (2019)

[Critically examining the knowledge base required to mechanistically project climate impacts: A case study of Europe's fish and shellfish. Fish and Fisheries](#)

Catalan, I. A., D. Auch, et al.  
Wiley Online Library (2019)

[Towards climate resiliency in fisheries management](#)

Holsman, K. K., A. Haynie, et al.  
ICES Journal of Marine Science (2019)

[Uncertainties in projecting climate-change impacts in marine ecosystems](#)

Payne, M. R., M. Barange, et al.  
ICES Journal of Marine Science 73(5): 1272-1282 (2016)

[Projecting the future state of marine ecosystems, "la grande illusion"?](#)

Planque, B.  
ICES Journal of Marine Science 73(2): 204-208 (2016)

[Review of climate change impacts on marine fish and shellfish around the UK and Ireland](#)

Heath, M.R., Neat, F.C., Pinnegar, J.K., Reid, D.G., Sims, D.W., & Wright, P.J.  
Aquatic Conserv: Mar. Freshw. Ecosyst. 22: 337–367 (2012)

[A methodology for community-level hypothesis testing applied to detect trends in phytoplankton and fish communities in Irish waters](#)

Lynam, C.P., Cusack, C., & Stokes, D.  
Estuarine, Coastal and Shelf Science 87(3): 451-462 (2010).