

Post-Doctoral Fellowship: Proposal Outline

Topic	From tagging to trophic roles: Understanding the place of Atlantic Bluefin Tuna (<i>Thunnus thynnus</i>) in the trophic ecology of Irish waters
Research Theme(s)	<ol style="list-style-type: none"> 1) Climate Change 2) Marine Food Webs 3) Spatial Ecology
Background and Rationale (including Strategic Priority)	<p>Atlantic bluefin tuna (<i>Thunnus thynnus</i>) (ABFT) are a large endothermic predatory fish with a broad distribution across the North Atlantic. They are an important commercial fisheries species, that suffered severe population declines from overexploitation in the 1990s and 2000s. This resulted in the IUCN classifying the species as ‘Endangered’ in 2011.</p> <p>However, their populations started to recover after increased management and the introduction of total allowable catch (TACs) limits imposed by The International Commission for the Conservation of Atlantic Tunas (ICCAT). In the last decade ABFT have also reestablished in historic foraging grounds, including Ireland, from which they disappeared for approximately 10 years between the mid-2000s to mid-2010s. As of 2021, the status of ABFT was downgraded and are presently listed as ‘Least Concern’ by the IUCN, with their populations generally considered to be doing well at a species level. Currently there is no quota for ABFT in Ireland, however there is growing interest in the possibility of working towards an allowable catch.</p> <p>A well-designed international tagging programme by ICCAT, developed over a schedule of several years and with a progressive methodological approach, has been important in improving the understanding of the ABFT ecology and ethology and for developing better stock assessment. Tagging programmes are now linked to the management plans for ABFT in the Eastern Atlantic and Mediterranean. Previous tagging work by BIM in 2004 and 2005, and more recently by the Marine Institute since 2016 have filled in the gaps in migratory history and origin of ABFT appearing off the western Irish seaboard.</p> <p>To date, the Marine Institute has deployed electronic tags on over 150 ABFT from the Irish coastline and collected accompanying metrics and tissue samples from this species. Additionally, the recreational catch and release (CHART) fishery was introduced in Ireland in 2019 and has become economically valuable at both a local and national scale attracting anglers from across the globe and supporting several SMEs.</p>

	<p>Although ABFT have been frequenting Irish waters annually for the past decade, maintaining appropriate management is essential to safeguarding populations in Ireland.</p> <p>This project will add value to the previously funded PhD Cullen on Atlantic Bluefin Tuna tagging and the Tuna CHART programme. It aligns with Marine Institute Strategic Priorities; Meeting Climate, Biodiversity and Seafood Security Challenges and Delivering Impact through research and innovation.</p> <p>This research will deliver an improved understanding of how a recreationally and commercially important species may be impacted by a changing climate. It aims to produce impactful science, delivering the impact through cutting-edge research and innovation. It will use tools based in telemetry and genetics/biochemical analysis and will build-on data and analysis already collected by the Marine Institute. As such, this research will develop our research capabilities forging new collaborations at a national scale, whilst delivering excellence through scientific output that is of international importance.</p>
<p>Scope of Research (Scientific/ Technical Challenge)</p>	<p>The overarching aim of this fellowship is to reveal the spatial, ecological and economic dynamics of ABFT around Ireland now and into the future.</p> <p>ABFT have a broad thermal tolerance. However, habitat suitability preference models developed using data from fish tagged in Ireland, found a preference of 15 – 18 °C, and that in warmer years, ABFT bypassed Irish waters to forage at higher latitudes (McNicholas et al. 2024). Additionally, unpublished data from the CHART fishery analysed as part of the ABFT Cullen PhD scholarship, found catches in the programme peaked between 12.5 – 15 °C.</p> <p>As the climate continues to change and warming events are predicted to increase in frequency and intensity, understanding the impact these changes may have on ABFT populations and captures is valuable for future management decisions for this recreational fishery. Furthermore, understanding how ABFT interact with prey species, many of which are commercially valuable (e.g. mackerel, sprat, pollock), is also important, both for understanding the factors driving ABFT to Irish waters, and their impact on marine ecosystems while here. As we move towards the later stages of Marine Protected Area development in Ireland, these insights are also relevant to spatial planning.</p>

	<p>The fellowship should address key research objectives as follows:</p> <ul style="list-style-type: none"> • Using muscle-biopsy samples already accumulated from tagged tuna and newly collected anal swabs, pilot the use of biochemical analysis on dietary tracers to disentangle the prey species within the common tuna environment. Compare the potential temporal changes in this distribution. • Compare distribution patterns of ABFT to prey species (e.g. mackerel, pollack, sprat) to understand drivers of ABFT movements and their trophic role in Irish marine ecosystems. • Leverage existing tagging and movement data (from both acoustic, satellite and CHART data) to forecast regional and seasonal changes in ABFT fine scale distributions due to a changing climate to optimise future management decisions. • Undertake an economics and social science study of the ABFT CHART program to understand the broad value of the species to the Irish recreational sector and coastal communities more generally. A variety of data are already being collected through the CHART program that would inform this objective.
<p>Expected Impact(s)</p>	<p>The fellow will support the production of policy briefs for managers and stakeholders, and publish their research findings as widely as possible through peer-reviewed papers, conference presentations, articles, etc.</p> <p>The fellow will add value to core Marine Institute programmes such as Tuna CHART and ABFT tracking studies. As well as providing additional scientific evidence to ABFT advisory services on tuna, specifically DAFM and ICCAT.</p>
<p>Outcomes</p>	<p>This project would provide a range of insights into the factors that influence ABFT movements in Irish waters. Specifically, it will explore:</p> <ol style="list-style-type: none"> a) the ecological impact ABFT have on Irish marine ecosystems, particularly in terms of predator-prey dynamics; b) the potential future distributions of ABFT stocks and how climate change may affect future distribution of ABFT in Irish waters; and c) Socio-economic impacts of ABFT angling, including its contribution to the Irish economy.



	<p>This research is especially important and timely given the need to ensure the effectiveness and benefits of the CHART programme, discussions around quota for ABFT, and the observed northward shift in ABFT distribution linked to recent coastal warming events. Integrating these ecological and socio-economic perspectives is essential to inform the sustainable management of ABFT and related species.</p>
Specific Collaboration	Marine Institute and Inland Fisheries Ireland (Tuna CHART collaborator)
Location of Fellow	Successful Higher Education Institute or Public Research Body (Republic of Ireland or Northern Ireland)
Duration and Funding Available	<p>4 years</p> <p>€100,000 per annum (i.e. total €400,000 maximum for duration of four years)</p> <p>This fellowship is funded by the Marine Institute</p>
References	<p>ICCAT. (2018). BFT 18-02: Recommendation by ICCAT establishing a multi-annual management plan for bluefin tuna in the eastern Atlantic and the Mediterranean Sea (pp. 1–46). https://www.iccat.int/Documents/Recs/compendiopdf-e/2018-02-e.pdf</p> <p>McNicholas, G. E., Jackson, A. L., Brodie, S., O'Neill, R., Ó'Maoiléidigh, N., Drumm, A., ... & Payne, N. L. (2024). Seasonal variability of high-latitude foraging grounds for Atlantic bluefin tuna (<i>Thunnus thynnus</i>). <i>Diversity and Distributions</i>, 30(8), e13865.</p> <p>Wögerbauer C, Maxwell H, Drumm A, Waters C, and Roche WK 2025. Report on Ireland's Atlantic bluefin tuna catch, tag and release data collection programme 2024. Ireland's Tuna CHART Programme Report. Inland Fisheries Ireland, Dublin. 21pp.</p>