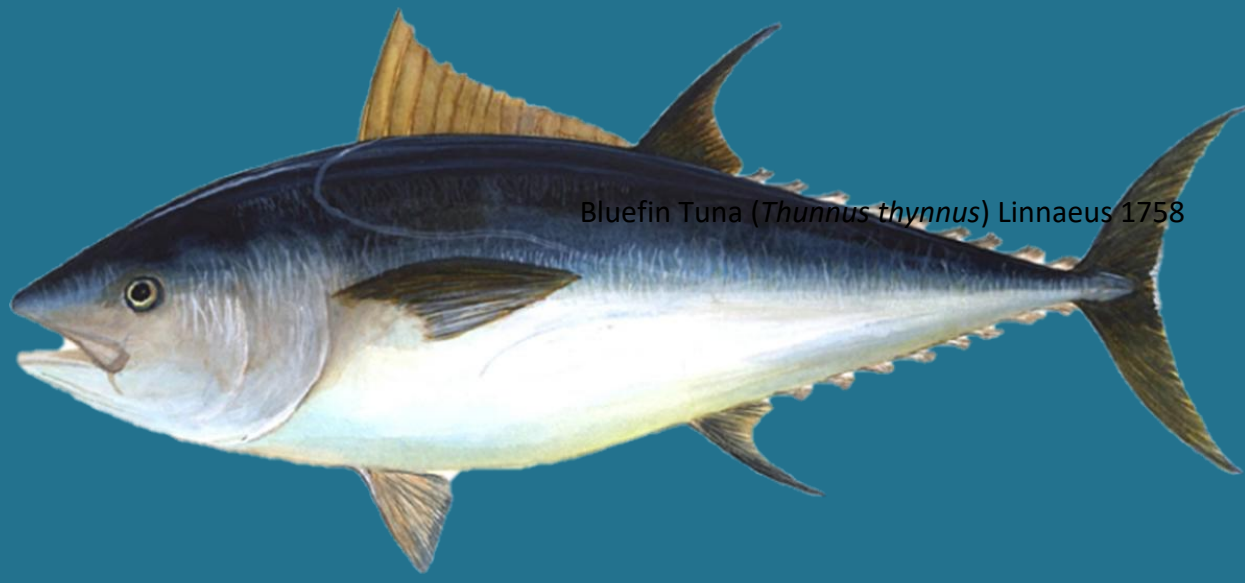
THE ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (GBYP Phase 14)

Final report on tagging activities in the Celtic Seas Area 2024



Bluefin Tuna (*Thunnus thynnus*) Linnaeus 1758

Hugo Maxwell, Catherine Waters, Alan Drumm, , Joseph Cooney, Ciaran Kelly, Barbara Block, Robbie Schallert, Michael Castleton.

This project is co-funded by the European Union

Foras na Mara
Marine Institute

Authors of the report: Hugo Maxwell, Catherine Waters, Alan Drumm, Joseph Cooney, Ciaran Kelly.

Contributors to the report from Stanford University: Barbara Block Robbie Schallert , Michael Castleton.

Marine Institute Newport, Fisheries Ecosystems Advisory Services
Furnace, County Mayo, F28PF65
Ireland
March 2025

Contact – hugo.maxwell@marine.ie

Cover Image: Wikimedia Commons

Table of Contents

1. Executive Summary of bluefin Tuna Satellite Tagging in Ireland, 2023

In July 2024, the Marine Institute successfully responded to a call for expressions of interest for the Atlantic-Wide Research Programme for Bluefin Tuna (Phase 14). As a result, the Institute was awarded four satellite tags and eight acoustic tags. Additionally, the Marine Institute provided 5 satellite tags, 2 acoustic tags and secured funding to support the deployment of all tags, vessel charter, and the production of this report.

All tagging activities were conducted under an approved project license from the Irish Health Products Regulatory Authority (HPRA: AE19121_P007) by licensed and trained personnel. The Irish Sea Fisheries Protection Agency (SFPA) was informed of the programme, including the identities of the vessels, skippers, and scientific personnel involved. Furthermore, the Marine Institute was included in the International Research Mortality Allowance (RMA) by ICCAT, which also supplied coded floy tags for the identification of recaptured fish. In July 2024, a call for tenders was issued for the charter of a commercial/recreational fishing vessel to support the tagging operations.

Satellite tagging of Atlantic bluefin tuna was successfully carried out in Donegal Bay (North-West Ireland) over two days—October 3rd and October 8th. During this period, seven individuals were tagged and released with ICCAT-GBYP-owned Wildlife Computers pop-off satellite archival tags (PSATs), Innovasea V16 acoustic tags, and numbered floy tags (Table 1).

Of the 12 tags provided by ICCAT, one GBYP Acoustic V16 transmitter was not deployed due to operational constraints.

Additionally, between September 16th and November 4th, the Marine Institute tagged and released five more Atlantic bluefin tuna in Donegal Bay. These individuals were fitted with either Wildlife Computers or Microwave Telemetry PSATs, in tandem with Innovasea V16 acoustic tags and ICCAT-issued floy tags (Table 2).

2. Introduction

Electronic tagging using archival tags by Block et al. (2005) highlighted the potential importance of the coast of Ireland and the UK as migratory routes for Atlantic bluefin tuna. A 191 cm fish tagged in waters off North Carolina showed trans-Atlantic migrations to the Mediterranean Sea and multi-annual site fidelity to waters off Ireland and the UK. This single track suggested that after a juvenile foraging period in the west, Atlantic bluefin foraged in the waters of the east Atlantic off Ireland and then

undertook migrations to the Balearics and other known Mediterranean spawning areas. Many other western released fish have moved into these waters (Block et al. 2005). The first dedicated electronic tagging activity off Ireland was conducted in 2003 and 2004 by a scientific team from Stanford University and An Bord Iascaigh Mhara - Irish Sea Fisheries Board (Cosgrave et al, 2008; Stokesbury et al. 2007). Tagging of fish in Irish waters demonstrated that Atlantic bluefin released in Irish waters travel between European foraging grounds, known eastern breeding regions (Mediterranean Sea; Malta) and western Atlantic waters. These data also highlighted a tentative link between bluefin caught off Ireland and western management regions. In addition, recent electronic tagging of ABFT off Scotland has shown local movements of Atlantic bluefin tuna around Scottish waters (Neat et al. 2014), to the north of Ireland, and further south. Given these insights it is important that stock of origin, habitat utilisation and large-scale movement patterns of these Atlantic bluefin are characterised in more detail to ensure that the population models and concepts used in Atlantic bluefin tuna stock assessment and Management Strategy Evaluation (MSE) are parameterised as accurately as possible.

Investigation of the distribution and movements of Atlantic bluefin tuna in Irish waters is now a research priority for Ireland. The ocean waters off south Donegal are currently regarded by the International Commission for the Conservation of Atlantic Tuna (ICCAT) as an important area for Atlantic bluefin tuna and indications are that significant numbers arrive in the area over the period August to November each year. The Department of Agriculture Food and the Marine (DAFM) requested that the Marine Institute carry out a bluefin tagging programme in autumn 2016 to support the International Commission for the Conservation of Atlantic Tuna (ICCAT) Atlantic-wide research programme for bluefin tuna (GBYP).

ICCAT is an inter-governmental fishery organization responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas. ICCAT compiles fishery statistics from its members and from all entities fishing for these species in the Atlantic Ocean, coordinates research, including stock assessment, on behalf of its members, develops scientific-based management advice, provides a mechanism for Contracting Parties to agree on management measures, and produces relevant publications. The Atlantic-wide research programme for bluefin tuna was officially adopted by the ICCAT Commission in 2008 with a key priority being to improve understanding of key biological and ecological processes through electronic tagging experiments to determine habitat and migration routes. GBYP was adopted as official acronym of the research, which was initiated at the end of March 2010.

ICCAT manages Atlantic bluefin stocks under a two stock hypothesis for management and assessment:

1. Eastern Atlantic Ocean and Mediterranean Sea stock, that spawns in the Mediterranean Sea.
2. Western Atlantic Ocean stock, that spawns in the Gulf of Mexico,

with a boundary line dividing the stocks at 45 W longitude.

Results of Block et al. (2005) as well as tagging research by others including ICCAT and their collaborators indicates that movement across the currently assumed east-west boundary in the Atlantic, does occur. Scientists have used the spatial data to improve management models (Taylor et al. 2011, Kerr et al. 2016). ICCAT now recognises the need to develop quantitative knowledge of mixing rates and integrate this knowledge into the current assessments, as well as new models to improve the multiple stock evaluation processes.

The Mediterranean and Eastern Atlantic bluefin tuna (considered a single stock) is a highly regulated species with annual catch limits set by the International Commission for the Conservation of Atlantic Tunas (ICCAT) based on scientific advice.

The E.C. became a Contracting Party to ICCAT (the International Commission for the Conservation of Atlantic Tunas) in 1997. EU TACs and quotas for bluefin Tuna were set by Council for the first time at the December, 1997 meeting in order to implement ICCAT catch limits/TACs for these species. Ireland did not have a track record of targeting bluefin tuna and does not have a quota. Ireland has access to a by-catch "others" quota for MSs without a quota share to cover by-catches of BFT in commercial fisheries subject to certain conditions. Ireland has no quota to cover recreational fishing for BFT and has had no such quota since 1997. This tagging programme has been developed to improve understanding of the stock and migratory patterns.

Background to Marine Instiute ABFT tagging

Since 2016, the Marine Institute has conducted extensive satellite tagging of Atlantic bluefin tuna in Irish waters under its own programme and through ICCAT's GBYP programme via MoU agreements. The primary objectives have been to identify spawning stocks, assess stock mixing, and investigate post-tagging behaviour.

The programme began in 2016, with expert guidance from Stanford University (USA) and Acadia University (Canada), leading to the successful tagging of 16 bluefin tuna off Donegal. Training in handling and tagging large tuna was provided to Marine Institute staff to support future research.

From 2017 to 2019, tagging efforts continued in Donegal Bay in partnership with Queen's University Belfast and Trinity College Dublin, expanding research to include early behaviour and swimming responses post-tagging.

- 2017: 9 PSATs and 3 accelerometer tags deployed.
- 2018: 24 PSATs and 4 accelerometer tags deployed (ICCAT GBYP Phase 8).
- 2019: 12 PSATs deployed (ICCAT GBYP Phase 9).

In 2020, 27 satellite tags were deployed—17 Lotek tags for GBYP (Phase 10) and 10 additional tags funded by the EU EMFF Sustainable Fisheries Programme.

In 2021, the Marine Institute deployed 14 PSATs in Donegal Bay, but due to the low presence of bluefin tuna later in the season, the 9 allocated GBYP Phase 11 tags could not be deployed despite extended tagging efforts.

Tagging resumed in 2022, with five GBYP PSATs deployed on August 8th in Donegal Bay, followed by 13 additional tags in Donegal Bay (n=8) and Courtmacsherry Bay (n=5) between August 9th and October 11th.

In 2023, all eight MoU tags for GBYP (Phase 13) were successfully deployed in Donegal Bay over two consecutive days (September 31st – October 1st). Additionally, the Marine Institute deployed nine more PSATs on October 1st and 17th in Donegal Bay.

Tagging Operations in 2024

In 2024, a total of 11 MoU tags for the GBYP (Phase 14) were deployed in Donegal Bay (North-West Ireland) between October 3rd and October 8th. During this period, eight Atlantic bluefin tuna were successfully tagged and released using ICCAT-GBYP-owned Wildlife Computers pop-off satellite archival tags (PSATs), Innovasea V16 acoustic tags, and numbered floy tags (see Table 1).

The specific breakdown of these tagged individuals is as follows:

- Four tuna were dual-tagged with both a PSAT and an acoustic tag.

- Three tuna were tagged only with GBYP-owned Innovasea V16 acoustic tags.

- One tuna was tagged with a Marine Institute PSAT alongside an ICCAT acoustic tag.

In addition to these electronic tags, all individuals were also tagged with conventional ICCAT floy tags as part of the Irish Catch, Tag, and Release (CHART) Programme. One GBYP Acoustic V16 transmitter was not deployed due to due to low numbers of tuna encountered later in the season, limiting tagging opportunities.

Beyond the MoU tagging effort, the Marine Institute independently tagged and released five additional Atlantic bluefin tuna in Donegal Bay between September 16th and November 4th. These individuals were equipped with either Wildlife Computers or Microwave Telemetry PSATs, alongside Innovasea V16 acoustic tags and ICCAT-issued floy tags.

A summary of five additional Marine Institute fish:

- Two individuals were tagged exclusively with satellite tags—one fitted with a Microwave Telemetry PSAT and the other with a Wildlife Computers PSAT.

- Three individuals were dual-tagged with both a Wildlife Computers PSAT and an Innovasea V16 acoustic tag, one of which was from the GBYP programme.

As with the MoU-tagged fish, all five tuna were also tagged with ICCAT conventional floy tags as part of the CHART Programme.

2.1 Legislative/formal preparation:

Tagging was carried out under an Animal Welfare Licence (Project AE19121/P007 as required under Directive 2010/63 /EU and S.I. No. 543 of 2012).

ICCAT included the Marine Institute in the International Research Mortality Allocation (RMA) in 2018.

The Irish Sea Fisheries Protection Authority were notified of the tagging programme.

2.2 Financial preparation:

ICCAT provided 4 pop-off satellite archival tags as well as 8 acoustic transmitter tags under the MOU while funding for vessel time and Marine Institute support staff was provided for by the Marine Institute for deployment of the MOU tags. Marine institute satellite tags as well as vessel time and Marine Institute support staff were funded by the Marine Institute in 2024.

In 2024, four experienced skippers were tendered and the contract was awarded to skippers of the Leah C (Northwest Ireland), a vessel which had previously been used for tagging bluefin tuna from 2016 to 2022, and the Radiance based on the South-West coast of Ireland a vessel licenced for bluefin tuna recreational angling, previously used for angling and tagging tuna in 2022 and 2023 (Appendix II).

3. Tagging Locations and Methods

Pop-up satellite transmitting tags are designed to track the large scale movements and behaviour of pelagic fish and other animals. Depth, temperature and light-level data are used to estimate location. At a user-specified date and time, a pin is corroded, releasing the tag to float to the surface and transmit summarised information via the ARGOS satellite network. Daily longitude of the migration track, is calculated onboard the tag using geo-location by light level techniques. Daily latitude can be calculated from transmitted light level curves using software provided by the tag manufacturer. The results provide the migration path and depth and temperature preferences of the study animal, as well as oceanographic data, in the form of depth-temperature profiles.

All fish were tagged off the coast of Donegal (North-West Ireland) within sight of shore (Figure 1). A total of four PSAT tags and eight acoustic transmitter tags were provided by the ICCAT GBYP programme, with tag codes and models detailed in Table 1. Additionally, the Marine Institute supplied five more tags, as outlined in Table 2.

Tagging operations were conducted using a single vessel, the Leah C, operating in Donegal (North-West Ireland). This vessel is equipped with a transom door, allowing fish to be safely brought on board for the tagging procedure.

All fish were captured using angling methods and squid spreader bar lure setups with up to 11 separate plastic squid lures per rig. Only the last in the train bears a hook. Once the lure is taken the fish are played to the boat as quickly as possible and landed through the transom door via a ramp using a lip

hook technique developed by the Block lab (Block et al. 2001). On board, the team performed individual tasks e.g. placing of wet cloth over the eyes of the fish to keep the fish calm, constant irrigation of the gills with a hose pumping fresh saltwater, insertion of the PSAT into the dorsal musculature using a titanium tag dart with retention loop. Two other numbered marker tags (spaghetti tags) were also applied to aid in recovering information form tagged fish. Small samples of tissue were removed from the dorsal musculature and pectoral fin for genetic analyses. As rapidly as possible the fish were released back into the water. The on-board procedure takes approximately 2 to 4 minutes. Straight fork length and girth were recorded as well as comments on the fish appearance in general, the landing, tagging and release condition of the fish upon release. The GPS coordinates of hook-up as well as sea surface temperature and depth is noted and recorded. Details of tagging events are given in Table 2 with the ICCAT electronic tag report in Appendix II.

Table 1. Pop-off archival tags (PSAT) and acoustic transmitters provided by GBYP (ICCAT) to the Irish Marine Institute for tagging in 2024 under MOU.

Number	PTT ID	PSAT code	Owner PSAT	Acoustic code	Owner Acoustic tag	1st Floy	2nd floy	Tagging Date	Time (24H)	Latitude (DMM)	Longitude (DMM)	SF Length (cm)
1*	253182	23P1284	MI	24974/1613473	ICCAT	30832	90201	08/10/2024	n/a	54°33.92	8°40.98	n/a
2	265539	24P0035	ICCAT		n/a	30835	90204	03/10/2024	09:25	54°33.73	8°40.87	170
3	269226	L330-4905	ICCAT	24978/1613477	ICCAT	30838	90207	03/10/2024	11:15	54°31.29	8°45.43	195
4	265553	24P0141	ICCAT	24981/1613480	ICCAT	30836	90205	03/10/2024	12:35	54°33.45	8°41.26	213
5	269227	L330-4906	ICCAT	24979/1613478	ICCAT	30837	90206	03/10/2024	14:10	54°32.30	8°44.11	245
6			ICCAT	24977/1613476	ICCAT	30841	90210	08/10/2024	n/a	54°39.08	8°50.14	246
7			ICCAT	24976/1613475	ICCAT	30840	90209	08/10/2024	n/a	54°40.75	8°48.53	246
8			ICCAT	24975/1613474	ICCAT	30839	90208	08/10/2024	n/a	54°39.43	8°48.69	243

Table 2. Pop-off archival tags (PSAT) and acoustic transmitters deployed and owned by the Irish Marine Institute during the 2024 tagging season. *Note: BFT 1* listed in both Table 1 and Table 2 was dual-tagged with a Marine Institute PSAT and an ICCAT acoustic transmitter, resulting in their inclusion in both datasets.*

Number	PTT ID	PSAT code	Owner	Acoustic code	Owner acoustic tag	1st Floy	2nd Floy	Tagging Date	Time (24H)	Latitude (DMM)	Longitude (DMM)	SF Length (cm)
1*	253182	23P1284	MI	24974/1613473	ICCAT	30832	90201	08/10/2024	n/a	54°33.92	8°40.98	n/a
2	253171	23P1164	MI	41592/1575407	MI	29424	82988	16/09/2024	08:50:00	54°32.27	8°44.48	215
3	253165	23P1157	MI			29405	82969	16/09/2024	16:15:00	54°35.31	8°50.52	247
4	253180	23P1282	MI	41601/1577458	MI	29417	82981	03/10/2024	15:35:00	54°32.44	8°41.57	222
5	260509	39698	MI			30843	90211	04/11/2024	15:35:00	54°32.9	8°41.5	180

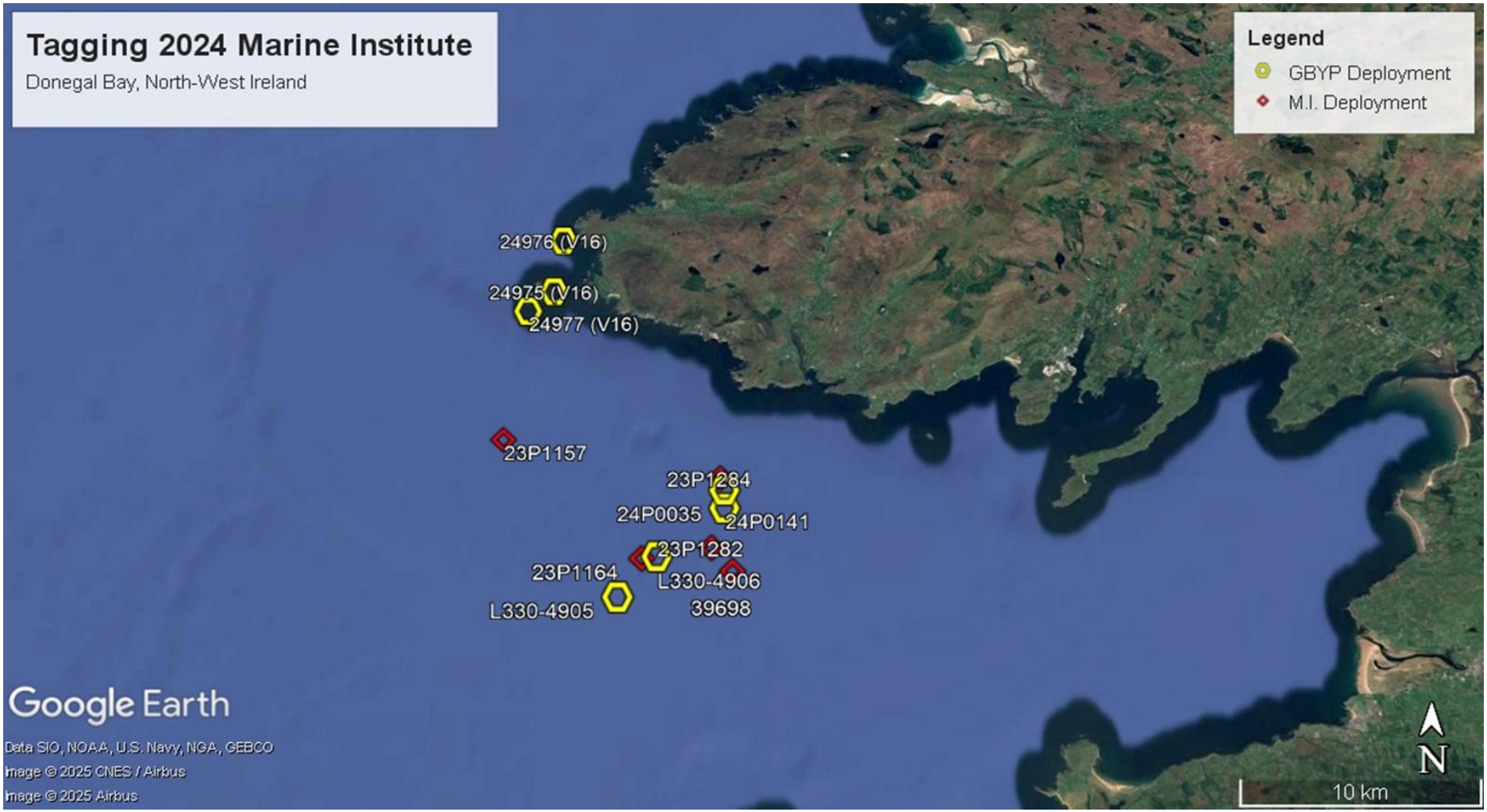


Figure 1. Marine Institute's PSAT tagging locations in Donegal Bay, North-West Ireland. Tagging took place form the 16th of September to the 4th of November 2024. A total of 4 trips were undertaken with the Leah C fishing vessel out of Killybegs, Donegal to tag 12 individual Bluefin tuna. Seven tuna were tagged with GBYP tags (yellow marker) and five with M.I. tags (red marker).

4. Results and possible recommendations for adjusting the tagging strategy in future Phases of ICCAT GBYP

Long term retention of satellite tags is essential to obtain the best value for money as well as the most complete information on the migration and behaviour of bluefin tuna. It is essential to have operators who have tagged bluefin tuna with satellite tags on board at all times. Training of new taggers operators should be under strict control and be supervised by experts with at least two years of tagging bluefin tuna experience. Only limited numbers of tags should be placed by newly trained taggers.

Fish for satellite tagging should be brought to the boat as quickly as possible to avoid exhausting the fish. Hand-lining or retrieving the fish with the rod in the rod holder can assist with bringing the fish in quickly (Figure 4). Tagging of the fish while still in the water alongside the boat would be advantageous in terms of eliminating much of the stress associated with tagging on board, provided the tag could be deployed quickly and easily. However, it is not possible to do this in all sea conditions and therefore, the presence of a transom door and ramp on the vessel is essential in order to avoid lifting the fish excessively onto the boat. Sufficient space is needed to be able to turn the fish and release it head first after tagging. Lip-hooking and bringing the fish on-board is also an operation which needs to be taught by experienced operators.

Types of anchor and tethering materials are crucial. Titanium anchors should not be too sharp to avoid them pulling out of the muscle too quickly. The use of a retention loop and a second anchor is highly recommended.

5. Preliminary Results from Ireland-Based Tagging and Modelling Efforts

Emerging Insights into Atlantic Bluefin Tuna Use of Irish Coastal Waters and the North Atlantic Basin

The recent study by McNicholas et al. (2024) presents significant new evidence on the seasonal habitat use and migratory behaviour of Atlantic bluefin tuna (ABFT) in the North Atlantic. Drawing on satellite tagging data from 49 individuals deployed off the Irish coast between 2016 and 2021, the research shows a clear seasonal pattern in habitat use, with ABFT returning consistently to Irish coastal waters during the summer and autumn months, followed by migrations to the Bay of Biscay, the central Atlantic, and in some cases northward toward Iceland in response to anomalous ocean warming. The study used advanced habitat modelling approaches, integrating environmental covariates such as sea surface temperature, mixed layer depth, bathymetric relief, and eddy kinetic energy, to identify key drivers of ABFT space use. These findings indicate a re-establishment of historic high-latitude foraging grounds and highlight the role of ocean warming and stock recovery in enabling this resurgence.

This work is being extended by Grace McNicholas, a Cullen PhD student based jointly at Trinity College Dublin and the Marine Institute. Her ongoing research focuses on improving our understanding of Atlantic bluefin tuna habitat use in Irish coastal waters and across the wider North Atlantic Basin. She is using a combination of data from the Marine Institute's national tagging programme and additional tagging deployments conducted under the collaborative ICCAT–Marine Institute Memorandum of Understanding (MoU) within the framework of the Atlantic-Wide Research Programme for Bluefin Tuna (GBYP). These joint efforts are enabling more refined analyses of the environmental and spatial drivers influencing ABFT distribution and migration patterns.

6. References

Block, B. A. *et al*. (2005) Electronic tagging and population structure of Atlantic bluefin tuna. Nature **434**: 1121-1127.

Cosgrove et al. (2008) bluefin Tuna Tagging in Irish Waters. Fisheries Resource Series, Bord Iascaigh Mhara (Irish Sea Fisheries Board), Dun Laoghaire, Ireland. Vol. 6, 2008, 16pp. ISSN 1649-5357 ISBN 1-903412-29-3.

Kerr, L, A; Cadrin, S.X; Secor, D.H; and Taylor N.A (2016) Modeling the implications of stock mixing and life history uncertainty of Atlantic bluefin tuna; Canadian Journal of Fisheries and Aquatic Sciences, 2017, 74(11): 1990-2004, https://doi.org/10.1139/cjfas-2016-0067

McNicholas, G. E., Jackson, A. L., Brodie, S., et al. (2024). Seasonal variability of high-latitude foraging grounds for Atlantic Bluefin Tuna (Thunnus thynnus). Diversity and Distributions, 30:e13865. https://doi.org/10.1111/ddi.13865

Neat, F., Horton, T. & Campbell (2014) Atlantic bluefin tuna movements in the high latitudes of the NE Atlantic: Initial results from satellite tagging west of Scotland. POLSHIFTS, April 2015, Marine Research Institute of Iceland.

Stokesbury, M. J. W. *et al*. (2007) Results of satellite tagging of Atlantic bluefin tuna, *Thunnus - thynnus*,off the coast of Ireland. Hydrobiologia **582**: 91-97 (TAG & Stanford).

Taylor NG, McAllister MK, Lawson GL, Carruthers T, Block BA (2011) Atlantic bluefin Tuna: A Novel Multistock Spatial Model for Assessing Population Biomass. PLoS ONE 6(12): e27693. doi:10.1371/journal.pone.0027693

7. Acknowledgements

Particular thanks go to Michael Callaghan who skippered the vessel and to a number of anglers who caught fish for the project.

This work has been carried out under the ICCAT Atlantic-Wide Research Programme for Bluefin Tuna (GBYP), which is funded by the European Union, several ICCAT CPCs, the ICCAT Secretariat, and other entities (see https://www.iccat.int/gbyp/en/overview.asp). The content of this paper does not necessarily reflect ICCAT's point of view or that of any of the other sponsors, who carry no responsibility. In addition, it does not indicate the Commission's future policy in this area.

Appendix I Invitation to Tender for Tagging Vessel

In 2023, Quotes were sought from 4 skippers with previous experience in tagging bluefin tuna and which had confirmation of Public Liability Insurance, valid Safety Certificate for vessels; confirmation that the required Safety Equipment is on board; valid Tax Clearance Certificate and minimum Vessel Technical Specification, whereby vessels must:

a. be at least 8 meters in length.
b. have a range of at least 20 miles offshore
c. have a stern door with removable slide or chute
d. space for at least one experienced anglers
e. space for up to 5-person scientific tagging team
f. be experienced in offshore angling operations
g. be able to stay at sea for at least 12 hours
h. have previous experience with catching bluefin Tuna

Quotations were evaluated by scientific staff of the Marine Institute.

Bluefin Tuna Vessel Charter 2023

Sample quotation request No. 1 - Lot North West Coast

Dear,

The Marine Institute is continuing its bluefin Tuna tagging programme during the 2023 season. The Institute is seeking quotations for the supply of a suitable vessel on the **North West Coast of Ireland** for **10 days** from the beginning of July until mid-November 2023. The vessel will be required to have a stern door with removable slide or chute, have space for up to 5-person scientific tagging team and have a range of at least 20 miles offshore.

The Institute will also require the vessel owner to have Public Liability insurance of not less than €2.6 million and Employers Liability of €13 million, a Valid **Safety Certificate** for vessels and the skipper has a current Atlantic bluefin Tuna Angling Authorisation.

If you are interested your quotation should be forwarded to me by return email. Please include VAT if you charge it.

Regards,

Sample quotation request No. 2 for bluefin Vessel Charter 2023 – Lot 2 South Coast.

Dear,

The Marine Institute is continuing its bluefin Tuna tagging programme during the 2023 season. The Institute is seeking quotations for the supply of a suitable vessel on the **South Coast of Ireland** for **10 days** from the beginning of July until mid-November 2023. The vessel will be required to have a stern door with removable slide or chute, have space for up to 5 person scientific tagging team and have a range of at least 20 miles offshore.

The Institute will also require the vessel owner to have Public Liability insurance of not less than €2.6 million and Employers Liability of €13 million, a Valid **Safety Certificate** for vessels and the skipper has a current Atlantic bluefin Tuna Angling Authorisation.

If you are interested your quotation should be forwarded to me by return email. Please include VAT if you charge it.

Regards.

Appendix II. TG03-EleTReRc_Ireland_BFT_2023 ICCAT electronic tag report document for 2023 bluefin tuna tagging Ireland

Specimen identifier (unique)			Tagging information											Time strata		Geographical strata			Fishing operation				
			RC	Electronic 1				Conventional 1			Conventional 2												
ID	Species code	Sex code	RCStage code	Tag Code	Tag type	Tag color	Manufacturer	Tag Code	Tag type	Tag color	Tag Code	Tag type	Tag color	Date	Time	Latitude	Longitude	Area Descr	Vessel ID	Gear code	School type	Survey name (acronym)	Depth (m)
integer	T01	T02	T03		T21	T22	text	XX999999	T21	T22	XX999999	T21	T22	yyyy-mm-d	hh:mm	±dd.ddddd	ddd°mm'ss"	text (100)	Vessels	T05	T06	text (15)	integer
1	BFT	M	RC1	06AF0001	POP-UP	grn		SS004051	STWT	grn	SS004051	STWT	grn	25/08/2007	08:45	15.12345	-17.01333	n/a	1	PS	FAD	CIV-ETRO0	1000
1	BFT	U	R-1	23P1159	POP-ARC	oth1	Wildlife Computers	29407	ST-DART1	yel	82971	ST-DART2	yel	17/10/2023	14:05:00	54 31.59	8 49.65	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
2	BFT	U	R-1	23P1158	POP-ARC	oth1	Wildlife Computers	29406	ST-DART1	yel	83970	ST-DART2	yel	01/10/2023	10:55:00	54 33.47	8 38.84	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
3	BFT	U	R-1	23P1162	POP-ARC	oth1	Wildlife Computers	29403	ST-DART1	yel	82967	ST-DART2	yel	01/10/2023	15:15:00	54 32.64	8 43.87	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
4	BFT	U	R-1	23P1161	POP-ARC	oth1	Wildlife Computers	29402	ST-DART1	yel	82966	ST-DART2	yel	01/10/2023	11:45:00	54 32.71	8 40.47	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
5	BFT	U	R-1	23P1160	POP-ARC	oth1	Wildlife Computers	29401	ST-DART1	yel	82956	ST-DART2	yel	01/10/2023	12:35:00	54 32.83	8 42.59	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
6	BFT	U	R-1	23P1166	POP-ARC	oth1	Wildlife Computers	29404	ST-DART1	yel	82968	ST-DART2	yel	01/10/2023	11:20:00	54 32.78	8 39.9	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
7	BFT	U	R-1	23P1280	POP-ARC	oth1	Wildlife Computers	29423	ST-DART1	yel	82987	ST-DART2	yel	17/10/2023	11:15:00	54 32.95	8 45.87	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
8	BFT	U	R-1	23P1276	POP-ARC	oth1	Wildlife Computers	29422	ST-DART1	yel	82986	ST-DART2	yel	17/10/2023	11:55:00	54 31.8	8 46.38	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
9	BFT	U	R-1	23P1283	POP-ARC	oth1	Wildlife Computers	29418	ST-DART1	yel	82982	ST-DART2	yel	17/10/2023	13:30:00	54 31.45	8 48.03	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
10	BFT	U	R-1	23P0543	POP-ARC	oth1	Wildlife Computers	29410	ST-DART1	yel	82974	ST-DART2	yel	30/09/2023	09:45:00	54 32.71	8 33.80	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
11	BFT	U	R-1	23P0369	POP-ARC	oth1	Wildlife Computers	29413	ST-DART1	yel	82977	ST-DART2	yel	30/09/2023	11:10:00	54 32.88	8 37.16	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
12	BFT	U	R-1	23P0482	POP-ARC	oth1	Wildlife Computers	29412	ST-DART1	yel	82976	ST-DART2	yel	30/09/2023	11:10:00	54 32.88	8 37.16	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
13	BFT	U	R-1	23P0370	POP-ARC	oth1	Wildlife Computers	29409	ST-DART1	yel	82973	ST-DART2	yel	01/10/2023	10:25:00	54 33.096	8 38.33	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
14	BFT	U	R-1	22P1243	POP-ARC	oth1	Wildlife Computers	29415	ST-DART1	yel	82979	ST-DART2	yel	30/09/2023	12:00:00	54 32.88	8 38.58	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
15	BFT	U	R-1	22P0930	POP-ARC	oth1	Wildlife Computers	29414	ST-DART1	yel	82978	ST-DART2	yel	30/09/2023	15:00:00	54 32.34	8 37.68	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
16	BFT	U	R-1	22P1242	POP-ARC	oth1	Wildlife Computers	209416	ST-DART1	yel	82980	ST-DART2	yel	30/09/2023	13:05:00	54 32.07	8 39.80	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
17	BFT	U	R-1	23P0388	POP-ARC	oth1	Wildlife Computers	29411	ST-DART1	yel	82975	ST-DART2	yel	01/10/2023	09:10:00	54 33.26	8 34.41	Donegal Bay	1	TROL	FSC	IRELAND 2023	50
18	BFT	U	R-1	1575406	OTHR	gra	InnovaSea	29419	ST-DART1	yel	82983	ST-DART2	yel	17/10/2023	09:40:00	54 33.98	8 42.8	Donegal Bay	1	TROL	FSC	IRELAND 2023	50