ICCAT GBYP TAGGING PROGRAMME 2023

Atlantic-Wide Research Programme for Bluefin Tuna
(GBYP PHASE 13)

Tagging of Atlantic bluefin tuna with ICCAT tags in the Channel in 2023

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FINAL REPORT
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Preamble

This report corresponds to two Memorandums of Understanding (MoU) – (i) between ICCAT/GBYP and the University of Exeter to deploy four pop-up satellite archival tags (PATs) off southwest England, and (ii) between ICCAT/GBYP and the University of Exeter in collaboration with the Government of Jersey to deploy four PATs in Jersey territorial waters. Following delays due to poor weather, fieldwork in Jersey was unsuccessful, and the four tags were not deployed. The consortium proposed to the GBYP that the PATs were deployed off southwest England on similar size classes of fish. This was agreed and approved in advance by the GBYP Coordinator and consequently a joint report is presented.

Executive Summary

Atlantic bluefin tuna (ABT) have returned to waters in the western Channel between the UK and France (hereafter "the Channel"), including coastal waters of the Channel Islands (Jersey, Guernsey and Alderney; Horton et al. 2021). As part of a project established to improve insight into ABT migration and ecology, we have deployed electronic tags on 28 ABT (136 to 230 cm curved fork length, CFL; mean ± 1 S.D. = 171 ± 22 cm) off southwest England (n=27) and the Channel Islands (n=1) in September and November 2023. Of these, eight pop-up satellite archival tags (PATs) were funded by ICCAT. We also deployed accelerometers (n=6), PATs (n=5) and acoustic tags (n=19), funded by the UK and Jersey governments, EU INTERREG, and the Danish Technical University. Biological sampling (fin clips, and/ or a skin swab for genetic analysis) was also undertaken at the time of tagging.

Introduction

Atlantic bluefin tuna were absent, or at least present in very low numbers, in the Channel from the 1960s until 2014 onwards, when sightings have been reported with increasing regularity (Horton *et al.* 2021). In 2018, the first ABT were tagged in the Channel with electronic tags by Thunnus UK, which has now been conducting tagging for six years (2018-2023). Part of this tagging work has been conducted under a Memorandum of Understanding (MoU) with the GBYP ICCAT program, who have provided conventional and electronic tags (PATs).

Project objectives

The primary objective of Thunnus UK is to develop an understanding of the spatial ecology of ABT present off the United Kingdom. The aim of the electronic tagging programme is to tag and sample ABT to: 1) explore the migration routes, 2) identify the population of origin, 3) understand behaviour, and 4) investigate long-term and larger-scale movements of ABT, and how these might be affected by fishing and ecosystem conditions.

Tagging work in 2023 included waters of southwest of England, and the western Channel and the Crown Dependency of Jersey (the Channel Islands; **Figure 1**). These areas are of particular interest because, to date, tuna tagged in these areas are generally small, and thus are likely to be relatively young, and are therefore likely to either be maturing or have recently matured.
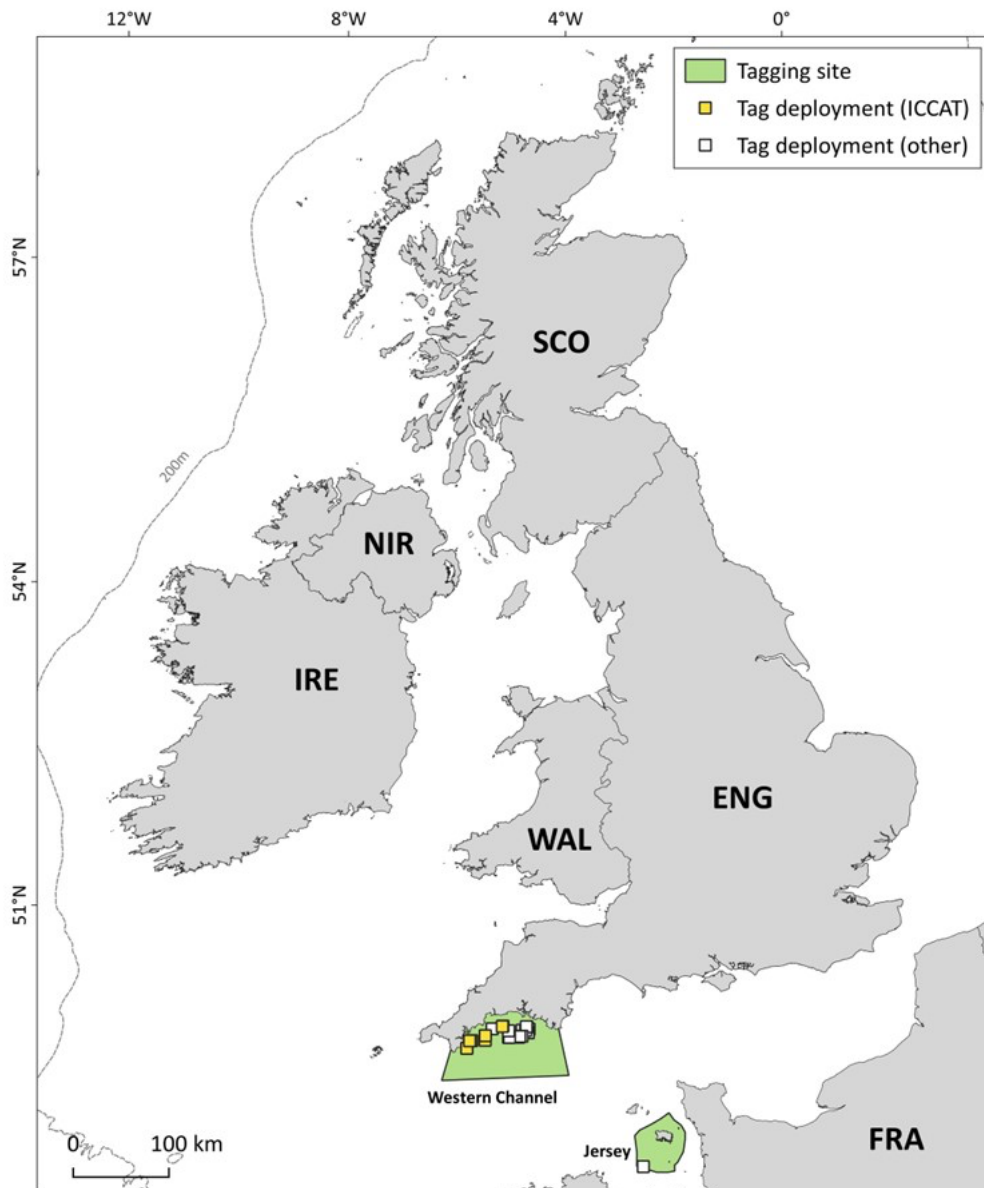
Figure 1: Map of the British Isles showing Thunnus UK tagging sites (n=2, southwest UK and the channel islands; green polygons) and deployments in 2023 (yellow and white squares).

Methods

Vessels for catching and tagging tuna were selected based on facilities, experience, and meeting safety standards, and contracted through a tendering and assessment process. Permission to fish in the UK was provided via a dispensation issued by the UK's Marine Management Organisation, while tagging operations were licenced by the UK Home Office and in concordance with the Animals (Scientific Procedures) Act 1986. Permission to tag in Jersey Waters was issued by the Government of Jersey with an exemption granted under the Jersey wildlife law 2021. An MoU was agreed and signed by the Government of Jersey, Defra and ICCAT to allow fishing operations in Jersey territorial waters for 2023. Fishing was conducted over five days between the 30th September and 5th October in Jersey, and eight days between the 10th September and 17th of November in the Western Channel (**Figure 1**). ABT were caught by experienced anglers by trolling surface lures and brought to the tagging vessel as quickly as possible. ICCAT PATs were deployed for two years following discussions between the GPYP co-ordinator and project team (emails chain starting the 15th of September 2023).

Once a fish was supplied to the tagging team, the operations progressed as follows:

1) ABT were boarded onto a wet PVC mat specifically for the tagging of large pelagic fish, continuously ventilated with a hose delivering fresh seawater, and their eyes were covered with a wet microfiber towel. Their condition was evaluated by the tagging team (movement, colours, ventilation etc.).

2) If they passed the evaluation, fish were measured (curved fork length, CFL and half girth), tagged, sampled (fin clip and muscle biopsy) and the fishing hook removed.

3) To revive ABT and assess fitness after tagging, ABT were 'swum' behind the boat using a boga grip, and their fitness for release was evaluated by the tagging team (movement, ventilation, tail beats etc.). Generally, all tagging, sampling and return to water was done within 2 to 3 minutes.
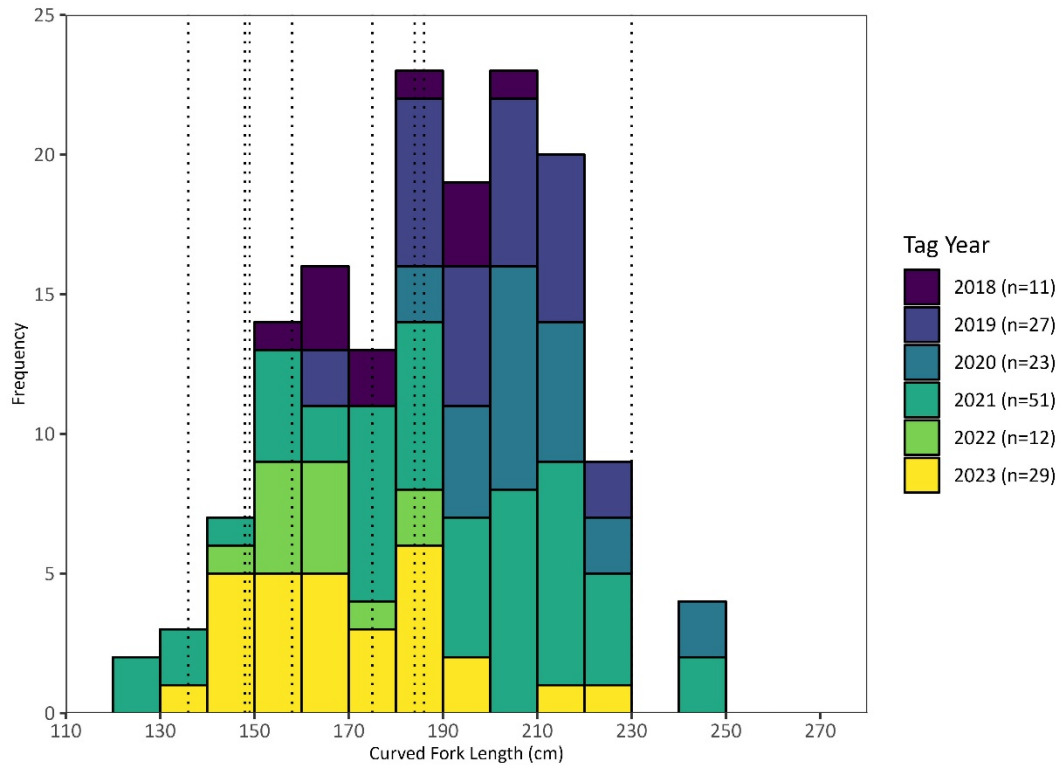
Figure 2. Length-frequency distribution for all Atlantic bluefin tunas measured by Thunnus UK during electronic tagging field operations between 2018 and 2023 (sample sizes given in parentheses). Vertical dotted lines denote sizes of the ABT tagged with ICCAT funded PATs in 2023. Not all fish measured were subsequently tagged.

Results

Fishing was conducted off southwest England and Jersey, Channel Islands, and in total 28 fish were caught and tagged (Table 1). Due to poor catchability off Jersey during fishing operations, all eight ICCAT PATs were deployed on ABT off southwest England (mean curved fork length ± 1 S.D. = 167 ± 17 cm, range = 141 to 187 cm; **Figure 2**). At the time of writing, none of the ICCAT deployed tags in 2023 have reported data via the Argos System (as planned as they were deployed for two years) and thus are likely to be operational and still attached to ABT.

Overall summary and conclusions

Thunnus UK successfully deployed three types of tags (PAT, accelerometry and acoustic tags), on 28 fish, including eight ICCAT PATs. Subsequent data from all tags will contribute to new knowledge on ABT movement and residency behaviour (short and long-term).

Acknowledgement*s*

References

Horton, T.W., Block, B.A., Davies, R., Hawkes, L.A., Jones, D., Jones, H., Leeves, K., Maoiléidigh, N.Ó., Righton, D., van der Kooij, J. and Wall, D., 2021. Evidence of increased occurrence of Atlantic bluefin tuna in territorial waters of the United Kingdom and Ireland. ICES Journal of Marine Science, 78(5), pp.1672-1683. http://dx.doi.org/10.1093/icesjms/fsab039

Table 1. ABT tagged in 2023 by the consortium. Blue rows denote tags deployed on ICCATs behalf. "JG" - Government of Jersey, "TUK" - Thunnus UK; "ICCAT" - International Commission for the Conservation of Atlantic Tuna, and "DTU" - Technical University of Denmark.

Deploy date	Type	PAT ID	Leader ID(s)	Floy	Lat	Lon	CFL (cm)	Location	Owner
10-Sep-23 12:10	Acoustic+ MiniPAT-2Y	21P2233	EX266 EX275 EX221 EX222	-	50.193	-4.661	184	England	Defra
10-Sep-23 16:23	MiniPAT-2Y	21P2236	EX271 EX279	-	50.189	-4.222	164	England	Defra
11-Sep-23 10:52	ACC-D5	19U1347	-	-	50.173	-4.143	179	England	Defra
11-Sep-23 11:58	ACC-D5	19U3737		BYP076785	50.189	-4.187	174	England	Defra
11-Sep-23 13:29	Acoustic+ MicroPAT-180D	23T0024	EX345	-	50.187	-4.170	199	England	FishIntel
11-Sep-23 15:56	ACC-D5	19U1343	-	-	50.200	-4.119	212	England	Defra
11-Sep-23 16:50	Acoustic+ MicroPAT-180D	23T0021	EX346	-	50.221	-4.152	164	England	FishIntel
11-Sep-23 17:49	Acoustic	NA	-	-	50.224	-4.159	183	England	FishIntel
12-Sep-23 09:45	ACC-D5	19U3790	-	-	50.134	-4.245	197	England	Defra
12-Sep-23 10:18	Acoustic	NA	-	-	50.132	-4.220	153	England	DTU
12-Sep-23 11:41	Acoustic	NA	-	BYP084099	50.121	-4.269	151	England	DTU
12-Sep-23 12:06	Acoustic	NA	-	BYP084100	50.130	-4.254	161	England	DTU
13-Sep-23 08:40	ACC-D5	19U3735	-	BYP084097	50.166	-4.130	181	England	Defra
13-Sep-23 12:05	ACC-D5	19U1349	-	-	50.122	-4.411	158	England	Defra
13-Sep-23 13:18	Acoustic	NA	-	BYP084086	50.118	-4.417	153	England	DTU
13-Sep-23 14:50	Acoustic	NA	-	BYP084094	50.116	-4.414	166	England	DTU
13-Sep-23 15:35	Acoustic	NA	-	BYP084081	50.118	-4.403	163	England	DTU
14-Sep-23 10:31	Acoustic	NA	-	-	50.365	4.384	188	England	DTU
14-Sep-23 15:30	Acoustic	NA	-	-	50.179	-4.419	149	England	DTU
04-Oct-23 10:37	MiniPAT-2Y	22P1241	244323	-	50.083	-4.758	175	England	ICCAT
04-Oct-23 13:30	MiniPAT-2Y	22P1244	244236	-	50.125	-4.757	158	England	ICCAT
05-Oct-23 07:28	Acoustic+ MiniPAT-1Y	23P1406	EX708	-	48.924	-2.433	146	Jersey	JG
11-Nov-23 09:49	Acoustic+ MiniPAT-2Y	21P0339	220542 EX746	-	50.074	-4.956	149	England	ICCAT / DTU
11-Nov-23 12:21	Acoustic+ MiniPAT-2Y	20P2942	215268 EX745	-	50.000	-5.020	136	England	ICCAT / DTU
11-Nov-23 12:21	Acoustic+ MiniPAT-2Y	21P0349	220549 220547	-	50.000	-5.020	230	England	ICCAT / DTU
11-Nov-23 14:51	Acoustic+ MiniPAT-2Y	22P1245	EX744 220565	-	50.072	-4.984	184	England	ICCAT / DTU
17-Nov-23 12:55	Acoustic+ MiniPAT-2Y	21P0433	220579 244327	-	50.222	-4.505	186	England	ICCAT / DTU
17-Nov-23 13:51	Acoustic+ MiniPAT-2Y	23P1703	EX748 EX747	-	50.218	-4.512	148	England	ICCAT / DTU

Table 2. All ABT tagged for ICCAT by the consortium between 2020 and 2023. Information provided on date, type of tag, tag ID's, and release site and person and group. Blue shading shows most recent deployment season detailed in this report (2023).

| Deploy date	Type	PAT ID	Lat	Lon	CFL (cm)	Location
12-Sep-2020 16:35	MiniPAT-1Y	20P1136	50.1047	-4.9032	194	England
16-Sep-2020 13:49	MiniPAT-1Y	20P1139	50.1267	-4.8489	222	England
16-Sep-2020 15:27	MiniPAT-1Y	20P1137	50.1115	-4.8337	201	England
06-Sep-2021 08:30	MiniPAT-1Y	21P0466	49.0875	-2.3735	212	Jersey
07-Sep-2021 18:19	MiniPAT-1Y	21P0341	49.0500	-2.3297	154	Jersey
12-Oct-2021 09:01	MiniPAT-1Y	21P0399	50.0753	-4.8407	201	England
12-Oct-2021 09:51	MiniPAT-1Y	21P0337	50.0830	-4.8169	190	England
12-Oct-2021 13:20	MiniPAT-1Y	21P0342	50.0613	-4.7580	211	England
12-Oct-2021 13:48	MiniPAT-1Y	21P0397	50.0521	-4.7952	168	England
04-Oct-2022 14:36	MiniPAT-1Y	21P1997	49.2446	-2.3510	168	Jersey
04-Oct-2022 17:08	Acoustic+ MiniPAT-1Y	21P0354	49.2620	-2.3620	141	Jersey
07-Oct-2022 13:18	Acoustic+ MiniPAT-1Y	21P0355	49.0512	-2.3619	153	Jersey
08-Oct-2022 10:53	MiniPAT-1Y	21P0365	49.1031	-2.5055	164	Jersey
13-Nov-2022 15:15	Acoustic+ MiniPAT-1Y	21P2022	50.1197	-4.8336	187	England
04-Oct-2023 10:37	MiniPAT-2Y	22P1241	50.0835	-4.7582	175	England
04-Oct-2023 13:30	MiniPAT-2Y	22P1244	50.1254	-4.7574	158	England
11-Nov-2023 09:49	Acoustic+ MiniPAT-2Y	21P0339	50.0743	-4.9556	149	England
11-Nov-2023 12:21	Acoustic+ MiniPAT-2Y	20P2942	50.0005	-5.0197	136	England
11-Nov-2023 12:21	Acoustic+ MiniPAT-2Y	21P0349	50.0005	-5.0197	230	England
11-Nov-2023 14:51	Acoustic+ MiniPAT-2Y	22P1245	50.0716	-4.9835	184	England
17-Nov-2023 12:55	Acoustic+ MiniPAT-2Y	21P0433	50.2215	-4.5047	186	England
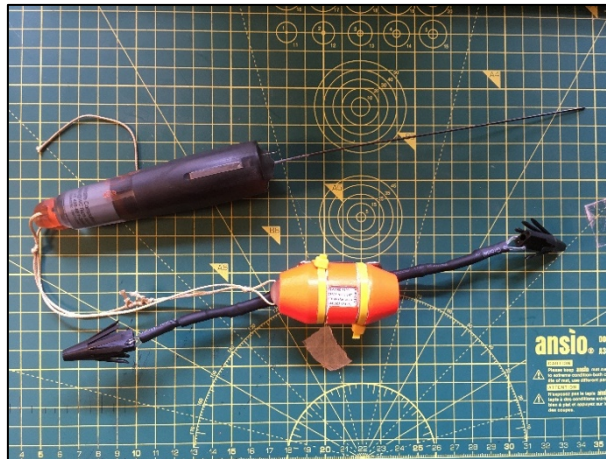
Figure 3. Example of tags deployed in Thunnus UK field operations in 2023. Thelma HP16 and Wildlife Computers MiniPATs (upper panel). Cefas G7 and Wildlife Computers mrPAT (central panel) and University of Exeter labelled heat shrink used to ID tag leaders (lower panel; Table 1).