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TAGGING PROGRAMME 2022

Atlantic-Wide Research Programme for Bluefin Tuna
(GBYP PHASE 12)

Tagging of Atlantic bluefin tuna with ICCAT tags in the Channel in 2022

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FINAL REPORT

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Executive Summary

Atlantic bluefin tuna (ABT) have recently returned to waters in the western Channel (hereafter "the Channel"), including coastal waters of the Channel Islands, where they have been rarely observed for over five decades. As part of an established project to build greater insight into ABT migration and ecology, two types of electronic tags were deployed on 12 ABT (136 to 243 cm curved fork length, CFL; mean ± 1 S.D. = 198 ± 26 cm) off southwest England (n=5) and the Channel Islands (n=7) during September and November 2022. These tags were funded by ICCAT, Jersey Government and EU INTERREG. Biological sampling was undertaken at the time of tagging in the form of a fin clip for genetic analysis and a muscle biopsy. The tagging and sampling operations reported here will contribute to the results obtained from similar electronic tagging conducted between 2018 and 2021, including ICCAT funded tag deployments off southwest England in 2020 and 2021.

Introduction

Atlantic bluefin tuna (ABT) were absent, or present in very low numbers, in the Channel since at least the 1960s. From 2014 onwards, sightings have been reported with increasing regularity (Horton *et al.* 2021). In 2018, the first ABT were tagged with electronic tags in the Channel. Prior to these efforts, ABT had not been tracked to or from the area. Since its inception, Thunnus UK (TUK) has conducted four years (2018-2021) of ABT tagging, with the 2022 field season being the fifth. Field operations typically take place between August and November - a period when ABT return annually to feed on a diverse assemblage of forage fish. Part of this work has been carried out under a MOU with GBYP ICCAT program, who have provided conventional and electronic tags (PATs).

Project objectives

The overall objective of Thunnus UK is to provide a baseline understanding of the spatial ecology of ABT present in aggregations off the United Kingdom. The aim of the electronic tagging programme is to tag and sample ABT to 1) explore the migration routes used by ABT that migrate into the Channel, 2) identify the population of origin of the tagged ABT, 3) explore relationships between a catch-and-release experience and behaviour, and 4) investigate long-term and larger-scale movements, and how these might be affected by fishing and ecosystem conditions. The method to obtain this information

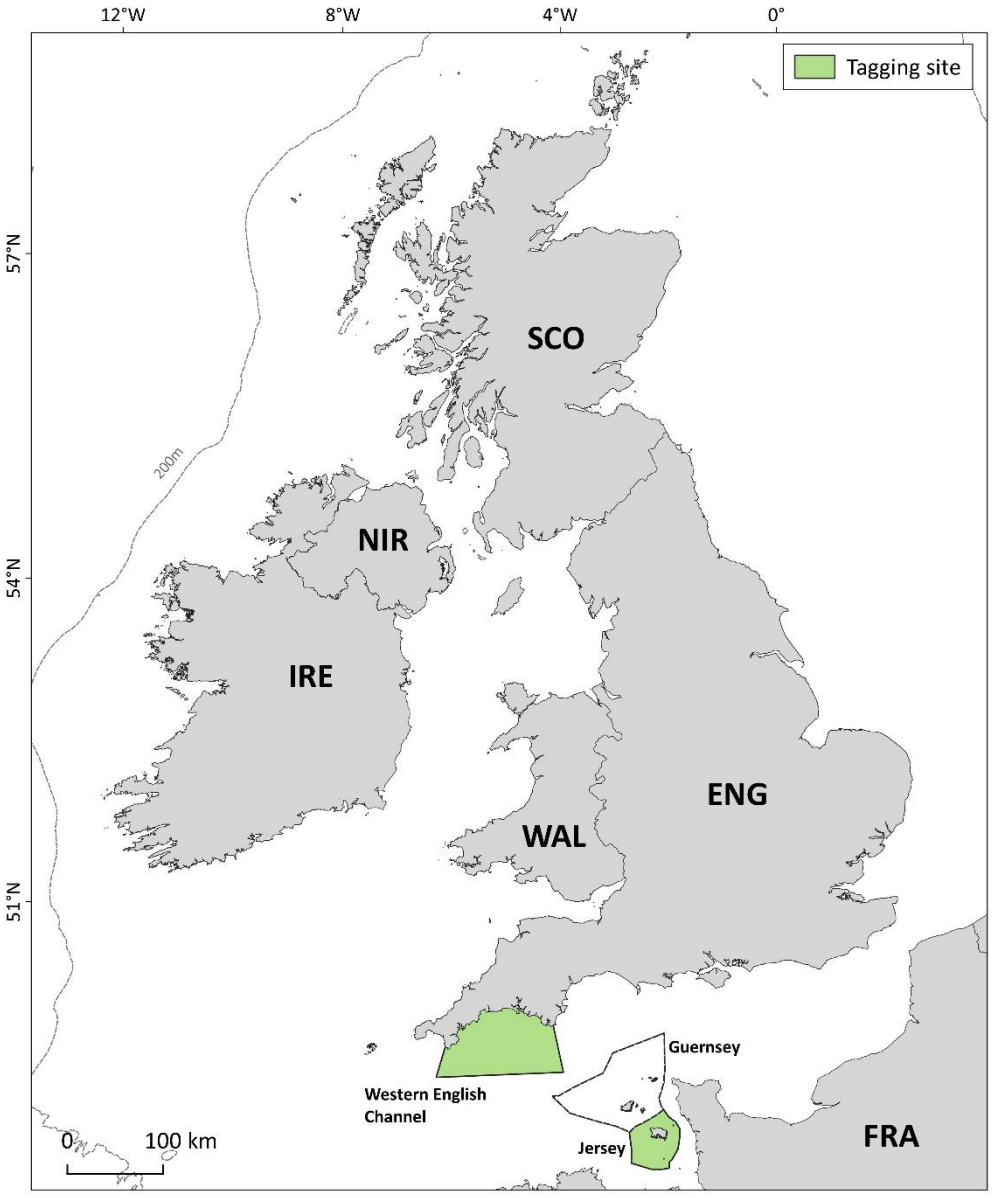

Figure 1: Map of the British Isles showing Thunnus UK e-tagging sites in 2021. Two tags were deployed in Guernsey waters through an agreement between devolved administrations.

and address these questions is through electronic tagging activities from ABT aggregations around the United Kingdom and Channel Islands. Tagging areas in 2022 included the western English Channel and the Crown Dependency of Jersey (**Figure 1**). Aside from the relatively recent phenomena of the occurrence of tuna in these areas (Horton et al., 2021), these areas are of particular interest because, to date, tuna tagged in these areas are relatively young (inferred from small body size) and are therefore likely to either be maturing, or have recently matured.

Methods

Vessels for catching and electrically tagging tuna were selected based on experience, capability, and meeting safety standards and contracted through a tendering and subsequent 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 waters for 2022. Fishing was conducted over five days between the 3rd and 8th October in Jersey and eight days between the 13th and 29h of November in the western English 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 365 days following ICCAT GBYP protocols.

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 and their condition was evaluated by the tagging team (movement, colours, ventilation etc.).
2) Once passing the evaluation, fish were maintained on deck and continuously ventilated with fresh seawater and their eyes were covered with a wet dark microfiber towel.
3) Fish were measured (curved fork length, CFL and half girth), tagged, sampled (fin clip and muscle biopsy) and the hook was removed.
4) Fish were then tagged with a PAT using a single titanium dart, supported by a second tether loop (with titanium dart) and optionally an acoustic tag (Thelma Biotel HP16), held in place by two titanium darts. All tag tethers were labelled with individual serial numbers (**Figure 3**).
5) To revive ABT and assess fitness after tagging, ABT were 'swum' behind the boat 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.

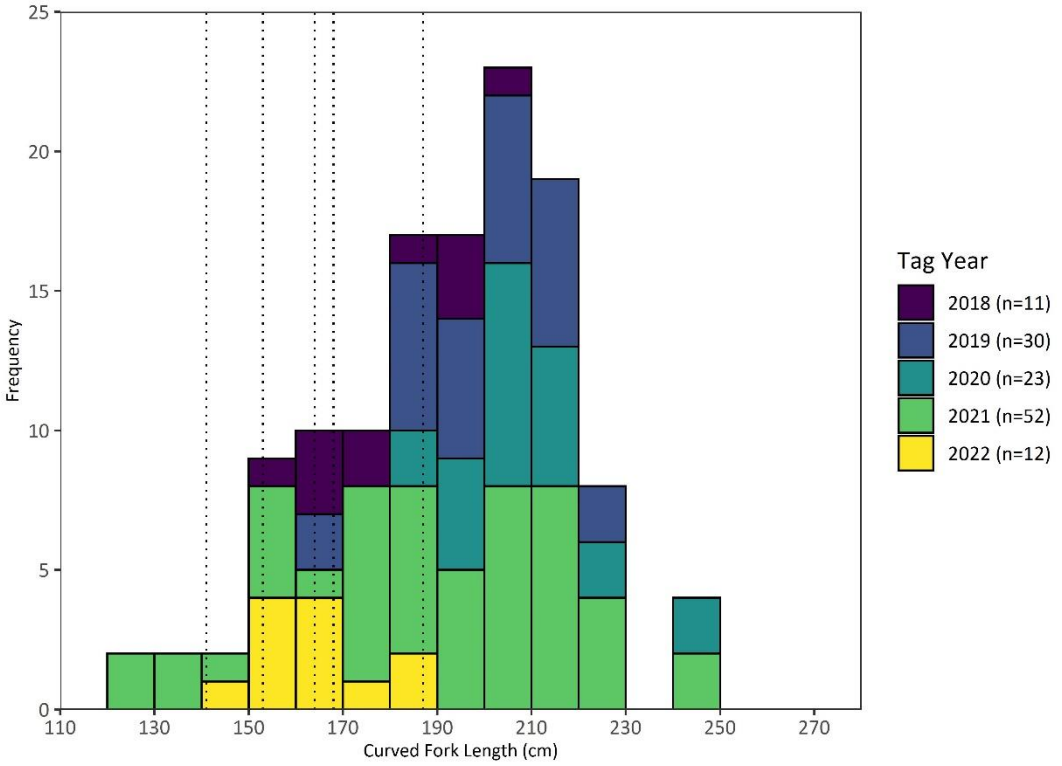

Figure 2. Length-frequency distribution for all Atlantic bluefin tunas measured by Thunnus UK during field operations between 2018 and 2022 (sample sizes given in parentheses). Vertical dotted lines denote sizes of the ABT tagged with ICCAT funded PATs in 2022.

Results (ICCAT tags)

Fishing was conducted off southwest England and Jersey, Channel Islands. ICCAT PATs were deployed on five ABT, four off Jersey and one in southwest England (mean curved fork length ± 1 S.D. = 167 ± 17 cm, range = 141 to 187 cm; **Figure 2**). At the time of writing, no ICCAT tags have reported data and as such are believed to be operational and attached to their respective study animals. Three of five ABT tagged with ICCAT funded PATs were also instrumented with Thelma Biotel HP16 acoustic tags (**Figure 3**). Acoustic detection data will be available through the European Tracking Network.

Conclusions

The operations of Thunnus UK in 2022 resulted in the successful deployment of two types of tags (PAT and acoustic tags) including five ICCAT PATs and will contribute to new knowledge on ABT migratory behaviour (both short and long-term).

Acknowledgements

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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 2022 by the consortium with information on date, type of tag, tag ID's, release site and person and group. Greyed out rows with emboldened text denote tags deployed on ICCATs behalf. Jersey (Government of Jersey), Thunnus UK (TUK); International Commission for the Conservation of Atlantic Tuna (ICCAT)

Deploy date	Type	PAT ID	Leader ID(s)	Floy	Lat	Lon	CFL (cm)	Location	PAT Owner
04-Oct-2022 14:36	MiniPAT-1Y	21P1997	EX210, EX211	BYP084096	49.24	-2.35	168	Jersey	ICCAT
04-Oct-2022 15:03	Acoustic + MiniPAT-2Y	21P0343	EX207, EX212	No Floy	49.25	-2.36	164	Jersey	Jersey
04-Oct-2022 17:08	Acoustic + MiniPAT-1Y	21P0354	EX208, EX209	No Floy	49.26	-2.36	141	Jersey	ICCAT
07-Oct-2022 10:37	Acoustic+ MiniPAT-2Y	21P0350	EX204, EX205	No Floy	49.07	-2.39	152	Jersey	Jersey
07-Oct-2022 13:18	Acoustic + MiniPAT-1Y	21P0355	EX206, EX213	No Floy	49.05	-2.36	153	Jersey	ICCAT
08-Oct-2022 09:08	Acoustic + MiniPAT-2Y	21P2252	PA1402, 233976, EX225, EX228	No Floy	49.06	-2.43	153	Jersey	Jersey
08-Oct-2022 10:53	MiniPAT-1Y	21P0365	EX203, EX187, EX227, EX226	BYP077637	49.10	-2.51	164	Jersey	ICCAT
13-Nov-2022 15:15	Acoustic + MiniPAT-1Y	21P2022	EX270, EX285, EX217, EX216	No Floy	50.12	-4.83	187	England	ICCAT
14-Nov-2022 13:42	Acoustic + MiniPAT-2Y	21P2230	EX268, EX325, EX214, EX224	No Floy	50.01	-4.05	178	England	TUK
14-Nov-2022 14:57	Acoustic + MiniPAT-2Y	21P2234	EX050, EX294, EX229, EX230	No Floy	50.02	-4.08	163	England	TUK
18-Nov-2022 12:30	Acoustic + MiniPAT-2Y	21P2232	EX210, EX211	No Floy	50.02	-3.81	154	England	TUK
18-Nov-2022 13:43	Acoustic + MiniPAT-2Y	21P0682	EX207, EX212	No Floy	50.00	-3.78	189	England	TUK

Figure 3. Example of tags deployed in Thunnus UK field operations in 2022 (Thelma HP16 and Wildlife Computers MiniPAT; top panel) and an example of labelled heat shrink used to ID tag tethers (bottom panel; Table 1).