

ICCAT GBYP TAGGING PROGRAMME 2023

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

Tagging of Atlantic bluefin tuna with ICCAT tags in Skagerrak, Kattegat and Øresund



Kim Aarestrup, Kim Birnie-Gauvin, Lene Klubben Sortland, Henrik Baktoft, & Anders Koed, Technical University of Denmark (DTU Aqua)

FINAL REPORT

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1. Executive Summary

Atlantic bluefin tuna (ABFT) have recently returned to waters in the Skagerrak-Kattegat-Øresund area between Denmark and Sweden, where they have been nearly absent for almost six decades. To understand the factors that affect their distribution, ecology, population structure and survival, we conducted a tagging study to track their migratory behaviour. We deployed, within the framework of the Swedish and Danish collaboration “Scandinavian Bluefin Marathon”, a variety of electronic and conventional tags on 134 ABFT (CFL ranging between 217 to 290 cm) in Skagerrak, Kattegat and Øresund over the course of 17 tagging days between 19 August and 1 October 2023. All tagged ABFT were tagged with a conventional tag (ICCAT tag series), and most (133 ABFT) were also tagged with an acoustic tag (Thelma Biotel). Twenty-three ABFT were also tagged with PSATs, of which 8 were provided by ICCAT GBYP program (under an ad hoc Memorandum of Understanding), and six were tagged with biologgers. Biological sampling was undertaken during tagging: a fin clip was taken for genetic analysis and a muscle biopsy, blood sample and scales were collected to explore the physiological status (and other parameters) of each tagged individual. The tagging and sampling operations will extend the results already obtained from similar electronic tagging programs conducted between 2017 – 2022. Moreover, given the ongoing deployment of acoustic infrastructure in the Strait of Gibraltar and Danish Straits (under the guise of the EU-funded STRAITS project), our data will contribute greatly to our broader understanding of ABFT movements and population dynamics.

2. Introduction

ABFT have been a rare sight (if not completely absent) in waters of the Skagerrak/Kattegat/Øresund since the early 1960s. However, sightings have been reported with increasing regularity since 2015 (Aarestrup et al. 2022a).

In 2017, the first ABFTs were tagged with electronic tags in the Skagerrak. This was the first time ABFT were tagged in Scandinavian waters since the early 1960s, when ABFT were tagged with conventional tags in Norwegian waters (Hamre, 1963; Mather et al., 1995). Since its inception, the Scandinavian Bluefin Marathon (SBM) – a collaboration between the Technical University of Denmark, National Institute of Aquatic Sciences (DTU Aqua), Denmark, and the Swedish University of Agricultural Sciences (SLU Aqua), Sweden – has carried out six years (2017-2022) of ABFT tagging. Field operations take place between August and October, a period when ABFT return annually to feed on a diverse assemblage of forage fish. Again in 2023, an important part of this work was carried out under a MoU with the GBYP ICCAT program, which provided conventional and 8 of the deployed pop-up satellite archival tags (PSATs). ABFT were caught by experienced big game anglers using established fishing methods (either using bait or by trolling surface lures). On-board the tagging boat, ABFT were measured, sampled and tagged with an acoustic tag and a conventional tag from the ICCAT series, while a subset was also equipped with a PSAT or Biologger. Here, as per the request stated in the MoU signed with ICCAT GBYP, we provide a brief summary of the project, including an overview of the planning process, contact with anglers and the overall results of the tagging operation and related sampling.

2.1 Project objectives

The overall objective of the project was to tag and sample ABFT in Skagerrak, Kattegat and Øresund to: 1) explore the detailed migration routes used by ABFT that undergo a feeding migration into Northern European seas, 2) identify the population of origin of the tagged ABFT, 3) explore relationships between a catch-and-release experience, migratory behaviour and physiological status, 4) investigate long-term and larger-scale movements, and how these might be affected by fishing and ecosystem conditions, and 5) quantify and map mortality along the migration route. To achieve the objectives, ABFT were caught, tagged with some combination of PSATs, acoustic, biologging and conventional tags, and sampled (fin clip, muscle biopsy, blood sample, scales). For such ambitious

goals, a continuous multiyear effort is needed.

3. Methods

Briefly:

- a) In Skagerrak, Kattegat and Øresund, experienced big game anglers (a total of 100 boats involving more than 900 experienced anglers) fished for 17 days between 19 August – 3 September and 23 September – 1 October, 2023. All the tunas were caught using rod and reel.
- b) All ABFT were brought on-board the tagging boat to be tagged and sampled. Whilst on-board, fish were measured, sampled and the hook was removed whenever possible. Once back in the water, fish were ventilated to aid in recovery from the capture and subsequent tagging procedure. To do so, fish were towed by rope at 2-4 knots with the head of the fish pointing forward until the fish was deemed fit for release (fin movements, colour, tailbeats and swimming). In most cases, this was less than 1 minute. All tags were deployed following ICCAT GBYP protocols.
- c) In total, 134 ABFT were tagged with a conventional ICCAT tag, with 133 of these also tagged with an acoustic tag, sampled and released. Twenty-three of these were tagged with PSATs, and six with biologgers. Metrics of all tagged ABFT can be seen in Table 1.

3.1 Planning and organisation of tagging operations

Tagging coordination and planning: Kim Aarestrup, Kim Birnie-Gauvin

Coordination of fishing and project operation: Lene Klubben Sortland, Kim Birnie-Gauvin

Onboard tagging operation: Kim Aarestrup, Kim Birnie-Gauvin, Lene Klubben Sortland, Lars Thirslund

Assistance in tagging operation: Hans Ole Olesen

Data collection: Kim Birnie-Gauvin, Lene Klubben Sortland

3.2 Selection of anglers

All fishing operations were similar to the previous projects (Aarestrup et al. 2022b, Aarestrup et al. 2021, Birnie-Gauvin *et al.*, 2018), but with updates based on previous experience. In brief, together with our collaborators from SLU Aqua in Sweden, we reached out to sport fishing communities in Sweden, Denmark and nearby countries (e.g. Danish Angler Association (Dansk Sportsfiskerforbund) and Swedish Angler Association (Sportfiskarna)) as well as participants from previous years. To ensure that all fish that will be tagged and released are in good condition, very strict requirements were set on experience to handle gear, boat and fish for inclusion of the teams in the fishing operation. To be selected, fishing teams had to have an appropriate boat (including VHF, AIS and safety equipment), powerful gear (minimum 80 lbs reels, 130 lbs main line, 180 lbs leader, circle hooks and a specified hook for gaffing the tuna), and documented experience with big game fishing of species similar to in mass and behaviour to ABFT. We further requested a minimum of 1-week participation during the project in Skagen. This community approach is to ensure continued group learning among fishers about best fishing method for ABFT for tagging. A meeting with the participants was held before the fishing to update them on animal welfare and legislation in relation to animal experimentation.

In total, 100 teams met the requirements and qualified to participate. During fishing, each team was

provided with a flag and unique number to be placed on the boat. A list of boats participating in the project was handed to the fishing authorities to enable inspection of participating boats. Additionally, a small group of highly experienced anglers were selected to perform a 'gear check' on all new boats to ensure the quality and standards of the gear, as stipulated in the project description.

The fishing and tagging operations took place between 19 August and 3 September 2023 in Skagerrak, and 23 September and 1 October 2023 in Kattegat/Øresund. Due to the sensitivity of the tagging operation to weather conditions, we had 17 realized fishing days, some with only limited time at sea. The fishing area in the period from 19 August to 3 September spanned quite a large area of the Skagerrak, with water depth being 150-200 meters (**Figure 1**, top rectangle). For the period from 23 September to 1 October the tagging was performed in the South-western corner of Kattegat and Øresund (**Figure 1**, bottom square), but this time with fewer fishing boats. Due to the large number of boats and the vast area of sea to cover, we collaborate with SLU Aqua, who also runs a similar tagging operation. This enabled us to have two separate tagging boats cooperating to perform tagging in the entire area, except for the last few days in Øresund, where only one tagging boat was present.

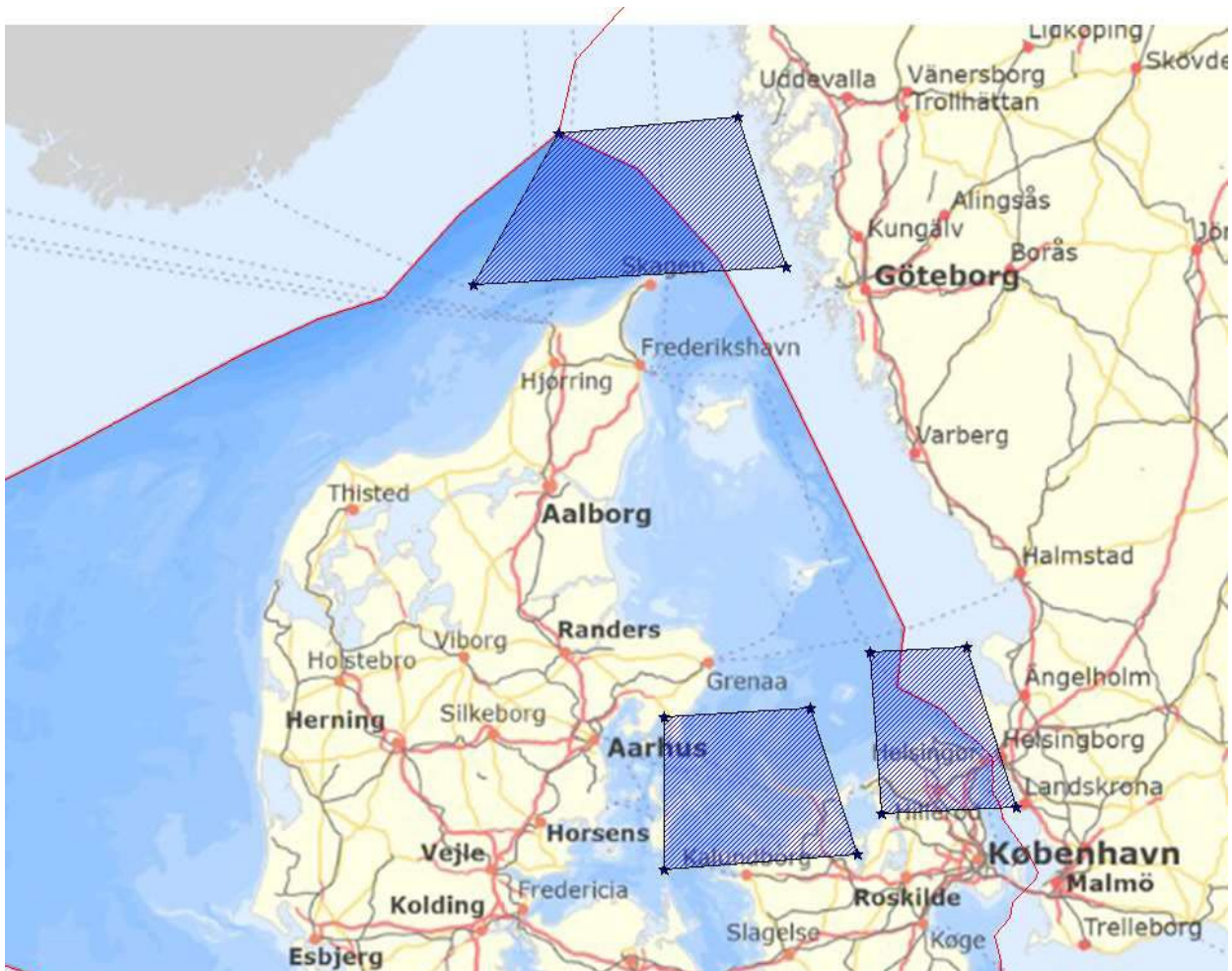


Figure 1. Location of fishing and tagging operations for the Scandinavian Bluefin Marathon (upper crossed polygon representing the fishing location for 19 August to 3 September 2023; lower right crossed polygon representing the fishing location for 23 September to 1 October 2022). Lower right crossed polygon was not fished in 2023.

3.3 Fishing techniques

The fishing was done with rod and reel, typically using balloons and drifting or trolling with baited hooks. The main bait used by the anglers was mackerel, with herring and garfish used to a lesser extent. A few teams opted to chum when deemed necessary. Before the start of each fishing day, a fishing area of approximately 6 to 8 nautical miles in radius was set from a predefined position where the tagging boat was placed (so the tagging boat could reach any fishing position within 20 minutes). Based on the fishing from the previous days or observational data, the fishing area moved slightly from day to day. Each boat had 2-8 crewmembers on board at any given moment. Subsequent to being caught, ABFT were gaffed by the anglers and towed 5-10m behind the boat at app. 2-4 knots to facilitate recovery. Fish were then transferred with a rope to the tagging boat where tagging and sampling was performed (Fig 2.).



Figure 2. ABFT are gaffed at the front of the mouth and towed after the fishing boat for recovery. A rope, attached to the gaff, are used to transfer the ABFT to the tagging boat, by throwing one end over

and releasing the other once the fish is secured behind the tagging boat. Photo: Hanna Lorentzen©

3.4 Tagging and sampling operations

Once a fish was transferred to the tagging boat (**Figure 2**), the handling protocol was the following:

- 1) ABFT were 'swum' behind the boat and their conditions were evaluated by the tagging team (movement, fins, colours, ventilation, tail beats and swimming);
- 2) ABFT were brought onboard using a winch system by sliding onto a wet aluminium platform fully spray painted with multiple layers of rubber, specifically designed for the tagging of large pelagic fish;
- 3) Fish were continuously ventilated with fresh seawater from the moment they were lifted out of water until they were returned to water following tagging and sampling. In addition, the available eye was covered with a wet dark microfibertowel;
- 4) In no specific order, fish were measured (CFL, curved fork length), tagged, sampled (fin clip, blood sample, muscle biopsy and scales) and the hook was removed. Generally, all tagging, sampling and return to water was done within 2 to 4 minutes.



Figure 3. ABFT onboard the rubber covered ramp of tagging boat specifically designed for the tagging of large pelagic fish. The fish has eyes covered and is continually ventilated with fresh saltwater while tagging. Photo: Hanna Lorentzen©

4. Results

4.1 Numbers and sizes of tunas caught and tagged

A total of 134 ABFT were tagged with conventional ICCAT tags, with the majority (133) also tagged with an acoustic tag (Thelma Biotel ID-HP16). Of those fish, a total of eight were tagged with ICCAT-provided PSAT and another 15 PSAT from DTU, all Wildlife Computers miniPAT tags. The latter 15 of these PSATs were programmed to surface after 24 months, while the former eight were programmed to surface after almost 12 months to match next year's planned project to optimize recovery potential. Furthermore, six biologgers + camera were coupled to Wildlife Computer SPOT tags (programmed to release after 3-5 days to facilitate recovery) (Figure 4). All tags were mounted externally.

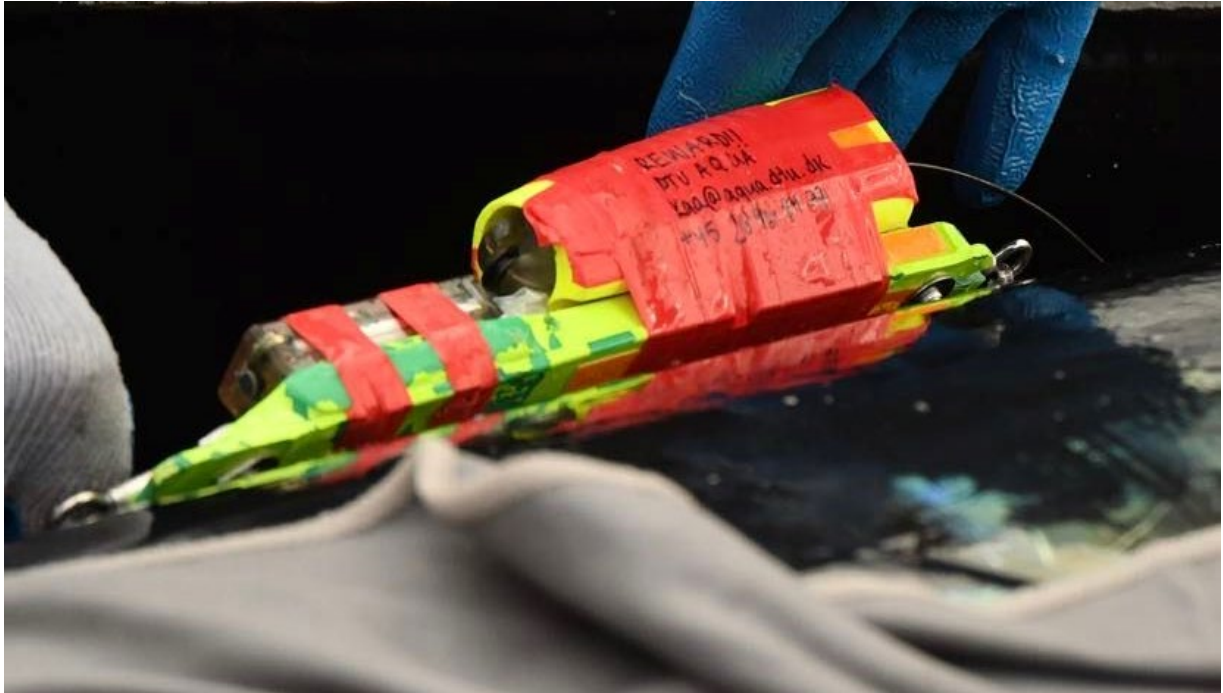


Figure 4. Package consisting of a PSAT, DST and Camera deployed on ABFT in Skagerrak 2023. Attachment anchors (not shown) are similar to standard PSAT attachment. Photo: Kim Birnie-Gauvin ©.

The 134 SBM-tagged ABFT ranged from 217 to 290 cm (CFL; mean \pm S.D. – 258.3 ± 14.6 cm), with the individuals tagged with ICCAT-provided PSATs ranging from 252 to 288 cm (CFL) (Figure 5).

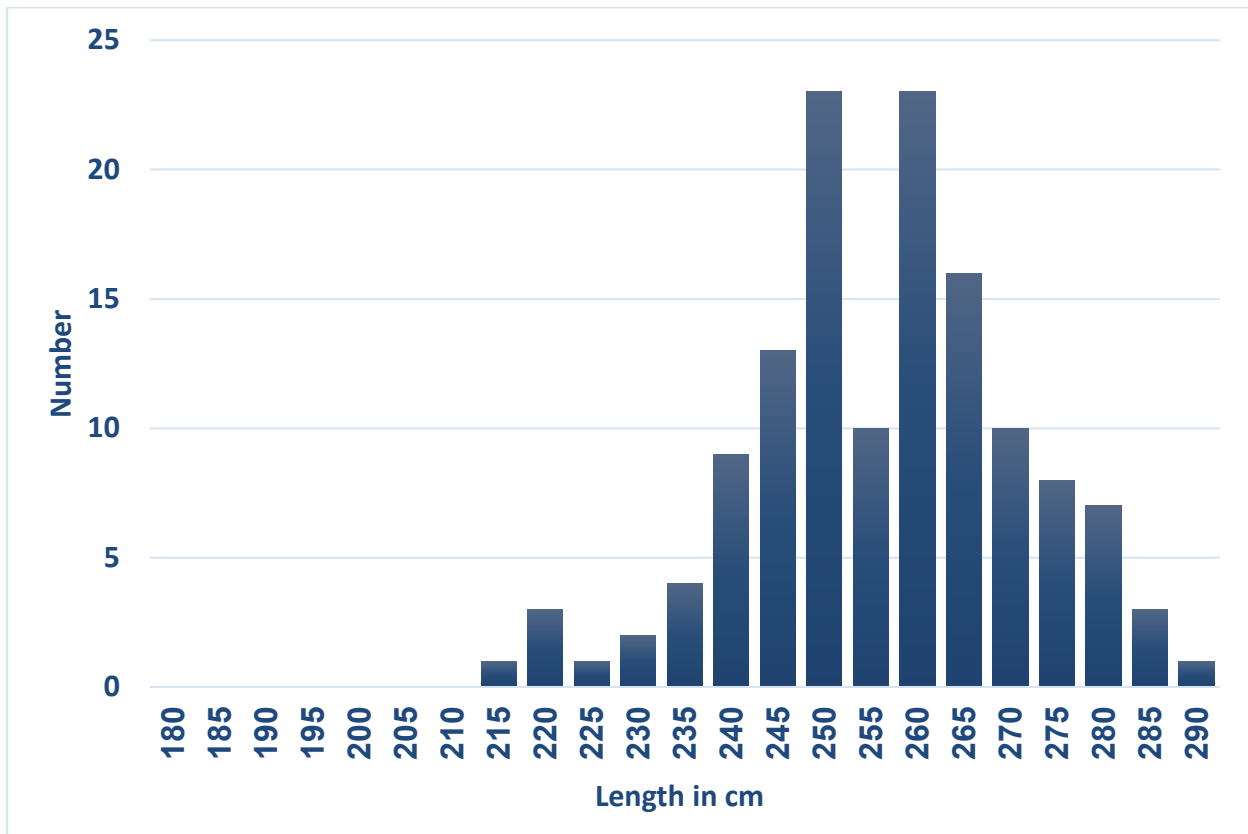


Figure 4. Length-frequency distribution for 134 Atlantic bluefin tunas measured by the Danish Scandinavian Bluefin Marathon during field operations in 2023. Mean length was 258 cm CFL.

4.2 Samples collected

Fin clips (< 0.5 cm in size) were taken from all 134 tagged tunas for genetic assignment to determine population of origin (western vs eastern Atlantic). In addition, scales, muscle biopsies (< 0.5 cm in size) and blood samples (<1mL) were obtained from most tagged tunas.

5. Overall summary and conclusions

The project successfully engaged the Nordic big game fishing community to participate in a tagging operation for ABFT in Skagerrak and Øresund. The operations in the Scandinavian Bluefin Marathon 2023 successfully deployed four types of tags (PSAT, Acoustic, biologgers, and conventional tags), and the results of these tagging operations will, in the coming years, contribute significantly to new knowledge generated on ABFT migratory behaviour (both short and long-term). Our tagging project is particularly relevant given the acoustic telemetry infrastructure currently being deployed by the EU-funded STRAITS project which will detect acoustically-tagged fish in the Danish Straits, but also as they migrate in and out of the Mediterranean, through the Strait of Gibraltar. As such, the large number of ABFT tagged with long-term acoustic tags will provide unprecedented data which will no doubt inform better management practices.

6. Acknowledgements

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>). We wish to thank our skipper, Hans Ole Olesen for his time and dedication to the project. We also wish to thank all the volunteer anglers, without whom this project would not have been possible and various sponsors, especially Tunforeningen af 2019. 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.

7. References

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Table 1. ABFT tagged in 2023 by the Danish tagging team of the Scandinavian Bluefin marathon with information on date, acoustic tag ID, PSAT ID, PSAT owner (ICCAT [International Commission Conservation of Atlantic Tunas], DTU [Technical University of Denmark]), tag type (WC = Wildlife Computer miniPAT, WCA = Wildlife Computer SPOT tag + Biologger), conventional tag ID, and release coordinates.

Date	Acoustic ID	PSAT ID	Owner	Tag type	Conventional	Latitude	Longitude	Length	Vial
19-08-2023	2231-6612	236629	DTU	WCA	BYP080306	58.03.327	10.42.285	261	T444
19-08-2023	2231-6613	NA	NA	NA	BYP080307	58.02.117	10.41.821	246	T445
19-08-2023	2231-6614	252478	DTU	WCA	BYP080317	58.04.431	10.42.157	250	T446
22-08-2023	2231-6615	252546	DTU	WCA	BYP080399	58.04.359	10.47.426	260	T447
22-08-2023	2231-6616	252458	DTU	WC	BYP080312	58.01.374	10.48.985	264	T448
22-08-2023	2231-6617	NA	NA	NA	BYP080321	58.00.041	10.53.490	244	T449
22-08-2023	2231-6618	252459	DTU	WC	BYP080310	57.59.907	10.51.554	261	T450
22-08-2023	2231-6619	252460	DTU	WC	BYP080313	57.59.155	10.52.922	253	T451
23-08-2023	2231-6620	222004	DTU	WCA	BYP080377	57.37.983	11.20.397	270	T452
23-08-2023	2231-6621	252461	DTU	WC	BYP080308	57.46.580	11.23.902	254	T453
26-08-2023	2231-6622	252462	DTU	WC	BYP080300	58.03.208	10.29.723	279	T454
26-08-2023	2231-6623	252463	DTU	WC	BYP080308	58.08.267	10.38.215	245	T455
26-08-2023	2231-6624	252464	DTU	WC	BYP080303	58.04.834	10.32.464	257	T456
26-08-2023	2231-6625	252465	DTU	WC	BYP080319	58.06.604	10.40.195	239	T457
26-08-2023	03JK-8149	252466	DTU	WC	BYP080324	58.00.493	10.43.457	252	T458
28-08-2023	03JL-8150	252467	DTU	WC	BYP080301	58.06.625	10.16.232	262	T459
28-08-2023	03JM-8151	NA	NA	NA	BYP080322	58.07.299	10.19.830	217	T460
28-08-2023	03JN-8152	252468	DTU	WC	BYP080315	58.07.100	10.21.831	257	T461
28-08-2023	03JO-8153	NA	NA	NA	BYP080304	58.07.345	10.18.206	259	T462
28-08-2023	03JP-8154	NA	NA	NA	BYP080398	58.07.894	10.18.076	267	T463
28-08-2023	03JQ-8155	252469	DTU	WC	BYP080380	58.06.753	10.19.081	254	T464
28-08-2023	03JR-8156	NA	NA	NA	BYP080396	58.07.066	10.23.654	222	T465
28-08-2023	03JS-8157	252470	DTU	WC	BYP080393	58.11.074	10.33.515	246	T466
28-08-2023	03JT-8158	NA	NA	NA	BYP080391	58.06.461	10.32.376	260	T467
28-08-2023	03JU-8159	NA	NA	NA	BYP080389	58.09.864	10.34.770	249	T468
28-08-2023	03JV-8160	NA	NA	NA	BYP080381	58.09.032	10.32.687	248	T469
28-08-2023	03JW-8161	NA	NA	NA	BYP080383	58.07.157	10.28.417	268	T470
28-08-2023	03JX-8162	NA	NA	NA	BYP080384	58.08.608	10.25.481	260	T471
28-08-2023	03JY-8163	NA	NA	NA	BYP080387	58.06.443	10.21.661	243	T472
28-08-2023	03JZ-8164	NA	NA	NA	BYP080376	58.05.437	10.26.916	254	T473
30-08-2023	03K0-8165	NA	NA	NA	BYP080394	58.04.899	10.19.070	242	T474
30-08-2023	03K1-8166	NA	NA	NA	BYP080388	58.05.451	10.22.219	238	T475
30-08-2023	03K2-8167	NA	NA	NA	BYP080392	58.07.259	10.24.461	260	T476
30-08-2023	03K3-8168	NA	NA	NA	BYP080379	58.07.393	10.19.874	253	T477
30-08-2023	03K4-8169	NA	NA	NA	BYP080375	58.07.805	10.15.848	260	T478
30-08-2023	03K5-8170	NA	NA	NA	BYP080386	58.07.199	10.23.109	253	T479
30-08-2023	03K6-8171	NA	NA	NA	BYP080378	58.10.460	10.22.259	262	T480
30-08-2023	03K7-8172	NA	NA	NA	BYP080395	58.10.031	10.17.442	230	T481
30-08-2023	03K8-8173	NA	NA	NA	BYP080397	58.08.627	10.24.962	250	T482

30-08-2023	03K9-8174	NA	NA	NA	BYP080390	58.06.660	10.17.848	242	T483
30-08-2023	03KA-8175	NA	NA	NA	BYP080385	58.09.229	10.20.713	226	T484
30-08-2023	03KB-8176	NA	NA	NA	BYP080356	58.07.322	10.19.421	272	T485
30-08-2023	03KC-8177	NA	NA	NA	BYP080359	58.10.533	10.25.150	269	T486
31-08-2023	03KD-8178	NA	NA	NA	BYP080366	58.06.533	10.14.287	242	T487
31-08-2023	03KE-8179	NA	NA	NA	BYP080361	58.03.123	10.30.437	236	T488
31-08-2023	03KF-8180	NA	NA	NA	BYP080368	58.06.171	10.25.602	252	T489
31-08-2023	03KG-8181	NA	NA	NA	BYP080365	58.06.886	10.22.615	223	T490
31-08-2023	03KH-8182	NA	NA	NA	BYP080373	58.05.262	10.15.475	235	T491
31-08-2023	03KI-8183	NA	NA	NA	BYP080353	58.05.345	10.15.226	255	T492
31-08-2023	03KJ-8184	NA	NA	NA	BYP080371	58.06.483	10.19.219	249	T493
31-08-2023	03KK-8185	NA	NA	NA	BYP080374	58.03.001	10.33.119	252	T494
31-08-2023	03KL-8186	NA	NA	NA	BYP080364	58.05.408	10.14.740	247	T495
01-09-2023	03KM-8187	NA	NA	NA	BYP080355	58.07.943	10.13.070	224	T496
01-09-2023	03KN-8188	252471	DTU	WC	BYP080352	58.07.616	10.13.172	240	T497
01-09-2023	03LS-8229	252472	DTU	WC	BYP080367	58.06.205	10.16.309	257	T498
01-09-2023	03LT-8230	NA	ICCAT	WC	BYP080250	58.04.521	10.29.407	255	T499
23-09-2023	03LU-8231	236629	ICCAT	WCA	BYP080354	56.07.442	12.32.777	275	T500
23-09-2023	2231-6552	252478	NA	WCA	BYP080369	56.08.530	12.32.732	266	T501
23-09-2023	2231-6553	250418	ICCAT	WC	BYP080362	56.07.764	12.30.440	288	T502
23-09-2023	2231-6555	250419	ICCAT	WC	BYP080370	56.07.911	12.31.281	284	T503
23-09-2023	NA	NA	NA	NA	BYP080360	56.10.216	12.28.664	255	NA
23-09-2023	2231-6557	250421	ICCAT	WC	BYP080372	56.06.460	12.35.362	264	T505
23-09-2023	2231-6556	250420	ICCAT	WC	BYP080351	56.10.611	12.30.837	279	T506
23-09-2023	2231-6558	244320	ICCAT	WC	BYP080357	56.11.419	12.30.182	252	T507
23-09-2023	2231-6559	250433	ICCAT	WC	BYP080256	56.09.504	12.32.004	282	T508
23-09-2023	2231-6560	250422	ICCAT	WC	BYP080254	56.12.600	12.29.888	261	T509
24-09-2023	2231-6561	NA	NA	NA	BYP080251	56.04.434	12.37.259	278	T510
24-09-2023	2231-6562	NA	NA	WC	BYP080263	56.06.645	12.33.997	250	T511
24-09-2023	2231-6563	NA	NA	NA	BYP080250	56.04.908	12.35.782	263	T512
25-09-2023	2231-6626	250423	ICCAT	WC	BYP080269	56.09.175	12.22.197	272	T513
26-09-2023	03LV-8232	NA	NA	NA	BYP080253	56.07.640	12.32.828	287	T514
26-09-2023	03LW-8233	NA	NA	NA	BYP080268	56.10.457	12.28.405	249	T515
26-09-2023	03LX-8234	NA	NA	NA	BYP080272	56.10.593	12.28.970	262	T516
26-09-2023	03LY-8235	NA	NA	NA	BYP080266	56.12.992	12.26.970	260	T517
26-09-2023	03LZ-8236	NA	NA	NA	BYP080261	56.10.890	12.26.930	256	T518
26-09-2023	03M0-8237	NA	NA	NA	BYP080252	56.09.609	12.31.266	253	T519
26-09-2023	03M1-8238	NA	NA	NA	BYP080260	56.06.918	12.32.236	241	T520
26-09-2023	03M2-8239	NA	NA	NA	BYP080271	56.10.863	12.22.762	266	T521
26-09-2023	03M3-8240	NA	NA	NA	BYP080262	56.12.455	12.29.477	260	T522
26-09-2023	03M4-8241	NA	NA	NA	BYP080258	56.09.851	12.29.768	265	T523
26-09-2023	03M5-8242	NA	NA	NA	BYP080264	56.09.841	12.30.570	265	T524
26-09-2023	03M6-8243	NA	NA	NA	BYP080257	56.10.776	12.30.500	249	T525
26-09-2023	03M8-8245	NA	NA	NA	BYP080270	56.10.249	12.30.549	266	T526
26-09-2023	03M9-8246	NA	NA	NA	BYP080273	56.10.717	12.29.518	260	T527

26-09-2023	03MA-8247	NA	NA	NA	BYP080255	56.13.199	12.26.651	271	T528
27-09-2023	03MB-8248	NA	NA	NA	BYP080265	56.08.439	12.32.952	260	T529
27-09-2023	03NG-8289	NA	NA	NA	BYP080267	56.10.512	12.30.112	279	T530
27-09-2023	03NH-8290	NA	NA	NA	BYP080274	56.08.580	12.31.401	275	T531
27-09-2023	03NI-8291	NA	NA	NA	BYP080259	56.06.394	12.33.900	284	T532
27-09-2023	03NJ-8292	NA	NA	NA	BYP080213	56.10.677	12.31.429	250	T533
27-09-2023	03NK-8293	NA	NA	NA	BYP080201	56.10.702	12.31.119	280	T534
27-09-2023	03NL-8294	NA	NA	NA	BYP080206	56.12.698	12.30.737	268	T535
27-09-2023	03NM-8295	NA	NA	NA	BYP080221	56.12.421	12.30.527	260	T536
27-09-2023	03NN-8296	NA	NA	NA	BYP080210	56.10.358	12.30.457	274	T537
27-09-2023	03NO-8297	NA	NA	NA	BYP080224	56.10.146	12.30.460	248	T538
27-09-2023	03NP-8298	NA	NA	NA	BYP080203	56.12.355	12.28.720	258	T539
27-09-2023	03NQ-8299	NA	NA	NA	BYP080204	56.13.342	12.29.038	250	T540
27-09-2023	03NR-8300	NA	NA	NA	BYP080217	56.12.410	12.29.572	266	T541
27-09-2023	03NS-8301	NA	NA	NA	BYP080202	56.12.168	12.29.243	230	T542
27-09-2023	03NT-8302	NA	NA	NA	BYP080219	56.12.065	12.29.843	251	T543
27-09-2023	03NU-8303	NA	NA	NA	BYP080214	56.12.415	12.29.493	260	T544
27-09-2023	03NV-8304	NA	NA	NA	BYP080223	56.12.395	12.26.858	277	T545
28-09-2023	03NW-8305	NA	NA	NA	BYP080220	56.09.804	12.29.451	248	T546
28-09-2023	03NX-8306	NA	NA	NA	BYP080216	56.09.849	12.29.669	271	T547
28-09-2023	03NY-8307	NA	NA	NA	BYP080207	56.10.041	12.29.566	276	T548
28-09-2023	03NZ-8308	NA	NA	NA	BYP080218	56.09.828	12.30.644	281	T549
28-09-2023	03OK-8329	NA	NA	NA	BYP080208	56.11.416	12.28.795	282	T550
28-09-2023	03OL-8330	NA	NA	NA	BYP080211	56.11.499	12.28.260	268	T551
28-09-2023	03OM-8331	NA	NA	NA	BYP080205	56.13.840	12.29.679	266	T552
28-09-2023	03ON-8332	NA	NA	NA	BYP080209	56.13.587	12.28.779	256	T553
28-09-2023	03OO-8333	NA	NA	NA	BYP080200	56.11.886	12.30.146	254	T554
28-09-2023	03OP-8334	NA	NA	NA	NA	56.11.016	12.24.444	286	T555
28-09-2023	03OQ-8335	NA	NA	NA	BYP080215	56.09.574	12.27.256	243	T556
28-09-2023	03OR-8336	NA	NA	NA	BYP080212	56.13.421	12.25.807	248	T557
29-09-2023	03OT-8338	NA	NA	NA	BYP080222	56.08.411	12.32.969	261	T558
29-09-2023	03MW-8269	NA	NA	NA	BYP080327	56.12.476	12.30.137	253	T559
29-09-2023	03MX-8270	NA	NA	NA	BYP080337	56.12.201	12.30.117	249	T560
29-09-2023	03MY-8271	NA	NA	NA	BYP080341	56.11.480	12.29.148	268	T561
29-09-2023	03MZ-8272	NA	NA	NA	BYP080349	56.09.895	12.27.605	266	T562
29-09-2023	03N0-8273	NA	NA	NA	BYP080328	56.11.061	12.29.165	262	T563
29-09-2023	03N1-8274	NA	NA	NA	BYP080342	56.10.959	12.29.024	268	T564
29-09-2023	03N2-8275	NA	NA	NA	BYP080339	56.11.773	12.29.762	251	T565
29-09-2023	03N3-8276	NA	NA	NA	BYP080347	56.12.397	12.27.355	290	T566
29-09-2023	03N4-8277	NA	NA	NA	BYP080344	56.12.254	12.28.989	250	T567
29-09-2023	03N5-8278	NA	NA	NA	BYP080331	56.10.118	12.30.848	243	T568
29-09-2023	02N6-8279	NA	NA	NA	BYP080338	56.12.537	12.29.036	264	T569
29-09-2023	03N7-8280	NA	NA	NA	BYP080326	56.13.584	12.26.395	273	T570
01-10-2023	03N8-8281	NA	NA	NA	BYP080340	56.05.535	12.33.666	269	T571
01-10-2023	03N9-8282	NA	NA	NA	BYP080336	56.04.531	12.34.929	250	T572

01-10-2023	03NA-8283	NA	NA	NA	BYP080330	56.05.129	12.34.822	270	T573
01-10-2023	03NB-8284	NA	NA	NA	BYP080329	56.06.030	12.35.056	252	T574
01-10-2023	03NC-8285	NA	NA	NA	BYP080325	56.05.808	12.35.086	281	T575
01-10-2023	03ND-8286	NA	NA	NA	BYP080333	56.08.591	12.32.075	271	T576
01-10-2023	03NE-8287	NA	NA	NA	BYP080343	56.04.204	12.38.019	272	T577

Table 2. Tags deployed within ICCAT GBYP Electronic tagging campaign 2023

Tag Serial No.	Argos No. decimal	Conventional Tag No.	Deployment Date	Deployment Latitude	Deployment Longitude	Specimen length CFL (cm)
23P0686	250418	080362	2023-09-23	56.07.764	12.30.440	288
23P0710	250419	080370	2023-09-23	56.07.911	12.31.281	284
23P0717	250421	080372	2023-09-23	56.06.460	12.35.362	264
23P0711	250420	080351	2023-09-23	56.10.611	12.30.837	279
22P1256	244320	080357	2023-09-23	56.11.419	12.30.182	252
23P0767	250433	080256	2023-09-23	56.09.504	12.32.004	282
23P0718	250422	080254	2023-09-23	56.12.600	12.29.888	261
23P0727	250423	080269	2023-09-25	56.09.175	12.22.197	272