

Tuna CHART 2021 Report



Report on Ireland's Atlantic bluefin tuna catch, tag and release data collection programme 2021

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1. Introduction

In 2018, the International Commission for the Conservation of Atlantic Tunas (ICCAT) permitted countries in the North-East Atlantic without an Atlantic bluefin tuna quota to authorise a limited number of sport vessels to target bluefin tuna with the purpose of “tag and release” without the need to allocate a country-specific quota. Tuna CHART is Ireland’s conventional tagging programme designed to implement, co-ordinate and oversee “tag and release” of ABFT by authorised angling charter skippers.

The aim of the programme is to collect data on the spatial and temporal distribution of Atlantic bluefin tuna. Another function is to record biometric data such as length and condition to report for Ireland to ICCAT and improve our understanding of the Atlantic bluefin tuna visiting Irelands coastal waters.

Atlantic bluefin tuna (*Thunnus thynnus*), the largest tuna in the world, frequent Irish coastal waters to feed following annual spawning migrations in the Mediterranean and possibly even the Gulf of Mexico. The bluefin tuna is prized by sea anglers for its power and fighting ability and is a highly valuable commercial species.

The International Commission for the Conservation of Atlantic Tunas (ICCAT) is an inter-governmental fishery organisation 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.

ICCAT manage Atlantic bluefin stocks under a two-stock hypothesis for management and assessment i.e.

- Eastern Atlantic Ocean and Mediterranean Sea stock, that spawns in the Mediterranean Sea
- Western Atlantic Ocean stock, that spawns in the Gulf of Mexico, with a boundary line dividing the stocks at 45 W longitude.

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

The EC became a Contracting Party to ICCAT 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 member states 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.

The ocean waters off south Donegal are currently regarded by 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 Tuna CHART programme is a collaborative scientific programme between Inland Fisheries Ireland and the Marine Institute in partnership with the Sea Fisheries Protection Authority, the Department of Agriculture, Food and the Marine (DAFM) and the Department of Environment, Climate and Communications (DECC).

This is a recreational catch and release fishery operated by authorised, trained charter skippers. Anglers participate in the fishery by hiring the charter skippers and their vessels for angling trips. Anglers hook and play the bluefin to the side of the boat using angling gear, applying methods approved by the wider Tuna CHART group but this is strictly monitored. The angling methods and bluefin tuna handling guidelines for the programme are detailed in the method manual (Wögerbauer *et al.* 2019) which is in-part based on the ICCAT Tagging manual (Cort *et al.* 2010). Training of skippers in tagging procedures and reporting of the fish caught and fishing activities are requirements of the programme. Any mortalities must be reported to ICCAT.

The Tuna CHART programme commenced in 2019. This report presents a summary overview of the 2021 programme results.

2. Methods

This section provides an overview of the methods relating to various elements of the programme and the changes made in 2022. The methods relate mainly to the process of enabling the charter skippers to capture and report data on individual tuna and to effect safe tagging and release. Tuna welfare is central to this process.

The Tuna CHART technical group manage the skipper authorisations, the training course, the methodologies used to tag, decide which data to collect and coordinate the data collection by skippers, measure and handle the bluefin, and oversee the observers.

2.1 Skipper authorisation

In 2021, following an application process, 22 experienced charter skippers were authorised under a DECC Section 14 authorisation to operate a catch, tag and release bluefin charter fishery. 19 skippers returned from previous Tuna CHART years, three new skippers were approved for the programme along the south coast, extending the distribution of authorised skippers further east than previous years.

Anglers are permitted to participate in the fishery as paying customers onboard vessels of authorised skippers. Authorised skippers were based in ports along the Northwest, West and South coasts (Fig.1).

In 2020 a detailed and mandatory online training course was developed by IFI and the Marine Institute in collaboration with DAFM, DECC and the SFPA for the authorised skippers. This course was expanded in 2021 to include information on the regulations regarding angling near cetaceans. Due to Covid-19 governmental restrictions limiting congregations in one place, once again training of the authorised skippers took place online. Skippers were required to pass a short test on each module to pass the course. The training course spanned 7 videos encompassing an introduction to ICCAT and bluefin tagging research, bluefin welfare, required angling gear and best practice, bluefin handling and tagging techniques, legislation, and data collection. A live interactive on-line session with contributions from all collaborative partners in the programme was held subsequently to answer any queries which individual skippers may have had.

Section 14 authorisations were limited to the open season only (1st July - 12th November 2021).

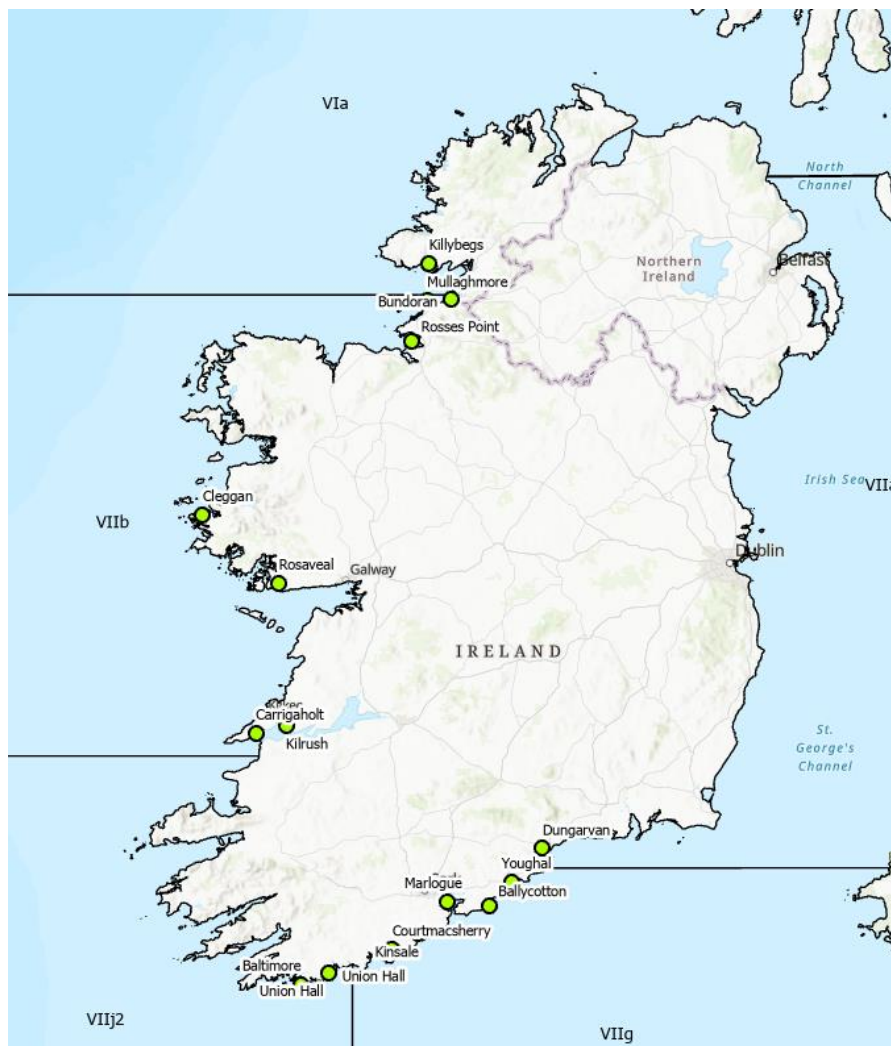


Fig. 1 Spatial Distribution of Authorised Skippers in 2021

All skippers/vessels were required to have suitably rated angling equipment, including 80-130lb class (or greater) bent butt rods and reels, and swivel rod holders. These provisions were required to minimise risk to tuna from lengthy playing bouts, and to allow for best management of fish welfare. Gear checks were undertaken by IFI staff in advance of the opening of the season and prior to authorisation.



Fig. 2 Measuring an Atlantic bluefin tuna in Donegal Bay

Skippers were provided with standardised equipment including measuring kits, lip hooks and double-barbed tags in 2021, the same tag types used in 2020. These tags were a more robust tag compared to the spaghetti tags used in 2019. The double-barb tag was once again supplied by ICCAT (Fig. 3).



Fig. 3 Large Double barb ICCAT tag used in Tuna CHART 2020 and 2021

2.2 Additional Control Measure

The Department of Environment, Climate and Communications introduced a new bye-law in 2020. Bye-law 981 of 2020 Control of sea angling methods for certain species of fish prohibits the use of surface trolling for catching any species of tuna, shark or billfish and prohibits retaining gear or equipment on board capable of trolling fishing lines for these species. This bye-law provided additional powers to protection officers to ensure that no unauthorised persons could target Atlantic bluefin tuna.

2.3. Protection

Inland Fisheries Ireland (IFI) and the Sea Fisheries Protection Authority (SFPA) have joint responsibility for the protection of the bluefin tuna fishery. IFI undertakes RIB patrols and coastal surveillance to monitor for unauthorised fishing of bluefin. RIB patrols engage with authorised skippers at sea to ensure handling and release methods are in keeping with Tuna CHART requirements.

SFPA had responsibility for port inspections to ensure no bluefin tuna were landed by authorised or unauthorised vessels.

2.4 Data

All skippers were required to permit onboard installation of a vessel monitoring system (VMS) for the duration of the open season. The VMS was provided by CLS, a provider of satellite systems which support monitoring and tracking of vessels at sea. Vessel positions were monitored by the Sea Fisheries Protection Authority (SFPA) and IFI.

Skippers submitted a digital report of their bluefin angling trips to IFI and Tuna CHART using the Tuna CHART form on Survey123, an ArcGIS application developed by IFI on ruggedised Samsung tablets (Fig. 4a). Skippers were obliged to submit their surveys digitally within 24 hours of their angling trip. An IFI-developed ArcGIS Tuna CHART dashboard provided daily running summaries of spatial and temporal tagging activity.

Paper copies of the trip and fish information were also recorded by skippers and collected by MI at the end of the open season (Fig. 4b). Fields in the digital and paper forms were designed to correspond to fields in the ICCAT conventional tagging document (Fig. 5).

IFI Tuna CHART staff contacted all skippers weekly before, during and after the open season via phone and email to support data collection and general Tuna CHART queries. Digital and paper records were reviewed by IFI staff. Summary emails were provided fortnightly to skippers. In 2021, for the first time, authorised skippers were provided with live access to their digitally submitted data via an ArcGIS Hub website (Fig. 6). Each skipper was provided with login details to their own data on the Hub to aid with the data verification process and so that they could review maps, summary statistics and raw data.

A verbal update was obtained on the 30th of August 2021 from 20 of the 22 skippers participating in the Bluefin tuna scientific fishery and skippers were subsequently met in person over two weeks (from the 20th to the 26th of September and 27th of September to the 3rd of October) to discuss any issues encountered so far in the progressing season. Qualitative data on the fishery was also collected when meeting the licenced skippers on distribution, presence/absence of BFT as well as prey abundance and prey species availability. All 22 skippers were met once more, in the week following the end of the season (12th of November 2021) in order to collect data sheets as well as any observations, information and conclusions they had regarding the 2021 season.

a)

Fight time (minutes)

Bluefin brought alongside?

Yes No

Condition when brought alongside?

Good condition Injured Dead

Is the Bluefin already tagged?

Look around dorsal fins on both side for Tag. If present cut off the old Tag, note the Tag code and retain for reward. Measure Bluefin and attach a new Tag

Yes No

Bluefin released with new Tag code?

Only tag healthy Bluefin

Yes No

Straight fork length (cm)



Please do not report in inches. Keep tape as taut as possible and measure alongside from fork to snout

Estimated weight (kg) from length

This is an estimation based on Mediterranean caught BFT (Lombardo et al. 2019). At the end of the calendar year, bluefin are likely to weigh more than calculated here as they will have been feeding during the autumn months

b)

Upload an image of completed page(s) to the tablet with every trip.

Vessel Name:				Fishing method:		Environmental Conditions			
Vessel ID:				Trolling		Wind speed (knots):			
Date:				Bait		Sea surface Temp. (°C):			
No. Hrs Fished:				Kite		Depth (m):			
No. Anglers:				Other		Sea State:			
Fish No.	Tag Code (s)	Old Tag Code	Straight Fork Length (cm)	LATITUDE (decimal degrees if possible e.g. 53.62)		LONGITUDE (decimal degrees if possible e.g. -10.45)		TIME fight time (mins)	TIME handling (mins)
1									
2									
3									
4									
5									
Fish No. /Injuries	Global	Head	Mouth	Eyes	Fins	Skin	Body	Injury Code	
1									Blank = no injury
2									+= moderate
3									
4									
5									+++ severe

Page 1

Fig. 4 a) Tuna CHART screenshot from the digital data collection form b) paper form

ICCAT: INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS										2019a		ENG																	
Tagging correspondent					Secretariat use only					Filtering criteria																			
Identification Name: _____ E-mail: _____ Phone: _____ Affiliation Institution: _____ Department: _____ Address: _____ Country: _____					Date reported: _____ Reference No: _____ id: _____ File name (proposed): _____					Filter 1: 0 Filter 2: 0		a) 0 b) 0 c) 0 d) n/a																	
Data set characteristics					Notes																								
Report type : _____ Sub-form / Description TG02A Conventional tagging events (releases/recaptures) TG02B Vessels involved in tagging experiments TG02C Persons (taggers/recaptors) involved in tagging experiments Version reported : _____ Content (data) : _____																													
Release(R)/Recovery(C): Event identifier (unique)										RELEASE information																			
Specimen identifier (unique)					Tagging operation (unique identifier)					Time strata					Geographical strata					Fishing operation									
					Tags used (full codes)					RC code																			
ID	Species cod.	Sex cod.	Tag 1	Tag 2	Tag 3	Tag 4	RCStage cod.	Date	Time (hh:mm)	Latitude	Longitude	Area description (optional)			Vessel ID	Gear cod.	School type	Survey acron	Bait cod.	Dept (m)									
SpecimID	SpcCd	SexCd	Tag1Cd	Tag2Cd	Tag3Cd	Tag4Cd	RCStageCd	reDate	reTime	reLat	reLon	reArea	reVesselID	reGearCd	reSchoolCd	reSurvAcro	reBaitCd	reDeptM											

Figure 5. ICCAT conventional tagging report "TG02-CnvTReRc".

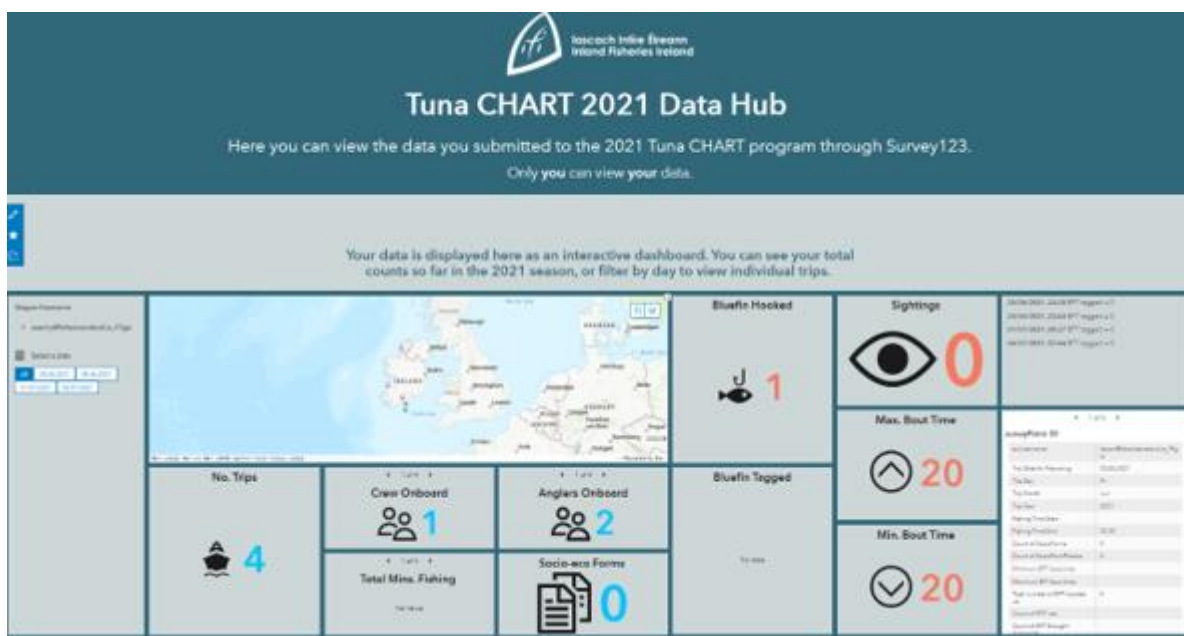


Fig. 6 Example Tuna CHART 2021 Data Hub for skippers to access their own data in real time

Data collected from the programme was subsequently cross-checked by IFI and MI, using both the physical report and digital report once the programme has finished for the season. The quality assured data was then collated and submitted to ICCAT in the form of the conventional tagging report (TG02-CnvTReRc) (Fig. 6).

The tagging data forwarded to ICCAT is processed regularly and included in the international tagging database according to the relevant Species Group needs (in this case the ABFT) and is updated every year. A summary of these data is then published and made available publicly at <https://www.iccat.int/en/accesingdb.html> under the "Tagging" toggle.

2.4 Observer programme

In 2021 MI and IFI shared observer days. IFI staff undertook 12 observer days on seven individual vessels. Two of these vessels were manned by skippers new to the programme in 2021. The Marine Institute undertook 9 observer days on 4 individual vessels, 3 of which were new to the 2021 programme. In total 11 vessels were observed, providing 5.4% coverage. The handling of 14 bluefin tuna was observed.

Table 1. Observer days and fishery coverage by IFI and MI observers

Fishing Area	No. Skippers observed	No. Observer trips	% Trip Coverage	No. BFT Hooked during observer trips
Northwest	4	6	3.1	11
South	7	12	9.6	3
Total	11	18	5.4	14

3. Results

3.1 Overview

A total of 336 bluefin fishing trips were undertaken and 242 Atlantic bluefin tuna were tagged during the open season. A further 43 tuna were hooked but not tagged, largely because they were lost before being brought alongside. On 9 occasions, bluefin tuna were brought alongside and measured but the fish were not tagged for technical reasons. No other species were caught as by-catch. Zero mortalities were recorded in 2021.

Table 2. Bluefin tuna angling trips and tagged bluefin Tuna CHART 2021

Fishing Area	No. Skippers	No. Trips	No. Tuna Tagged
Northwest	7	192	218
South Coast	11	124	23
West Coast	4	20	1
Tuna CHART 2022	22	336	242

No tagged bluefin have been recaptured to date. Two previously 'handled' tuna were encountered in 2021. A further three bluefin were reported with long-line gear in their mouths. This gear was removed by the skippers during lip-hooking. All fish were in good condition and released successfully.

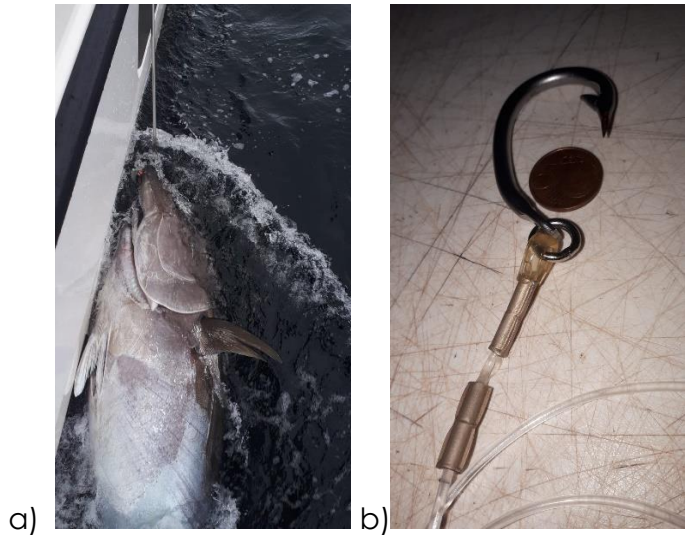


Fig. 7 a) Example of the bluefin tuna with a damaged lower jaw and b) example of a long-line hook removed from the mouth of a bluefin tuna in 2019.

3.2 Fishing Effort

Authorised skippers undertook bluefin angling trips in Donegal Bay and along the west and southwest Irish coasts (Fig. 8). Peak angling activity was recorded in September and October (Fig. 9).

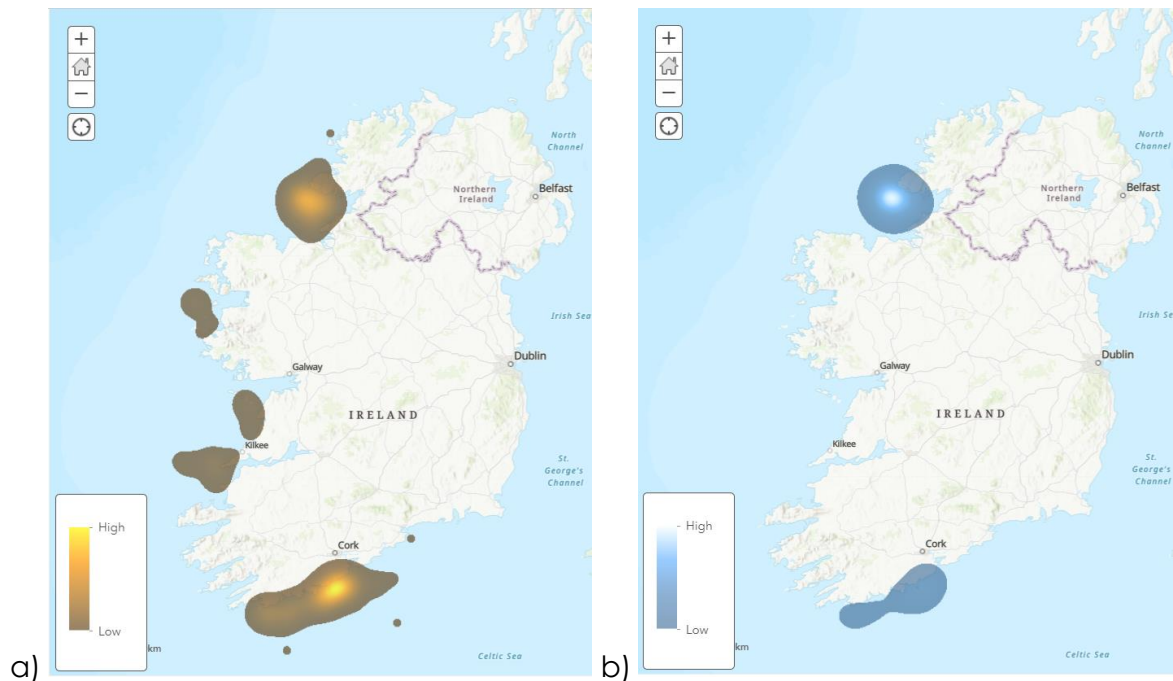


Fig. 8 a) Fishing locations by authorised skippers and b) Bluefin tuna tagging heat map Tuna CHART 2021

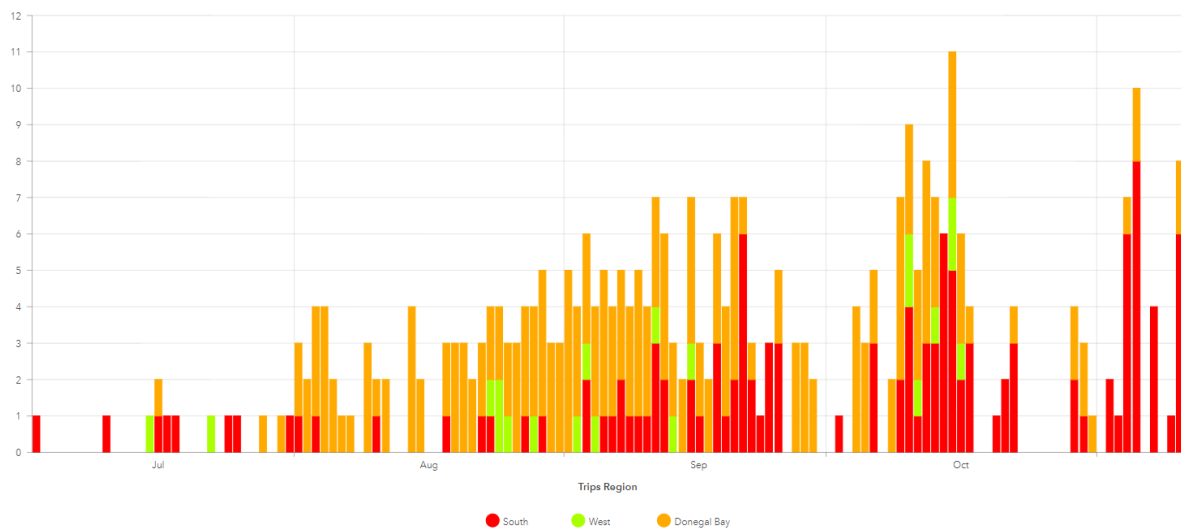


Fig. 9 Tuna CHART 2021 Fishing effort by day (Season 1st July-12th November).

3.3 Tagging results

The first bluefin tagged was in Donegal Bay on the 30th of July. The first bluefin tuna tagged off the south coast was on the 3rd September. The only bluefin tagged off the West coast was on the 13th October (Fig. 10). Skippers based in ports in both Donegal and Sligo converged in Donegal Bay to target tuna in the same area. Moderate numbers of bluefin were tagged in mid-August in the Northwest and again in late September until the end of October.

Nine skippers fished in the Northwest. 256 bluefin were hooked up and 217 bluefin were tagged over the course of 192 trips in the Northwest during the open season. Six out of seven skippers successfully tagged at least one bluefin in the northwest. The number of bluefin tagged in Donegal Bay in 2021 dropped to 46% of the 2020 number.

Fishing effort was lowest along the west coast where four skippers were based. Few sightings of tuna were observed in these waters, and this impacted on effort. Two bluefin were hooked but only one bluefin was tagged, off the Co. Clare coast. In 2020 only three West coast bluefin were tagged.

Eleven skippers were based along the south coast. 35 bluefin were hooked up. 23 bluefin were tagged by six different skippers. In 2020 some 212 bluefin were tagged off the south coast.

The last bluefin tagged off the South coast was on the 7th November and off the Northwest coast on the 10th November (Fig. 10).

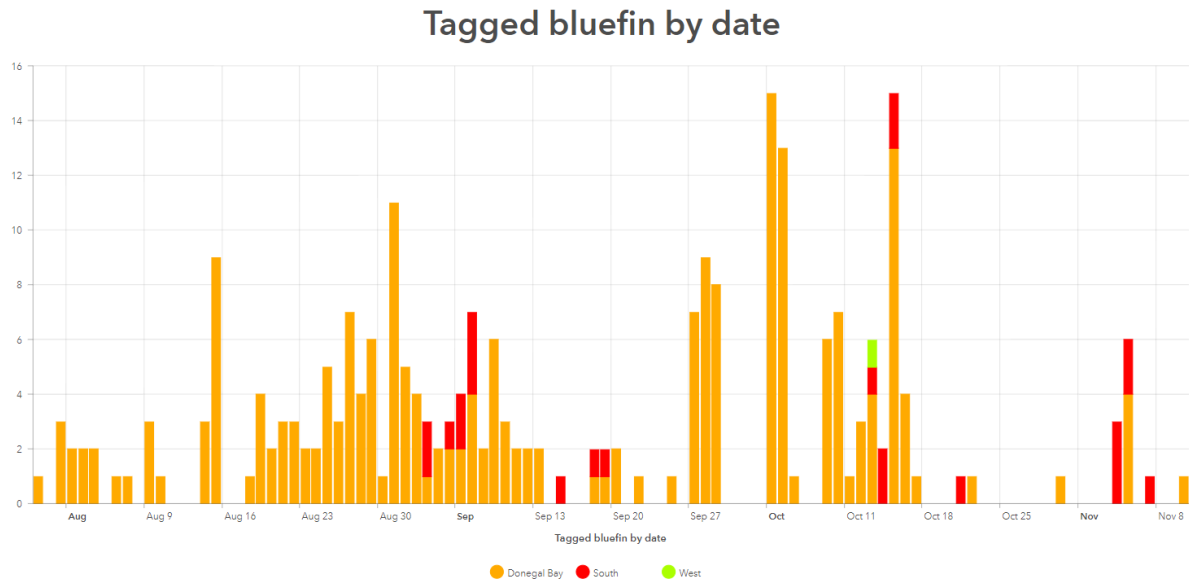


Fig. 10 Atlantic bluefin tuna daily tag numbers Tuna CHART 2021 (n= 242).

3.4 Size distribution of Bluefin tuna

Bluefin ranged in length from 155cm to 275cm Straight Fork Length (SFL). The length data was normally distributed with a median length value of 203cm (Fig. 11), close to the 2020 median of 208cm. A smaller-sized cohort of bluefin, from 139 to 154cm were not recorded in the smaller 2021 dataset. In 2019, the length frequency distribution was also similar, with a median value of 205cm, though with two peaks, at 190cm and 220cm.

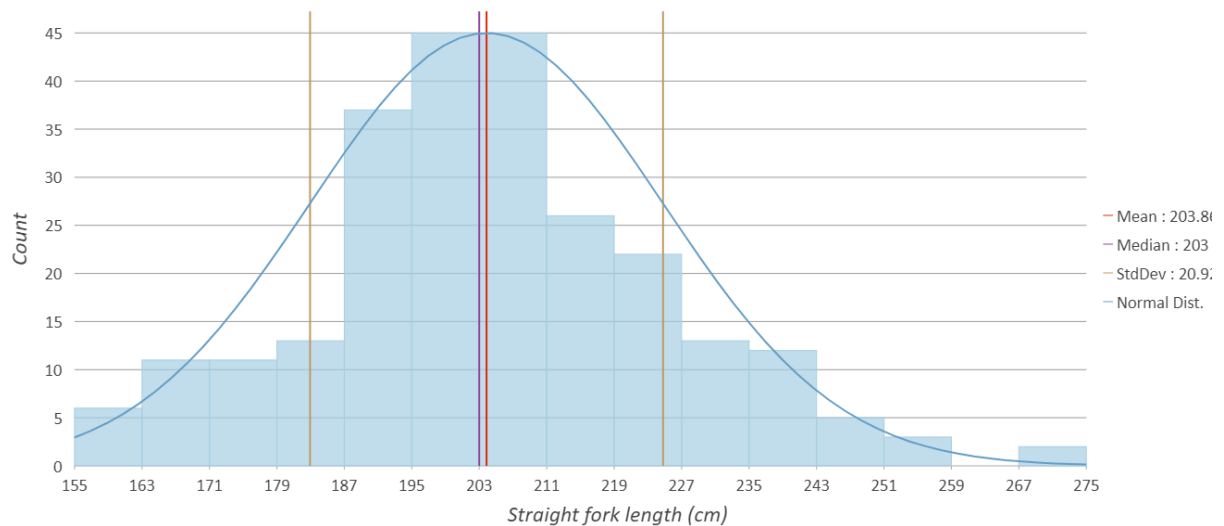


Fig. 11 Histogram of measured Atlantic bluefin tuna length distribution (cm) (Straight fork length) 2021 (n=251)

3.5 Observer reports

Three minor issues were observed, falling into one category: digital data collection using the tablet due to hardware issues. Two tablets were replaced during the open season as required.

3.6 Unauthorised bluefin tuna angling

There were no unauthorised vessels targeting Atlantic bluefin tuna encountered by IFI protection staff in the Northwest during the 2021 season. It is likely that the legislation (Bye-law 981 of 2020) was effective in acting as a deterrent to unauthorised anglers.

4. Discussion

The TUNA Chart programme is extensive involving many different elements (governance, administration, research, technical, protection and the angling sector) working together for a common goal. The high level of co-operation amongst the various partner agencies has allowed this programme to operate efficiently and effectively.

Fishing effort reached its highest level to date despite a continued reduction in international tourism due to the Covid-19 pandemic. However, CPUE and the percentage of successful trips fell to the lowest levels. A successful trip was defined as any trip with at least one bluefin tagged. 2021 was the least productive year to date in terms of CPUE and percentage of successful trips. For the first time, less than 1 fish was caught per trip (CPUE of 0.72). The maximum CPUE in any week was also at its lowest (1.8 fish per trip) and the highest percentage of unsuccessful trips were recorded (38.4%).

Table 4 Tuna CHART summary 2019-2021

Year	No. Skippers	Total Trips	No. Tagged	No. Successful Trips	CPUE (Tags/Trips)	Max. CPUE in any week	% Successful Trips
2019	15	204	209	99	1.02	2.4	48.5
2020	22	302	685	219	2.27	4.0	72.5
2021	22	336	242	129	0.72	1.8	38.4

A weekly comparison of fishing effort and catch rates is presented in Fig. 12. Peak fishing effort was in September and October in 2021. In the Northwest, the highest CPUEs were late September and mid-October. In the South in 2021 fishing was limited up to the last week in August. There was a short-lived appearance of bluefin in September and a few individuals were tagged in October. At the end of the season, in the South several boats undertook bluefin angling trips but with no returns. Along the west coast in 2021 few sightings were reported and in combination with low fishing effort, only one bluefin was tagged.

Fig. 12 illustrates higher catch rates weekly in 2020 than in other years. A regional breakdown of the data establishes the Northwest as the most productive and consistent region for bluefin tuna angling in all years. In 2020, when bluefin tuna angling was exceptional in the Northwest (Wögerbauer *et al.* 2021), the South coast performed very well between September and October. Bluefin tuna encounters are rarest along the west coast with less than 5 bluefin tagged annually to date.

The “shoulder” weeks at the start and end of peak bluefin angling, in July and November have so far proved relatively unproductive. No bluefin has yet been encountered before the last week in July and few bluefin have been encountered in November.

All three of the new skippers to the programme in 2021 were based on the south coast. Two out of this trio tagged at least one bluefin tuna. (Table 5). This was reasonably successful considering the paucity of bluefin encounters in the south in 2021.

Table 5 Success rate of skippers new to Tuna CHART in 2021

Skipper	Trips	No. Hooked BFT	No. Tagged BFT	CPUE (Tags/Trips)
New Skipper A	6	0	0	0.00
New Skipper B	8	3	1	0.13
New Skipper C	15	7	5	0.33
Total	29	10	6	0.21

Provisional data from the UK suggests that the first year of Tuna CHART England (2021) was productive, with a CPUE of 1.7 bluefin tagged per angling trip ([CEFAS webpage 2021](#)). Atlantic bluefin tuna were largely tagged off the Cornish coast. Anecdotal reports by Irish commercial trawlers of bluefin observed offshore, at fishing grounds off the Irish south coast, also suggest that Atlantic bluefin tuna remained largely offshore from the south coast in 2021.

There has been a steep increase in spawning stock biomass of the eastern ABFT stock since 2010 (ICCAT 2020). A recent paper on Atlantic bluefin tuna observations in Irish and UK waters found a relationship between ABFT observations and spawning stock biomass and climate, but not prey (Horton *et al.* 2021). Some further putative drivers for localised changes in ABFT distribution may include temperature, depth, commercial fishing pressure and productivity.

High levels of skipper compliance were observed in relation to Bluefin tuna regulations, Section 14 authorisation and angling, handling and measuring guidelines. Zero mortalities were recorded for the third year of the programme.

High quality spatial, temporal and size data were recorded in 2021 which will be shared with ICCAT in 2022. This builds on the dataset from Tuna CHART activity in 2019-2020.

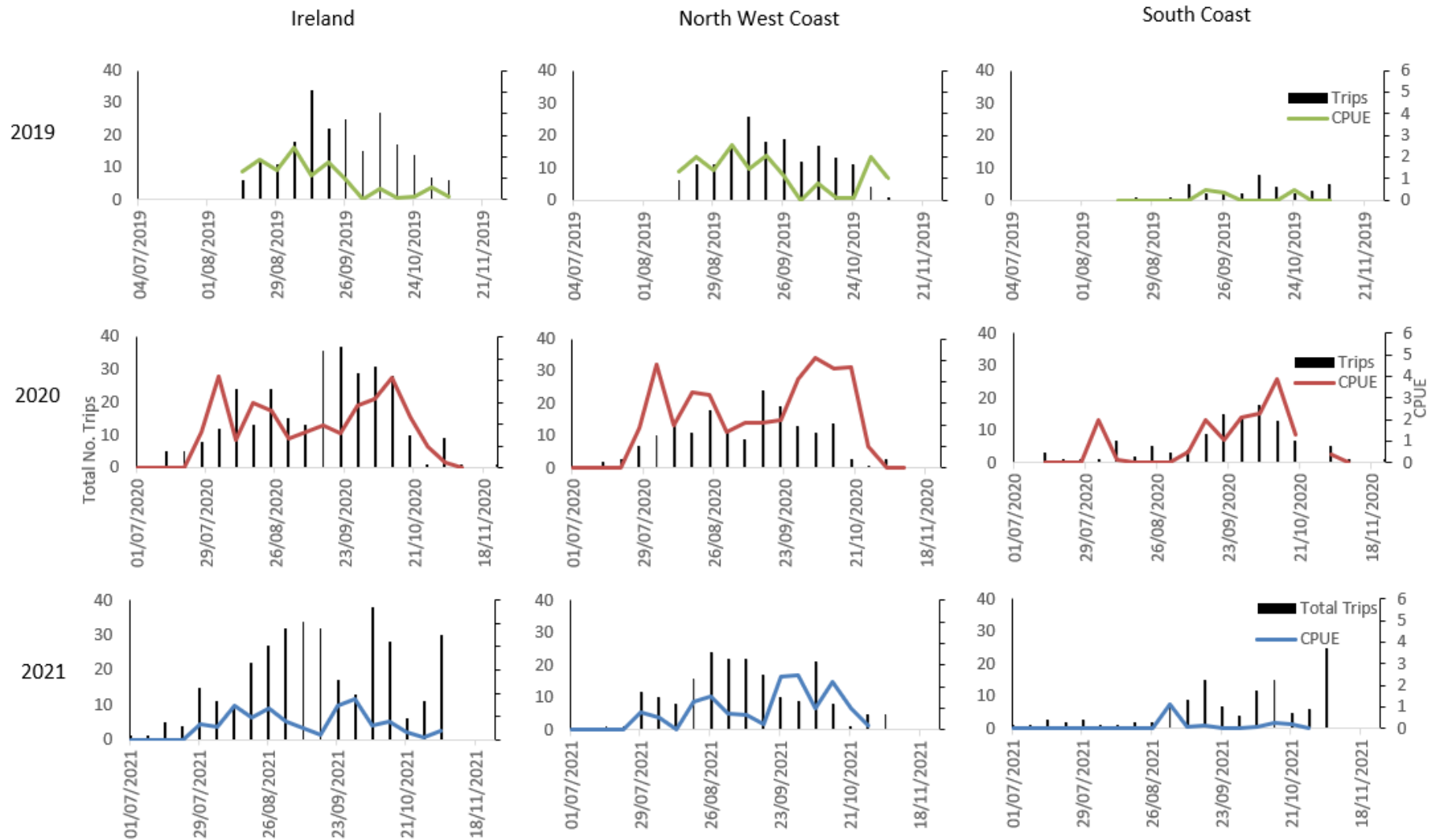


Fig. 12 Fishing effort presented as number of fishing trips and Catch Per Unit Effort (CPUE Total Tagged Bluefin/ Total Trips per week). Data is presented for the entire country and for the Northwest and South Coasts by year.

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