SUMMARY OF THE 2022 CATCH AND RELEASE TAGGING (CHART) PROGRAMME IN SOUTHWEST ENGLAND

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SUMMARY

An expanded Catch and Release Tag (CHART) programme for Atlantic bluefin tuna (BFT) was undertaken in the western English Channel (la Manche) in 2022. The programme followed a similar co-design approach and structure to CHART 2021, but was expanded to include 25 vessels (vs. 15 in 2021) and a longer season of 17 weeks (vs. 13 in 2021). Of the 15 vessels in CHART 2021, 13 returned with 12 new vessels added to the fleet. Camera monitoring was mandatory for all new vessels, GPS tracking was required from all returning vessels and observer coverage was 7%. During the season over 600 fishing trips were undertaken involving nearly 1,800 anglers. In total, 1,273 BFT were hooked up, of these, 1,090 (86%) tunas were tagged with large ICCAT floy tags, 23 (1.8%) were measured but not tagged, 152 (11.9%) escaped off the hook and 5 fish died during the capture process (0.4% at vessel mortality rate). The nominal Catch Per Unit Effort (CPUE) averaged 1.76 BFT per day with a size range of 119 to 284 cm straight fork length (SFL).

RÉSUMÉ

Un programme élargi de marquage des captures et remises à l'eau (CHART) pour le thon rouge de l'Atlantique (BFT) a été entrepris dans la Manche occidentale en 2022. Ce programme suivait une structure et approche de conception conjointe similaire à CHART 2021, mais a été élargi pour inclure 25 navires (contre 15 en 2021) et une plus longue saison de 17 semaines (contre 13 en 2021). Sur les 15 navires de CHART 2021, 13 ont été réutilisés et 12 nouveaux navires ont été ajoutés à la flottille. Le suivi par caméra était obligatoire pour tous les nouveaux navires, la localisation par GPS a été requise pour tous les navires réutilisés et la couverture d'observateurs était de 7%. Au cours de la saison, plus de 600 sorties de pêche ont été réalisées mobilisant près de 1.800 pêcheurs à la ligne. Au total, 1.273 BFT ont été pris à l'hameçon, parmi lesquels 1.090 (86%) ont été marqués avec de grandes marques de l'ICCAT, 23 (1,8%) ont été mesurés mais pas marqués, 152 (11.9%) se sont échappés de l'hameçon et 5 poissons sont morts lors du processus de capture (taux de mortalité à bord du navire de 0,4%). La capture par unité d'effort (CPUE) nominale était en moyenne de 1,76 BFT par jour avec une gamme de tailles de 119 à 284 cm de longueur droite à la fourche (SFL).

RESUMEN

En 2022 se llevó a cabo un extenso programa de marcado de captura y liberación (CHART) para el atún rojo del Atlántico (BFT) en el oeste del Canal de la Mancha. El programa siguió un enfoque de codiseño y una estructura similares a los de CHART de 2021, pero se amplió para incluir 25 buques (frente a los 15 de 2021) y una temporada más larga de 17 semanas (frente a las 13 de 2021). De los 15 buques de CHART 2021, 13 regresaron y se añadieron 12 nuevos buques a la flota. El seguimiento por cámara era obligatorio para todos los buques nuevos, se exigía el seguimiento por GPS a todos los buques que regresaban y la cobertura de observadores era del 7 %. Durante la temporada se realizaron más de 600 mareas en las que participaron cerca de 1.800 pescadores. En total, se engancharon 1273 atunes rojos, de estos, 704 (el 78 %) se marcaron con marcas Floy de ICCAT, otros 23 (el 1,8 %) se midieron pero no se marcaron,

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152 (el 11,9 %) se escaparon del anzuelo y 5 peces murieron durante la captura (la tasa de mortalidad en el buque del 0,4 %). La captura nominal por unidad de esfuerzo (CPUE) se situó en una media de 1,76 atunes rojos por día, con un rango de tallas de entre 100 y 288 cm de longitud recta a la horquilla (SFL).

1. Introduction

In 2021 a pilot CatcH And Release Tagging (CHART) programme was undertaken for Atlantic Bluefin Tuna *Thunnus thynnus* (BFT) in the waters of the western English Channel (as detailed in Phillips *et al*., 2021). The programme was a science led, angler driven recreational fishing programme whereby 15 charter skippers and their associated crews were trained to catch, tag and release BFT in a safe and sustainable manner whilst collecting high quality scientific data. Aside from data collection, the programme also provided socio-economic gains for the local areas. CHART was co-designed with government, scientists and stakeholder groups.

Due to the success of the pilot year, funding was granted for an expanded CHART programme in 2022. The expansion encompassed an increase in the number of participating vessels (from 15 to 25) and a longer fishing season (from 13 weeks to 17 weeks).

2. Methods

The programme design in 2022 followed that of 2021 (see Phillips *et al*. 2022) with a Steering Group maintaining oversight and continuing to refine and evolve the programme. The application process was opened again to select the 25 vessels and skippers that would be granted a licence on condition of their participation in training. This training was tiered: new entrants were required to attend a two-day training course that was co-delivered with stakeholders, while returning participants were required only to attend the first day of the training course to refresh the training they had received the previous year. The training took into account refinements identified in all the operational protocols used in the pilot year. One significant refinement, and which had been identified in 2021 as part of the post-season evaluation as the top priority, was to collect data digitally rather than on paper forms. To achieve this, all the data collection was moved to the Qualtrics platform (www.qualtrics.com) which enables users to input data using mobile phones or tablets, and for data to be submitted through the mobile data network or over Wi-Fi. Access to the data forms was facilitated by providing the participants with a printed set of Quick Response (QR) codes that could be read using the camera on a mobile phone or tablet. The forms could then be completed on-device using pre-defined options, sliders and free-text input. The data (on fishing trips, captured BFT, and sightings of BFT and other notable wildlife) contained on the forms were uploaded to Cefas, and were error checked using R code. A second refinement was the use of tough tablet camera systems on the vessels new to the programme, and the requirement for returning vessels to carry GPS trackers.

Catch per Unit effort (CPUE) was calculated as the number of fish brought boat-side and restrained per fishing day. BFT length distributions were compared between 2021 and 2022 and individual round weights were calculated using length-weight relationship from Rodriguez-Marin *et al*. 2016).

3. Results

The 2022 fishing season ran from the 15th August to the 11th December inclusive and all 25 vessels participated (i.e. made at least one fishing trip). A total of 631 fishing trips took place (over 4000 hours of fishing effort), with nearly 1800 paying anglers taking part (**Figure 1**). The potential for tagging in 2022 was 1272 fish (BFT hooked for more than 30 seconds of which 86% were brought to the boat) and 1090 BFT were tagged. The number of fish caught per day was highest in week ten (17th to 23rd October) with a nominal Catch per Unit Effort (CPUE) of approximately four fish per vessel per fishing day but, unlike 2021, a series of south westerly gales during November prevented fishing for much of the month and reduced the CPUE thereafter.

The average fish length (straight fork length, or SFL) was 189cm, which was 8cm greater in 2022 compared to 2021 (**Figure 2**), with a mean estimated round weight of 130 kg (calculated from Rodriguez-Marin *et al*. 2016). The size range of BFT caught was, however, similar to that in 2021 (119 – 284cm).

Of the 1120 fish brought boatside, the average time from hooking to restraint was 23 minutes with over 75% of fish being alongside within 30 minutes. 92% of these BFT were hooked in the scissors, 6.5% were hooked in the jaw but not the scissors, 1.25% were hooked in the cheek, 0.7% were foul hooked outside of the jaw and 0.3% were deep hooked.

The average post-tagging recovery time, during which BFT were towed alongside or behind the vessel to assist ventilation, was 6.6 minutes. Following this process, the number of BFT classified as lethargic dropped from 1% (pre-tagging) to 0.5%, highlighting the effectiveness of the recovery procedure. The negative welfare impacts occurred at a low level with 16 fish lost with the spreader bar and hook still attached (~1.2%, classified as a major impact), 15 fish were lost with the hook still attached (~1.2%, classified as a minor/moderate impact) and there were 5 mortalities (approximately 0.4%).

ICCAT provided details to Cefas on CHART tags returned to November 2022: 11 tags (1.5%) had been returned with an average time to recovery of 325 days (range 69-432 days), showing good evidence of long-term tag retention using the 'over the side' tagging method utilised in CHART.

4. Discussion

CHART 2022 has further aided our understanding of BFT within English waters, particularly towards the end of the year following the increased season length. The BFT initially appeared in large numbers in the western region of Cornwall and they appeared to move eastwards over the course of the four months of fishing, providing strong evidence of the suitability and use of the area to the south-west of the UK for post-spawning residence and foraging. Similarly to 2021, and as observed through other survey data (Horton *et al*. 2021), a steady increase in numbers of BFT seen and caught was observed between August through to October, but in contrast to the previous year the numbers caught then declined, likely as a consequence of the continually adverse weather experienced from November onwards.

In addition to the greater catch rates early in the fishing season, BFT caught in 2022 were greater in length than in 2021, providing evidence of an increase in size and age of the caught and tagged population in 2022, compared to the population caught and tagged in 2021. The increase in average SFL may represent the annual growth of returning cohorts, or it may represent a difference in the availability, accessibility or vulnerability to capture of smaller individuals. Further data collection, including recaptures of BFT tagged in previous years, will help to shed light on the likely reasons for this change.

As for 2021, fish welfare was central to this programme, and further refinements in 2022 were made to maintain and improve the welfare outcomes through changes to fishing and handling practices, and continued levels of monitoring (camera, data, observers). Although further data are required for future years to validate, the programme in 2022 realised better welfare outcomes than in 2021, with lower mortality rates (reduced to 0.4% from 1.4%), and fewer signs of BFT exhaustion (BFT classed as lethargic down to 1% from 3%). Furthermore, the proportion of BFT showing signs of exhaustion after the post-tagging recovery period was halved (from 1% to 0.5%), showing the value of this element of the handling process, and a higher proportion of BFT were brought boatside and recovered than in 2021 (up to 86% from 81%).

The success of the first two years of CHART in terms of valuable scientific data collected, minimal adverse outcomes and socio-economic benefits are testament to the co-design and refinement process, with researched protocols, robust training courses and in-season support and monitoring to promote best practice. These measures were adopted enthusiastically by participants who showed continued dedication to the programme and a good team-working ethos of sharing knowledge and experiences. As a result, CHART has been continued into 2023 with 24 vessels participating in England over a four month fishing season.

5. Acknowledgements

References

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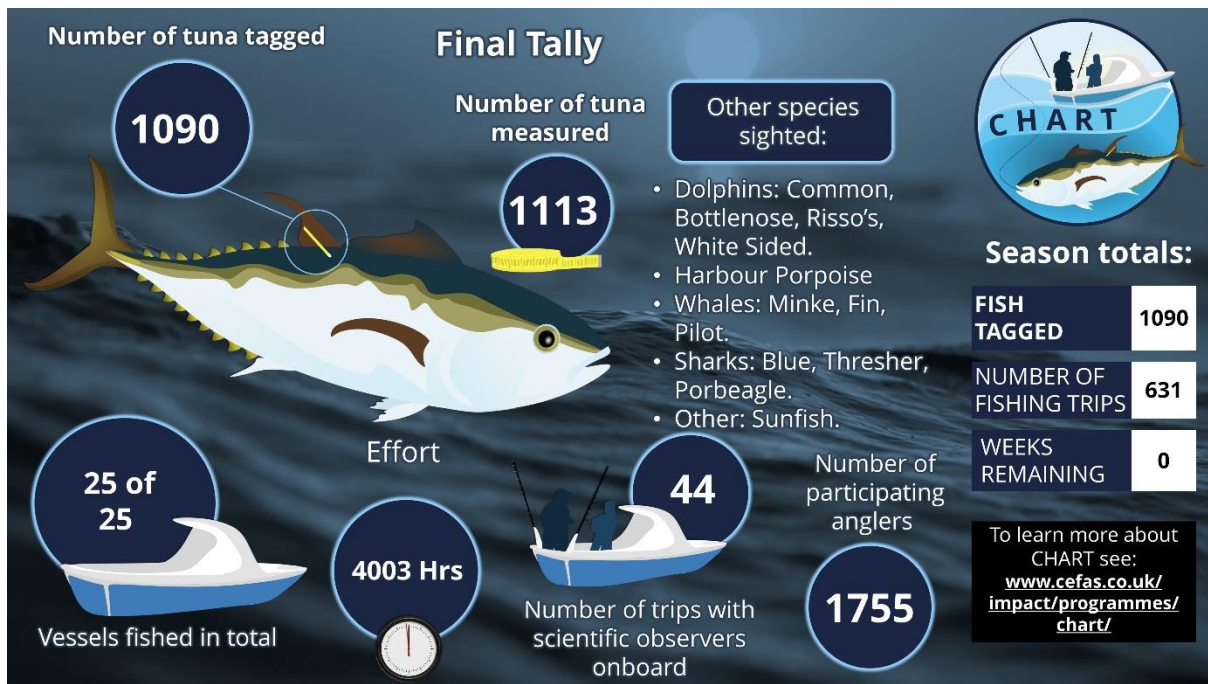
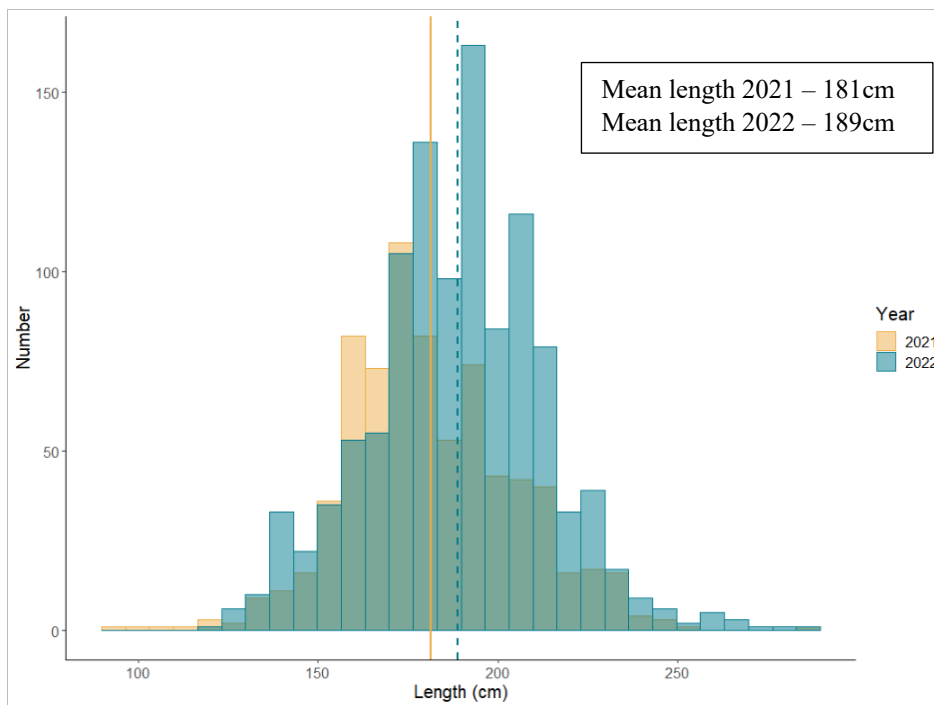**Figure 1.** Final tally for CHART 2022.

Figure 2. BFT length distributions in 2021 and 2022. Mean fish length in 2021 (yellow solid line) and 2022 (blue dashed line).