

INTRODUCING A PROCESS TO ASSESS THE CONTRIBUTION OF PURSE SEINE FISHERIES TO INCIDENTAL CATCHES OF ENDANGERED, THREATENED AND PROTECTED SPECIES IN THE AREA OF COMPETENCE OF ICCAT

A. García-Horcajuelo¹, J.C. Báez², M. Herrera³, A. Justel⁴, I. Moniz³, H. Murua⁴, J. Ruiz⁵

SUMMARY

This document presents the work that a panel of scientists is conducting to attempt producing estimates of levels of key by-catch species by ICCAT fisheries. It follows up on previous work conducted in the Indian Ocean, which led to the publication of estimates of catch of endangered, threatened and protected species (ETP) by IOTC fisheries, including sharks, marine turtles and marine mammals. However, the paucity of the data that ICCAT fisheries produce on by-catch and the fact that ICCAT's standards for the dissemination of observer data have been hampering attempts to use this information to produce estimates. The authors propose some actions that the ICCAT could contemplate to assist them in this work. They also recall that in 2016 the Commission requested the SCRS to evaluate the contribution of by-catches and discards to the overall catches in ICCAT tropical tuna fisheries. And stress the fact that the SCRS will not be able to respond to this request unless CPC Compliance with the existing provisions improves and ICCAT revises its requirements concerning observer coverage and data dissemination standards for by-catch stocks.

RÉSUMÉ

Le présent document expose les travaux menés par un groupe de scientifiques pour tenter de produire des estimations des niveaux des principales espèces de prises accessoires des pêcheries de l'ICCAT. Il fait suite à des travaux antérieurs menés dans l'océan Indien, qui ont abouti à la publication d'estimations des prises d'espèces en danger, menacées et protégées (ETP) par les pêcheries de la CTOI, notamment les requins, les tortues marines et les mammifères marins. Toutefois, les pêcheries de l'ICCAT produisent peu de données sur les prises accessoires et les normes de l'ICCAT pour la diffusion des données des observateurs ont entravé les tentatives visant à utiliser ces informations pour produire des estimations. Les auteurs proposent quelques actions que l'ICCAT pourrait envisager pour les aider dans ce travail. Ils rappellent également qu'en 2016, la Commission a demandé au SCRS d'évaluer la contribution des prises accessoires et des rejets aux prises globales des pêcheries de thonidés tropicaux de l'ICCAT. Ils soulignent également le fait que le SCRS ne sera pas en mesure de répondre à cette demande à moins que l'application par les CPC des dispositions existantes ne s'améliore et que l'ICCAT ne révisé ses exigences concernant la couverture des observateurs et les normes de diffusion des données pour les stocks de prises accessoires.

RESUMEN

Este documento presenta el trabajo que está llevando a cabo un panel de científicos para intentar producir estimaciones de los niveles de las principales especies de captura fortuita de las pesquerías de ICCAT. Se trata de una continuación de la labor realizada anteriormente en el océano Índico, que dio lugar a la publicación de estimaciones de las capturas de especies en peligro, amenazadas y protegidas (EPT) por parte de las pesquerías de la IOTC, incluidos los tiburones, las tortugas marinas y los mamíferos marinos. Sin embargo, la escasez de datos que las pesquerías de ICCAT producen sobre capturas fortuitas y el hecho de que las normas de ICCAT para la difusión de los datos de los observadores han obstaculizado los intentos de utilizar

¹ Independent Consultant [albertoghorcajuelo@gmail.com]

² Instituto Español de Oceanografía

³ Corresponding Author. Producers' Organization of Large Tuna Freezers of Spain (OPAGAC), C/ de Ayala 54 2A 28028 Madrid [Miguel.herrera@opagac.org]

⁴ International Seafood Sustainability Foundation

⁵ AZTI [Txataxarramendi ugarte a z/g. 48395 Sukarrieta (Bizkaia), Spain.

esta información para producir estimaciones. Los autores proponen algunas acciones que ICCAT podría contemplar para ayudarles en este trabajo. También recuerdan que en 2016 la Comisión solicitó al SCRS que evaluara la contribución de las capturas fortuitas y los descartes a las capturas globales en las pesquerías de túnidos tropicales de ICCAT. Y subrayar el hecho de que el SCRS no podrá responder a esta petición a menos que mejore el cumplimiento por parte de las CPC de las disposiciones existentes y que ICCAT revise sus requisitos sobre la cobertura de observadores y las normas de difusión de datos para los stocks de captura fortuita.

KEYWORDS

Bycatch, sharks, purse seine, longline

1. Introduction

In September 2016 the purse seine fleets under the Producers' Organisation OPAGAC and the Association AGAC signed a Memorandum of Understanding with the World Wide Fund for Nature (WWF) for the implementation of a Fishery Improvement Project (FIP), intended to assist in the Certification of the OPAGAC-AGAC (hereafter OPAGAC) Fishery with the Marine Stewardship Council (MSC), by or before 2021. The OPAGAC FIP (hereafter FIP) covers the three oceans and the areas of competence of four tuna-Regional Fisheries Management Organizations (tRFMO), including the International Commission for the Conservation of Atlantic Tunas (ICCAT). The OPAGAC fleet in the Atlantic Ocean consists of nineteen (19) industrial purse seiners (flagged under both EU and other flag states), with recent catches of tropical tunas⁶ accounting for around 20% of the total catches of those stocks in the ICCAT Area, mainly skipjack tuna.

Principle 2 of the FIP contains actions that the OPAGAC fleet need to undertake to reduce, or eliminate, the environmental impacts its activities cause on non-target species and the habitat, with concrete actions identified in each ocean. The actions are identified by an independent MSC accredited consultant with the assistance of a FIP Stakeholder Advisory Group, who also review progress with the implementation of the actions each year. One of the major actions identified involves estimating the contribution of the OPAGAC Fishery to the catches of Endangered, Threatened and Protected species (ETP), as identified by the independent Consultant for each tRFMO. However, the amount of data available in tRFMO databases for ETP stocks, including those identified for the ICCAT (**Table 1**), is very poor and this have hampered attempts at estimating the contribution of the OPAGAC Fishery to the catches of some ETP species.

For this reason, in 2017 the FIP initiated a process to evaluate the contribution of the OPAGAC Fishery to the catches of non-target species in each ocean, with a focus on ETP species, through support to desk studies aimed at deriving estimates of catches by gear of selected species in each tRFMO Area. This work started in the Indian Ocean with results presented to the 14th Session of the Working Party on Data Collection and Statistics of the Indian Ocean Tuna Commission (García & Herrera 2018; IOTC WPDCS⁷). The present study is a follow-up to the former and is intended to address some of the actions identified in the FIP Action Plan for the ICCAT Area of Competence, mainly those calling for the evaluation of impacts of the OPAGAC Fishery over stocks of non-target species, with a focus on ETPs in the Atlantic Ocean. As noted, it is not possible to evaluate the contribution that the OPAGAC Fishery in the Atlantic Ocean makes over total bycatch levels and ETP stocks unless the impact of other fisheries over those same stocks is assessed. Unfortunately, the ICCAT databases contain very incomplete data on interactions of ICCAT fisheries with sharks, marine mammals, marine turtles, and seabirds, and the same applies to data on catches, effort, length or any other biological data for such stocks. In addition, the ICCAT Secretariat cannot release the little observer data available in its databases in a format that can assist the estimates, because such data are considered to be poor quality, subject to various reporting formats, and are bound by ICCAT's confidentiality policy (Taylor et al. 2019).

The focus of the present document is to present the work that the authors have initiated to assess recent levels of bycatch for ICCAT fisheries, for the main stocks of sharks, marine turtles and marine mammals, in particular for those stocks for which the ICCAT has adopted specific measures (**Table 1**); the main obstacles that have been found to conducting this research; and propose actions that ICCAT could contemplate to facilitate that all the information required from observer programmes can be used to complete such estimates in the future.

⁶ Skipjack tuna (SKJ; *Katsuwonus pelamis*), Yellowfin tuna (YFT; *Thunnus albacares*) and, to a lesser extent, bigeye tuna (BET; *Thunnus obesus*)

⁷ Assessing the Contribution of Purse Seine Fisheries to Overall Levels of Bycatch in the Indian Ocean

2. Data Sources and Methods

2.1 Fisheries, species time-period, area, and fleets covered by the study

This work will present a snapshot of bycatch levels (with focus on sharks, marine turtles and marine mammals) for each fishery using purse seine, longline, or other gears that have reported catches in recent years (2015-17) of one or more of the six core group of ICCAT market species that the authors have selected to identify eligible fisheries (including yellowfin tuna, bluefin tuna, skipjack tuna, bigeye tuna, albacore and swordfish). Furthermore, some sport and recreational fisheries are covered too because pelagic sharks might also be caught by those fisheries. Bycatch levels will be presented as average values estimated for the period 2015-2017. The shark and rays stocks covered in the study (**Table 1**) were selected from the report of the 2018 Intersessional Meeting of the Shark Species Group of the ICCAT (ICCAT 2018).

This study will not cover some minor coastal fisheries. This is because those fisheries do not catch any of the six stocks referred to above, and the bycatch that those fisheries take is likely to just include species of coastal sharks or rays, not those covered here.

2.2 Data sources

This is a desk study intended to use data from as many sources as possible to estimate levels of bycatch of sharks, marine mammals and marine turtles by ICCAT fisheries, in particular:

2.2.1 Data from ICCAT databases

- Data on incidental catches of sharks, marine mammals and marine turtles covered in the study: Several ICCAT databases contain information on retained catches and discards of the bycatch stocks covered in this paper:

- Task 1 data, which includes the catches of target species and bycatch, as identified by the ICCAT: These only include some catches of sharks that ICCAT Contracting Parties (CPCs) report to the ICCAT. Data usually refers to just retained catches, are very incomplete for bycatch, and highly aggregated. Some data from this database will be used for this study. Data on discards are seldom reported to the ICCAT.

- CPC's National Observer Program: ICCAT adopted standards for the collection and reporting of observer data in 2010 (ICCAT 2019; Recommendation 10-10), including the levels of observer coverage required, at-sea and in land, and reporting deadlines. amending those standards various times, the last in 2016 (ICCAT 2019; Recommendation 16-14⁸). However, many ICCAT CPC have not complied with this requirement (ICCAT 2019b). Following a request from the authors, in September 2019 the ICCAT Secretariat provided the observer data that could be released for the period of the study, in accordance with ICCAT's Confidentiality Policy. Unfortunately, the resolution of the observer data provided is not enough (data are not useful because it does not contain information about the observed effort, catch of target species, and time and area resolution are too broad), which hampers attempts to derive bycatch rates (using observed effort) or ratios of catch of target species to bycatch from this dataset.

- ICCAT Port Inspection Scheme: ICCAT has adopted standards, through Recommendation 18-09 (ICCAT 2019), for the collection of data on inspection of foreign vessels in port, which include data on the amount of sharks and other bycatch unloaded by foreign vessels that go through inspection in the ports of coastal states of the Atlantic Ocean, or other ports.

- ICCAT Transshipment Programme: The ICCAT adopted standards for the collection of data from longline vessels under the ICCAT Transshipment Programme through Recommendation 16-15 (ICCAT 2019), which include data on the amounts of sharks and other bycatch transhipped at-sea by longliners.

However, Port inspection and Transshipment data are not in the public domain and none of the two datasets contains discards.

⁸ Rec. 10-10 establishes a minimum 5 % observer coverage for scientific observer programs. Additionally, ICCAT Rec. 14-01 (superseded by Rec. 15-01 & 16-01) requires 100% observer coverage to all purse seine vessels (PS) targeting tropical tunas and supply vessels, during the two months FAD area/time closure in the Atlantic Ocean. In addition, the EU has adopted an obligation for vessels under EU flags to cover at least 10% of their activity with observers, ensured via EU-funded data collection programs.

In general bycatch data are very poor and, where available, data are very incomplete, and the catches are recorded in aggregated format rather than by species or gear (ICCAT 2019b).

- Data on effort and catches of ICCAT species: To complete bycatch estimates for fisheries for which data are incomplete or lacking, a core group of market species has been selected: Bluefin tuna (BFT), yellowfin tuna (YFT), bigeye tuna (BET), skipjack tuna (SKJ), albacore (ALB), and swordfish (SWO). The total catches of this group for a fishery were used to estimate levels of bycatch, through the use of catch to bycatch ratios from one or more proxy fleets.

- Task 1 (nominal catch and discards): Data on total retained catches for the core species group, by fleet and species. This dataset was also used to identify all fisheries for which bycatch levels had to be estimated because it contains the best scientific estimates of catch according to ICCAT's SCRS.

- Task 2 (Catch-and-Effort): The available catch and effort data for ICCAT fleets will be used to estimate total levels of effort and catch rates for the fleets for which such data are available.

- Biological data on the stocks of sharks, marine mammals and marine turtles: length-weight relationships will be useful for the conversion of length into weight for ICCAT bycatch species, mainly sharks, for which in some cases only the number of fish caught/discarded is available (ICCAT 2014). In addition, the authors are compiling information on the average weight of shark species from several publications. This information will be used to convert numbers of sharks into weight in cases in which only numbers of bycatch by species are available.

2.2.2 Data from other sources

- Publications

The authors are conducting a thorough search for all data available in scientific papers (peer reviewed or not), reports and other publications, including online material. Most of the information on bycatch come from National Reports presented by CPC to meetings of the ICCAT SCRS, papers presented to ICCAT Species Groups, reports from research programmes in land and at-sea, reports from sampling programmes, and other sources. The information in scientific papers will be used in several ways to assist in the estimation of catches of sharks, marine mammals and marine turtles. Most of the estimates for marine mammals and marine turtles will be raised using data from publications as such bycatch groups are poorly represented in the ICCAT databases. While the authors attempt to use publications from recent years to raise estimates, this will not be possible when information on recent bycatch levels is lacking. In those cases, it may be required to use data from earlier years and estimates of depletion obtained from proxy fisheries to adjust the estimates.

2.3 Estimation procedures

In most cases bycatch levels will be estimated using data from several sources, through various estimation procedures, depending on the species or group of species. The three methods below, while representing a simplification of the procedures, are useful to understand the main approaches used to estimate bycatch:

1. Bycatch species for which estimates of total bycatch are available for a fleet:

- a. When estimates are available by species, and thought reliable, they will be directly used;

- b. When estimates are available in aggregated format (e.g. genus, family, whole group) they will be broken by species using estimates by species derived from data available for the same fleet or a proxy fleet (ratio estimation).

2. Bycatch species for which estimates are available but they do not represent total catch: In many cases the information available for a fleet represents just a sample. Where appropriate, the estimates available will be raised to total catch using the level of coverage provided in the paper:

- a. Catch rate: Using the effort measure recorded (e.g. number of hooks, fishing days, number of sets, number of boats, number of trips, etc.), and the totals estimated from the catch and effort or vessel records databases;

- b. Ratios: Using the ratio between bycatch and the catches of one or more species in the core group, as available, and the total catches for the fleet concerned obtained from the nominal catch table.

3. Bycatch species for which estimates of bycatch are not available for the fleet concerned:

a. Where possible, bycatch levels will be estimated using information for the same fleet for previous years. Where appropriate, the ratio bycatch *versus* catch of the core group of species will be used to estimate bycatch levels in recent years.

b. Where bycatch levels are not available at all for the fleet concerned, data from a proxy fleet will be used. In most cases, the ratio bycatch *versus* catch of the core group of species from the proxy fleet and the catch of the core group of species for the target fleet will be used to estimate bycatch levels for such fleet.

Additional procedures may involve the use of estimates of depletion in bycatch rates in cases in which recent data on bycatch rates or ratios are not available for a fishery or its proxy (Anderson *et al.* 2019), estimates of ETP species susceptibility to capture by the gear under consideration (Murua *et al.*, 2013), or other methods.

As indicated before, for some fleets the estimation of bycatch levels will also involve the conversion from numbers into weight or other additional procedures prior to those indicated above.

While bycatch levels will be estimated in weight for most sharks, for whale sharks, marine turtles and marine mammals bycatch levels will be estimated in number (**Table 1**).

3. Data Gaps

The authors have identified the following gaps in the information and databases concerning bycatch:

- Most ICCAT fleets do not collect observer data and, when they do, observer coverage is usually below the level required by the Commission (Recommendation 16-14: at least a 5% of the fishing operations should be covered by observers). Sampling of bycatch at the landing place is also insufficient.

- The bycatch species data reported by ICCAT CPC (when reported) is highly incomplete (e.g. no discards reported, catches aggregated, time-area catches unknown, effort levels unknown, lack of biological data) or inaccurate (e.g. problems with species identification, samples not representative, etc.). In addition, the catches of shark species over which ICCAT has adopted a ban on retention may be underrepresented due to underreporting. This compromise attempts to estimate levels of bycatch of sharks belonging to the genus *Carcharhinus*, *Alopias*, *Sphyrna* and *Lamna*.

- Data on incidental catches of marine mammals are extremely poor, or information is too patchy and not submitted according to ICCAT data reporting procedures.

- The observer data provided by the ICCAT Secretariat is highly incomplete (it does not include the observed effort or the catch of target species), and aggregated (not by gear, month or area). This is a consequence of insufficient data reporting and dissemination standards, poor reporting levels, and very low levels of observer coverage, with most fleets not even complying with the minima levels adopted by the Commission

This has caused delays in the estimation of bycatch levels for some fleets and postpone publication of the estimates, to a further date.

4. Actions recommended to improve the estimation of levels of bycatch

Paragraph 53 of ICCAT Recommendation 16-01 (ICCAT 2019) states that *The SCRS shall evaluate the contribution of by-catches and discards to the overall catches in ICCAT tropical tuna fisheries, on a fishery by fishery basis*. However, while the SCRS addressed this in 2017 in a Response to the Commission regarding purse seine fisheries, no information was provided for other gears (longline, pole-and-line and handline).

This work is intended to complete estimates of bycatch, including all fisheries. However, as indicated in the previous sections, the ICCAT Secretariat does not have enough information on bycatch or, where available, the resolution of the data is not sufficient. In order to address the request from the Commission, the SCRS could contemplate to undertake the following actions:

In the short-term:

- Encourage ICCAT CPC to participate in the study, through direct contribution of scientists and/or sharing of any relevant datasets and publications that can assist in producing estimates of bycatch and discards;
- Recall ICCAT CPC with fisheries for tropical tunas that they should report estimates of total bycatch and discards for their fisheries, as requested in Rec. 16-01.

Medium-term:

- Amend ICCAT data reporting requirements for observer programs, to include estimates of the total observed effort and catch of target species, bycatch and discards:
 - Effort according to the same resolution as that used in logbooks for target species and as per ICCAT requirements;
 - Catch by species or, where not available, aggregated to the closest possible species group;
 - Estimates of post-release survival of discards or at least an indication of its condition at release (fate);
 - Catch and effort by gear type, including fishing mode and/or target species
 - Catch and effort by ICCAT grid, including one degree squares for surface fisheries and five degrees squares for longline; where not possible, report bycatch and discards by ICCAT Statistical Area;
 - Catch and effort by fishing operation or, where not possible, by day or month.
- Modify the dissemination standards for observer data, in order that information in the public domain includes at least estimates of total observed effort and catch of main market species, bycatch, and live and dead discards by Flag state, gear type, fishing mode (target species), by ICCAT statistical area and month.

5. References

- Anderson, R., Herrera, M., Moazzam, M., Ilangakoon, A., Mustika, P. and Sutaria, D. 2019 (In Press). Cetacean bycatch in Indian Ocean tuna gillnet fisheries. *Endangered Species Research*.
- García, A. and Herrera, M. 2018. Assessing the Contribution of Purse Seine Fisheries to Overall Levels of Bycatch in the Indian Ocean. Document presented at the 14th Session of the Working Party on Data Collection and Statistics of the Indian Ocean Tuna Commission, Eden Blue Hotel, Eden Island, Mahé, Seychelles, 29 November-1 December 2018. IOTC-2018-WPDCS14-26_Rev1.
- URL: https://www.iotc.org/sites/default/files/documents/2018/11/IOTC-2018-WPDCS14-26_Rev1.pdf
- ICCAT 2014. Conversion Factors for Sharks. Report of the 2014 ICCAT Inter-sessional meeting of the sharks species group: 37-52.
- ICCAT 2018. Report of the 2018 ICCAT intersessional meeting of the shark species group (Madrid, Spain, 2-6 June 2018). ICCAT Col. Vol. Sci. Pap. 75(3): 357-434. SCRS/2018/009.
- ICCAT 2019. Compendium of Management Recommendations and Resolutions Adopted by ICCAT for the Conservation of Atlantic Tunas and Tuna-Like Species.
- ICCAT 2019b. Report of the 2019 ICCAT Sub-Committee on Ecosystems Meeting,
- Murua, H., Abascal, F. J., Amade, J., Ariz, J., Bach, P., Chavance, P., Coelho, R., Korta, M., Poisson, F., Santos, M. N., and Seret, B. 2013. Provision of scientific advice for the purpose of the implementation of the EUPOA sharks. Final Report. European Commission, Studies for Carrying out the Common Fisheries Policy (MARE/2010/11 - LOT 2)
- Taylor, N.G., Mayor, C., Gallego, J.L., Ortiz, M. and Palma, C. (in press) 2019. Databases and metadata for ICCAT national observer program data submissions 2015-2018: an analysis of coverage and completeness. Document presented at the 2019 Session of the Intersessional Meeting of the Sub-Committee on Ecosystems of the ICCAT. SCRS/2019/049.

Table 1. Bycatch species, genus or species groups for which the ICCAT has set data collection and reporting requirements. All those stocks or groups of stocks that have been identified in the OPAGAC FIP as secondary or ETP species.

ICCAT Code	Species (<i>latin name</i>) / [Group]	Fishery Statistics recorded in	In Doc.	ICCAT Management
BSH	Blue shark (<i>Prionace glauca</i>)	Weight	BSH	[16-12]
SMA	Shortfin mako (<i>Isurus oxyrinchus</i>)	Weight	MAK	[10-06]; [14-06]; [17-08]
LMA	Longfin mako (<i>Isurus paucus</i>)	Weight	MAK	
POR	Porbeagle (<i>Lamna nasus</i>)	Weight	POR	[15-06]
SPL	Scalloped hammerhead (<i>Sphyrna lewini</i>)	Weight	SPN	[10-08]
SPK	Great hammerhead (<i>Sphyrna mokarran</i>)	Weight	SPN	[10-08]
SPZ	Smooth hammerhead (<i>Sphyrna zygaena</i>)	Weight	SPN	[10-08]
ALV	Thresher (<i>Alopias vulpinus</i>)	Weight	THR	[09-07]
BTH	Bigeye Thresher (<i>Alopias supecilius</i>)	Weight	THR	[09-07]
FAL	Silky shark (<i>Carcharhinus falciformis</i>)	Weight	FAL	[11-08]
OCS	Oceanic whitetip shark (<i>Carcharhinus longimanus</i>)	Weight	OCS	[10-07]
CCG	Galapagos shark (<i>Carcharhinus galapagensis</i>)	Weight	CCG	
PSK	Crocodile shark (<i>Pseudocarcharias kamoharai</i>)	Weight	PSK	
WSH	Great white shark (<i>Carcharodon carcharias</i>)	Weight	WSH	
BSK	Basking shark (<i>Cetorhinus maximus</i>)	Number	BSK	
RHN	Whale sharks (<i>Rhincodon typus</i>)	Number	RHN	
MAN	Mantas and devil rays (Mobulidae)	Weight	MAN	
PLS	Pelagic stingray (<i>Pteroplatytrygon violacea</i>)	Weight	PLS	
SRX	Other rays	Weight	NO	
SKH	Other sharks	Weight	SKH	
MAM	Marine Mammals	Number	MAM	
TTX	Marine turtles	Number	TTX	[10-09];[13-11]