South Africa's Annual Report to the Ecologically Related Species Working Group (ERSWG) of the Commission for the Conservation of Southern Bluefin Tuna, 2018

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April 2019

1. Introduction

South Africa was formally accepted as a Cooperating Non-Member (CNM) of the CCSBT on 24 August 2006; and subsequently became a Member of the Extended Commission, committed to CCSBT obligations from the 15th of February 2016. The two South African commercial fishing sectors that target large pelagic species comprise the Large Pelagic Longline (LL) and the Tuna Pole and Line (baitboat) fleet.

1.1. Large Pelagic Longline

The large pelagic longline sector can be divided into domestic (ZAD) and chartered vessels (ZAC). The general method and gear used by ZAD vessels involves setting lines at night (to reduce seabird mortality) with squid bait using buoy - and branch lines of 20 m length. Depending on the vessel size, 700 – 1500 hooks are set per line. Stainless steel hooks are prohibited and as of 2017 wire traces are also prohibited. Other than Southern bluefin tuna (SBT; *Thunnus maccoyii*), ZAD vessels target a mix of tuna species, bigeye (*Thunnus obesus*), yellowfin (*Thunnus albcares*) and albacore (*Thunnus alalunga*) as well as swordfish (*Xiphias* gladius). ZAD vessels operate in both the Atlantic, with effort distribution associated with proximity to the two main fishing harbour locations (Cape Town on the West coast and Richards Bay on the East coast).

Joint-venture (JV) agreements between South African fishing rights holders and Japan vessels have been underway since 1995, whereby these foreign-flagged ZAC vessels are permitted to fish under a South African Rights Holder. JV vessels are required to adhere to South African legislation, including but not limited to, the Marine Living Resources Act (Act No. 18 of 1998) and Regulations promulgated thereunder, including Large Pelagic Longline sector specific policy. Importantly, each foreign vessel is required to carry an observer on board every trip. The catch from these vessels accrues to South Africa. Due to a relatively small SBT quota, these larger vessels that predominantly target the tropical bigeye tuna and yellowfin tuna and are able to fish further offshore and differ in their methodology from ZAD vessels. ZAC vessels set up to 3000 hooks per set with a combination of fish and squid bait, using deeper branch lines and varying hook numbers per basket to influence the setting depth. ZAC vessels have been exclusively operating in the Indian Ocean, east of Cape Agulhas (>20° Longitude) since 2012.

1.2. Tuna Pole and Line (Baitboat)

The Tuna Pole and Line sector operates along the south-west and west coasts of South Africa in the Atlantic Ocean where the traditional target species albacore is available close inshore from October to May, but vessels make forays into the Indian Ocean depending on target species distribution. Traditionally the South African fleet has been characterized into three different categories (1) Skiboats, (2) Pole and Line and (3) Freezer vessels. Skiboats are less than 25 GRT and are mostly confined to day trips within a range of 50 nm. Pole and Line boats, which represent the bulk of the fleet, are mainly older displacement-type vessels converted from other fisheries. These vessels can undertake multiday trips of limited duration and range, as the catch is kept on ice. Freezer vessels are mainly vessels up to 30 m and 230 GRT. Due to their large size and freezing facilities, these vessels can stay out at sea for long periods and reach the farthest fishing grounds. The main target species remain albacore and yellowfin tuna, while SBT is sporadically caught between May to August. There was no SBT caught this sector in 2017/2018, whereas all of the sector's catch (~ 2.7 tons) in 2018/2019 was landed by five

vessels in June 2018.

1.3 Type and magnitude of ERS caught by fishery/method

Protected species that are caught by large pelagic longline sector include seabirds and turtles. The observed numbers of birds caught by this sector (incl. non-SBT sets) has been varying notably over last five years ranging from a 131 (1.01 mio. hooks observed) in 2014 to just four (0.94 mio. hooks observed) in 2018. Bycatch and mortality rates among bird species vary substantially among the common bird bycatch species. Turtles are only sporadically caught in SBT associated longline sets and are mostly released alive.

The dominant retained non-target bycatch species are blue sharks (*Prionace glauca*) and shortfin mako (*Isurus oxyrinchus*), which are caught in close to equal ratios. In general, blue sharks are more likely released alive or discarded than shortfin mako. Thresher sharks belonging to the genus Alopias, hammerhead sharks (belonging to genus Sphyrna), oceanic whitetip sharks, porbeagle sharks, dusky sharks and silky sharks and manta- and mobulid rays are prohibited to be retained on board any vessel and all releases of these species have to be noted on the logbooks.

2. Review of SBT Fisheries

During the 2017-2018 fishing season 34 ZAD and 3 ZAC longline vessels were authorised by DAFF to take part in the SBT fishery. A total of 18 longline vessels activated their right to fish for SBT and 13 vessels (11 ZAD; 3 ZAC) caught SBT in 2017. The ZAD fleet landed 115.8 tons (*N* = 1,353) and the ZAC fleet landed 22.1 tons (*N* = 221) of SBT. There were no reported SBT catches from the Tuna Pole and Line fleet in 2017-2018. In the most recent 2018-2019 fishing season, 19 longline vessels caught SBT, resulting in an increased total catch of 207.1 tons. A total of 16 ZAD vessels landed 192 tons and three ZAC vessels landed 12.1 tons of SBT. In contrast to the previous season the Tuna Pole and Line fleet caught 2.7 tons of SBT in 2018, which were all landed in June.

“Targeted” SBT effort is defined here as the total number of hooks per set that retained at least one SBT. The 2017-2018 fishing season was the first time SBT directed effort exceeded 600 thousand hooks since the commercialization of the SBT fishery in 2015. SBT effort in the domestic fleet (ZAD) has been steadily increasing over the period 2006-2016, from a mere 45 thousand hooks in 2006 to present levels of over 400 thousand hooks**.** ZAC effort fluctuated widely between 6 and 326 thousand hooks. Following the low in 2014 of 85 thousand hooks, ZAC SBT effort has marginally increased since 2016 and subsequently exceeded 200 thousand hooks in 2017. Similar to the total landings, SBT directed effort attained a new maximum 700 thousand hooks in 2018.

The longline fishery operates mostly within South Africa’s EEZ and catches SBT from April to November; however the majority of SBT catch is typically taken over a three month period; June, July and August. Consistent with previous years, all catches of SBT for the 2017/2018 season occurred from April to November, but contrary to previous years, SBT catches were fairly low in June**.** There are notable differences in the distribution of catch and effort between the domestic (ZAD) and chartered (ZAC) longline vessels (**Figures 1 & 2**). The domestic fleet operates off the East and West coast of South Africa (**Figure 1**), with effort distribution clearly

associated with proximity to the two main fishing harbour locations (Cape Town on the West coast and Richards Bay on the East coast). The catch distribution for 2017/2018 shows a notable increase in ZAD catch along the east coast (Area 14) compared to the two previous years. The ZAC vessels have been exclusively operating east of Cape Agulhas (>20° Longitude) since 2012 (**Figure 2**). The ZAC fleet shows a strong range contraction from formally widespread effort in Area 9, including the High Seas, to predominantly fishing South Africa's EZZ of Area 14 in recent years. However, compared to the years 2014-2016, ZAC vessels have also made SBT catches at a few offshore positions. In contrast, since 2014 an increasingly large of SBT catch in the domestic fleet (ZAD) has been derived from the West coast of South Africa, or CCSBT Statistical Area 15.

3. Fisheries Monitoring for Each Fleet

3.1 Scientific Observer Program Design and Coverage

The South African Pelagic Longline Observer Programme was established in 1998, at the start of the experimental phase of the Pelagic Longline fishery, and a minimum 20% observer coverage was stipulated. The Offshore Resources Observer Programme (OROP) began in March 2002 and to date it still requires 100% observer coverage on foreign-flagged vessels. Up until March 2011, 11-20% observer coverage was achieved on local vessels per year based on the total effort (number of hooks) deployed. The observer programme contract expired in March 2011, and the Department is in the process of re-establishing the programme, for implementation in the near future. The observer programme for joint-venture Chartered (ZAC) vessels has continued with 100% of fishing trips observed. Furthermore, increased inspections and sampling of tuna pole-line vessels is conducted during offloading in port by South Africa Fisheries Compliance Officers and Fisheries Monitors.

The observers collect all operational, catch (retained and discard), effort and length frequency data, and as well as biological material when required. The observers record data on the following forms:

- Form 1: Vessel and trip information sheet
- Form 2D: Pelagic longline gear and operation information
- Form 3D: Fishing effort pelagic long-line
- Form 4: Marine mammal, sea turtle, and seabird incidental take form
- Form 6: Depredation
- Form 7: Fish biological sampling

Total observer coverage has increased from 679.5 thousand hooks in 2016 to 1041.7 thousand hooks in 2017. This resulted in an increase of percentage observer coverage from 31.1% to 39.9%, which can be largely attributed to an increased in the number of ZAD trips observed from three in 2016 to sixteen in 2017. The effective observer coverage of SBT effort (sets with at least one SBT) is summarized by fleet segment and statistical area in in **Table 1**. The total number of SBT measurements taken by observers was N = 166, which equates to 10.5% of the total retained catch.

To further improve the spatio-temporal observer coverage for ZAD fleet segment, Section 16

(Observer Programme) of the current Large Pelagic Longline Permit Conditions (2018-2019**Error! Bookmark not defined.**) now require Permit Holders to carry one or more scientific observers on board their vessel on a minimum of one fishing trip per quarter so as to ensure that 20% of all fishing days per quarter are monitored. The observer coverage for the 2018-2019 fishing season will be provided as part of the 2019 ERSWG data exchange and presented the South Africa's National Report to the Extended Scientific Commission. Initial analysis indicate that the observer coverage for ZAD could be further improved, while ZAC observer coverage at 100% in line with permit conditions.

3.2 Logsheet data collection and verification

Vessels in the Large Pelagic Longline fishery and Tuna Pole-line fishery have been required to complete daily logs of catches since 1997 and 1985, respectively. The data are verified by comparing logs of catches with landing declarations that are overseen by South African Fisheries Compliance Officers and Fisheries Monitors. Rights Holders are required to submit these logsheets on a monthly basis. Records of by-catch are required in the skipper logbooks. Mandatory information to be included on all longline logbooks while at sea includes: date, latitude, longitude, time of start and end set, number of hooks set, reason for set, float line length, branch line length, bait type, observer present (y/n), drift, light stick info, catch by species, weight and number, product type, non-retained species in numbers. For this current fishing season DAFF have introduced on logsheets a column specific for SBT that will note the number and weight of SBT released alive at sea.

3.3 Vessel Monitoring System

The Vessel Monitoring System (VMS) was implemented in 1998. All longline and pole-line vessels are required to have a functional VMS system on board that transmits directly to the Department's VMS OPS Room. It is the Permit Holder's responsibility to ensure that the VMS transmits data continuously and uninterrupted prior to and throughout the duration of the trip. South Africa is in the process of upgrading its VMS, which should bring about a more stringent monitoring and surveillance regime by applying the most advanced VMS technologies.

3.4 Offloading/Transshipment

Unloading or discharging of fish from a longline and tuna pole and line vessels can only be undertaken in the presence of a monitor or a South African Fisheries Control Officer. Transhipment of fish is not permitted at sea. Transshipments of fish in port require pre-authorisation and is only allowed under the supervision of a Fisheries Control Officer. These measures have been in place since 1998.

4. Seabirds

Capture incidents of seabirds in sets that caught at least one SBT in 2017 are summarized in **Table A2** and **A3** for ZAC and ZAD vessels, respectively. In 2017, only one individual of Atlantic yellow-nosed albatross (*Thalassarche chlororhynchos*) caught together with SBT. By contrast, the total observed number of seabirds for the total observed hooks of 1.06 mio hooks (incl. non-SBT sets) was 86 seabirds, comprising (4 Atlantic yellow-nosed albatross, 16 shy

Albatross and 6 white-chinned petrels. Logbook bycatch records (incl. non-SBT sets) from unobserved ZAD reported an additional 12 shy albatrosses and one white-chinned petrel (**Table A4**). Interestingly, the Atlantic yellow-nosed albatross is the only species that has been observed in sets that targeted SBT. In 2016, one Atlantic yellow-nosed albatross was caught in Statistical Area 14, in 2015 two Atlantic yellow-nosed albatross were caught in Statistical Area 14 and in 2014 six Atlantic yellow-nosed albatross were caught in Statistical Area 9, all of which were released alive.

5. Non-target shark species

Capture incidents of sharks and rays in sets that caught at least one SBT in 2017 are summarized in **Table A5** and **A6** for ZAC and ZAD vessels, respectively. Blue sharks and shortfin mako are the most common shark bycatch that are caught together SBT. However, in 2017 there were also unusual high catches of 150 pelagic stingrays (*Dasyatis violacea*) by ZAC vessels in Statistical Area 14 (**Table A5**), which exceeded the blue shark captures in that area. Logbook bycatch records from unobserved ZAD vessel trips (incl. non-SBT sets) provide additional information on non-target bycatch species (**Table A7**). It is important to note that mostly prohibited shark species are recorded as bycatch in the logbooks whereas commonly retained species, such as blue shark and shortfin mako would be recorded under the main species section unless released in larger numbers.

6. Marine Mammals and Marine Reptiles

There were no capture incidents of turtles in longline sets that caught at least one SBT in 2017. In 2016, two unidentified turtles were captured in Statistical Area 14 and released alive. Similarly, observers recorded two loggerhead turtles (*Caretta caretta*) captures in 2014 from the Statistical Area 14. Both turtles were released alive. There are no observer records of marine mammal captures. Logbook bycatch records (incl. non-SBT sets) from unobserved ZAD reported a comparably high number of 58 turtles caught in 2017 (37 Loggerhead turtles, 1 green turtle and 13 unidentified turtles), of which all were released alive in 2017 (**Table A8**). No bycatch cetaceans have been recorded by observers. However, the bycatch logsheets for 2018 revealed a first incidence of a pilot being caught in a long-line that could not be released alive.

7. Mitigation Measures to Minimise Seabird and Other Species Bycatch

7.1 Seabirds

The start and completion of line setting has to be conducted at night, defined by the period between nautical dusk and nautical dawn. Vessels have to fly a bird-scaring line (tori line) during the setting of each longline. Instruction on the method of tori line construction and deployment is provided to each vessel to ensure that correct specifications and procedures are followed. Deck lighting is to be kept to a minimum. The beams of deck lights have to be directed towards the deck. All bait has to be appropriately thawed, and where necessary, the swim bladder punctured to ensure rapid sinking of the bait.

All birds caught have to be brought onboard and, with the use of the release instructions provided, live birds are to be released. The release instructions clearly outline the procedures to follow to ensure that a seabird has a good chance of survival after release.

The NPOA-Seabirds was gazetted in 2008. The NPOA-SEABIRDS (2008) specifies a maximum bycatch rate of 0.05 birds/1000 hooks. Within this plan an initial seabird bycatch limit of 25 birds killed per year is set per vessel. Once the vessel reaches this limit a second tori line has to be flown, and branch lines (snoods) have to be weighted by placing 60 g weights within 2 m of the hook to ensure optimal sinking rates. Where multiple weights are used then the first weight should be within 2 m of the hook and the last weight within 3 m of the hook.

If a vessel reaches 50 birds killed in a year then the vessel has to stop fishing immediately. If the vessel has complied with all mitigation measures 100% of the time then it will be allowed to fish on condition that a trained onboard observer has to be present to investigate the nature of the high seabird mortality and that instructions given by the observer will be followed.

7.2 Sharks

The large pelagic longline permit conditions stipulate that directed targeting of sharks in not permitted. To enforce this, annual shark catches per right's holder must be less than 50% to comply with the permit conditions. If quarterly catches exceed 60% of the catch an observer must be taken on board for the remainder of the fishing season. The fins and trunks of all sharks caught must remain attached to the trunk naturally. A precautionary upper catch limit (PUCL) for sharks is set at 2000 t dressed weight for the entire South African longline fishery. Furthermore, the use of wire traces has been banned from the Large Pelagic Longline fishery as of 2017. Joint venture vessels are restricted to a 10% shark by-catch limit. Thresher sharks belonging to the genus *Alopias*, hammerhead sharks (belonging to genus *Sphyrna*), oceanic whitetip and silky sharks shall not be retained on board the vessel.

No shark species is allowed to be retained on board a Tuna Pole and Line vessel.

7.3 Marine Turtles

The use of circle hooks is encouraged as stated in the permit conditions. The South African government has worked closely with WWF to educate skippers on release procedures for turtles. According to the handling and release instructions provided to vessels in their permit conditions, vessels are required, amongst others, to:

- Remove the hook using a long-handled de-hooker on turtles too large to bring onboard and a de-hooker on turtles brought onboard.
- Use a line-cutter when a de-hooker is not possible and to cut the line as close to the hook as possible.
- Use net to bring the turtle onboard and to avoid pulling on the line.
- Handle the turtle with gentle care. Release the turtle headfirst and away from fishing gear once it has recovered onboard.

Trained observers are present on all ZAC vessels and they record all interactions with marine turtles during the fishing operation. Since 2013, all vessels have been required to record interactions with marine turtles in their logbooks, and each vessel has been given a species guide to aid identification of turtles to species level.

8. Public relations

In addition to governmental activities, which communicated and disseminated through the Large Pelagic Management Working Group and the Scientific Large Pelagics and Sharks Working Group, DAFF conducts annual “road shows” where DAFF personal visits various sites around the country to inform stake holders about changes in permit conditions and reporting requirements. DAFF provides education materials in the form of booklets, bycatch species ID guides, guides for correct use of logbooks and bycatch handing guides.

South Africa is a member of three Regional Fisheries Management Organisations (RFMOs): The Indian Ocean Tuna Commission (IOTC), The International Commission for the Conservation of Atlantic Tunas (ICCAT) and The Commission for the Conservation of Southern Bluefin Tuna (CCSBT). As such, South Africa is required to provide information to each of these RFMOs, generally in the form of data submissions and reports. In terms of Ecologically Related Species, South Africa is required to submit an annual report to each RFMO indicating by-catch trends and statistics. In addition, South Africa is required to submit numerous species-specific data submissions that detail catch and effort of our Large Pelagic Longline fishery and send delegates to attend ERSWG meetings. Scientific analyses are presented to regional and international working groups and are published in the form of numerous technical reports and peer-reviewed scientific publications.

ERS Data Exchange and Dissemination

South Africa has contributed data and analysis of set level longline data to collaborative work to assess seabird bycatch in pelagic longline fleets (South Atlantic and Indian Oceans). This project is a collaborative work to assess seabird bycatch in the pelagic longline fleets operating in the South Atlantic (SAO) and Indian (IO) Oceans from an entirely scientific perspective was conceived by researchers from several national fleets during the Inter-sessional Meeting of the Sub-committee on Ecosystems of ICCAT, in September 2016. The objectives of this process are 1) to determine the spatio-temporal patterns of seabird bycatch, 2) to estimate the seabird bycatch (at the lowest possible taxonomic level) and data permitting, 3) to gain knowledge on the performance of mitigation measures. South Africa provided spatially disaggregated bird bycatch data for analyses and contributed to the subsequent project report: Collaborative work to assess seabird bycatch in pelagic longline fleets (South Atlantic and Indian Oceans) - 16 to 20 of April 2018, Montevideo, Uruguay. A second workshop to finalise the analysis is agreed to be hosted by South Africa in June 2019.

South Africa has actively participated in the Common Oceans project to assess seabird bycatch in surface longline fisheries in the southern hemisphere south of 20 degrees. The Department has participated in the First Regional Bycatch pre-assessment Workshop held in early 2017, together with other national scientists from countries operating pelagic fleets south of 25° South. This workshop is part of a collaborative process to bring national scientists together, and where appropriate and requested, to help build capacity of national scientists to undertake a global bycatch analysis.

In 2018, scientists from DAFF and NOAA participated in the Seabird Bycatch Small Working Group Meeting hosted by Bird Life SA under the Common Oceans project with the aim to explore alternative techniques to estimate bird encounters and overall captures based on observer and effort data. The Seabird Bycatch Small Working Group focussed on further refining the model options and methodology for calculating bird captures, along with comparing

and contrasting the results of methods that account for the variation in space and time of the catch rates, as well as take into account the different levels of information content in disparate data sets. The meeting brought together data from Brazil, the Republic of Korea, and South Africa. The combined dataset was used to develop estimates of Bycatch Per Unit Effort (BPUE) and number of birds caught. Specific outcomes include the development of analytic tools (code) that can be utilised with any aggregation of data and for any spatial area to estimate seabird bycatch. The results were presented to the 2018 IOTC Working Party on Ecosystems and Bycatch in South Africa and are publicly available:

https://www.iotc.org/sites/default/files/documents/2018/08/IOTC-2018-WPEB14-45.pdf

In February 2019, South Africa participated in the final workshop of the Common Ocean Bird Bycatch Project, hosted by Bird Life South Africa. Delegates collaborated by sharing bird bycatch observer data and by applying spatial models and the SEFRA risk assessment method to estimate seabird bycatch of pelagic long fisheries operating south of 20 degrees..

A follow-up analysis using the SEFRA model was based on observer data provided by CCSBT member countries Japan, South Africa, Australia and New Zealand. These countries all record the seabird species caught during observed fishing, allowing the estimation of seabird bycatch at the species level. The report of this analysis has been submitted by New Zealand to be presented at the ERSWG 13.

This project, with meetings in South Africa 2017, Peru in February 2018, and South Africa in February 2019, was led by Birdlife. Delegates collaborated on applying the risk assessment method to estimating seabird bycatch at the species level, using observer data from CCSBT member countries including Japan, New Zealand, Korea, Australia, and South Africa.

9. Information on other ERS (non-bycatch) such as prey and predator species

On several occasions killer whales and pilot whales have been observed mauling fish caught on the longline, and these depredations are recorded in the skipper logbooks.

In addition, South Africa is a collaborator of the project, “Population structure of IOTC species in the Indian Ocean: Estimation with next generation sequencing technologies and otolith micro-chemistry”. The overall aim of the project is to develop a better understanding of the stock structure of tuna, billfish and sharks of the Indian Ocean using two independent, complementary techniques: genetics and otolith (or vertebrae) chemistry. The project intends to determine the degree of population structure and connectivity of the priority species of tuna, billfish and shark over a wide geographical range. Furthermore, the project aims also to develop and extend research networks among partners and to contribute to technical capacity building in participating coastal states.

10. Other

Nothing to report

11. Implementation of the IPOA-Seabirds and IPOA-Sharks

11.1 NPOA Birds

The Department, with the assistance of NGOs (e.g. Birdlife SA), assesses the impact of longline fisheries on seabirds, turtles and sharks and to investigate various mitigation and management measures. A National Plan of Action for seabirds (NPOA-seabirds) was published in 2008, which aimed to reduce seabird mortalities below 0.05 seabirds.1000 hooks^{-1}. Good collaboration with the fishing industry, researchers and managers, continual refining of mitigation measures, the implementation of stringent management measures through permit conditions, and close monitoring through the observer programme indicates that seabird mortalities have decreased.

11.2 NPOA Sharks

The South African National Plan of Action for sharks (NPOA-Sharks) was finalised in 2013 and provided information on the status of chondrichthyans in South Africa and examined structure, mechanisms and regulatory framework related to research, management, monitoring, and enforcement associated with shark fishing and trade of shark product in the South African context. This information was used to identify, group and prioritize issues particular to South African chondrichthyan resources that require intervention in the forms of specific actions, associated responsibilities and time frames. It provides a guideline for identifying and resolving the outstanding issues around management and conservation of sharks to ensure their optimal, long term, sustainable use for the benefit of all South Africans.
Integral to the NPOA for Sharks -South Africa was the list of issues to be addressed in terms of improving sources of data, addressing scientific knowledge on common and cryptic species and thereby improving the management of chondrichthyan fisheries. In 2018, DAFF updated and reviewed the NPOA which was presented at the IOTC WPEB14 (da Silva et al., 2018).

https://www.iotc.org/sites/default/files/documents/2018/09/IOTC-2018-WPEB14-11_Rev1.pdf

The review indicated that progress was made in six of the seven “Issue Clusters” and within most 22 issues highlighted in the NPOA Sharks SA. Most notable progress was made within the optimum use (100% of listed actions completed) and classification and assessment of species (84% of listed actions completed) issue clusters. The least progress was made in the data and reporting and regulatory tools issue clusters.

Table 1. Total fishing and observed effort[2] for South Africa in 2017 in the pelagic longline fishery

Country / Fishing Entity	Calendar Year	Fishery		CCSBT Statistical Area	Total & Observed Effort			Proportion of observed effort with specific mitigation measures					
		Gear Code	Fleet Code		Total Effort	Total Observed Effort	Observer Coverage *(percentage)*	TP+NS	TP+WB	NS+WB	TP+WB+NS	NIL	Others (*add additional columns if required*)
ZAF	2017	LL	ZAC	9	25 152	25 152	1	0	0	0	1	0	
ZAF	2017	LL	ZAC	14	205 592	205 592	1	0	-	0	1	0	
ZAF	2017	LL	ZAD	9	152 070	11 310	0.07	0	0	0	1	0	
ZAF	2017	LL	ZAD	14	34 300	-	-	0	-	0	1	0	
ZAF	2017	LL	ZAD	15	213 286	7 250	0.03	0	0	0	1	0	

[2] Number of observed hooks per set for shots that caught at least one SBT

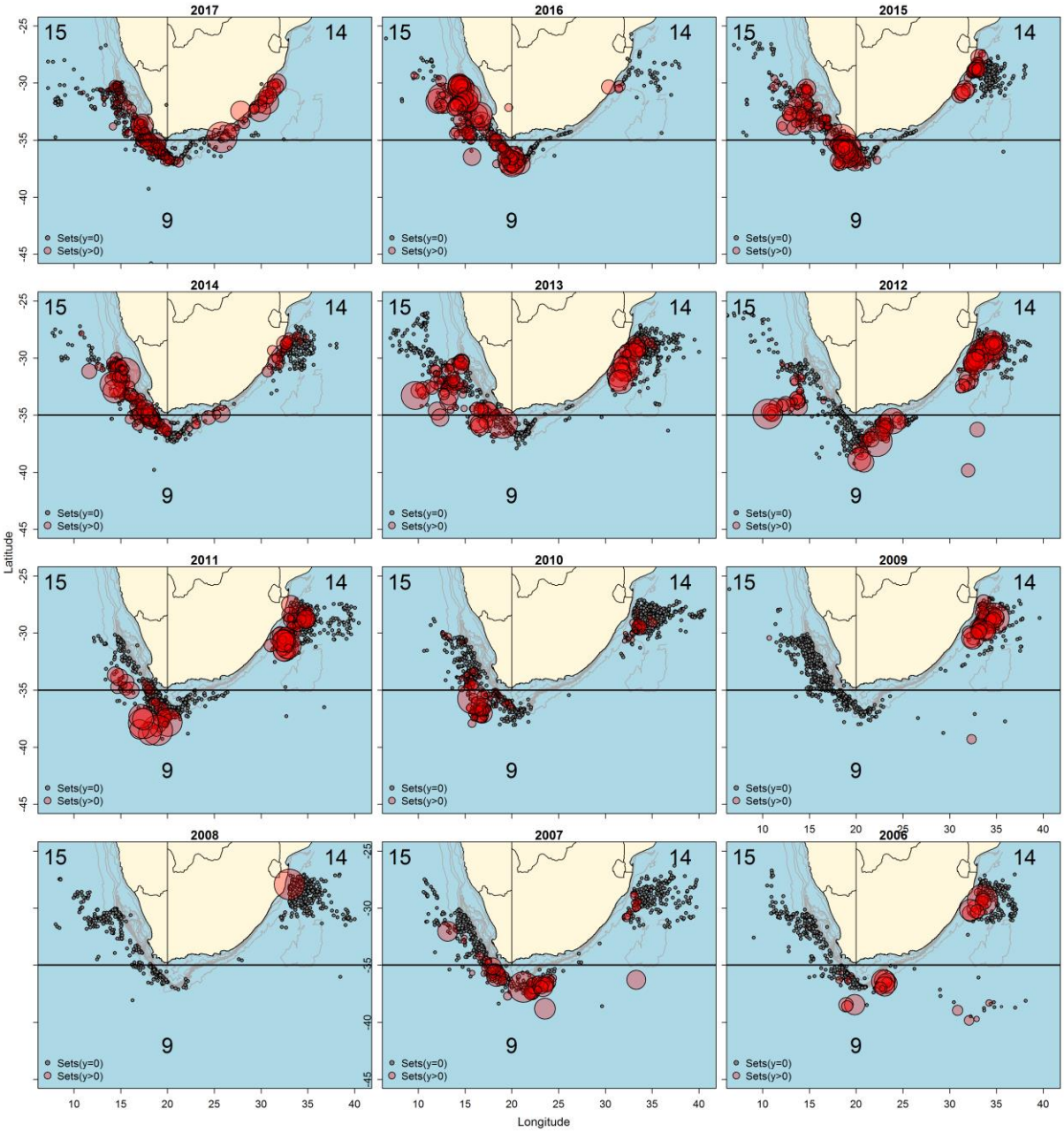

Figure 1. Annual distribution (2006 - 2017) of longline sets for the South African domestic vessels fleet (ZAD). The size of the bubble indicates the relative SBT catch per set in kg per 1000 hooks.

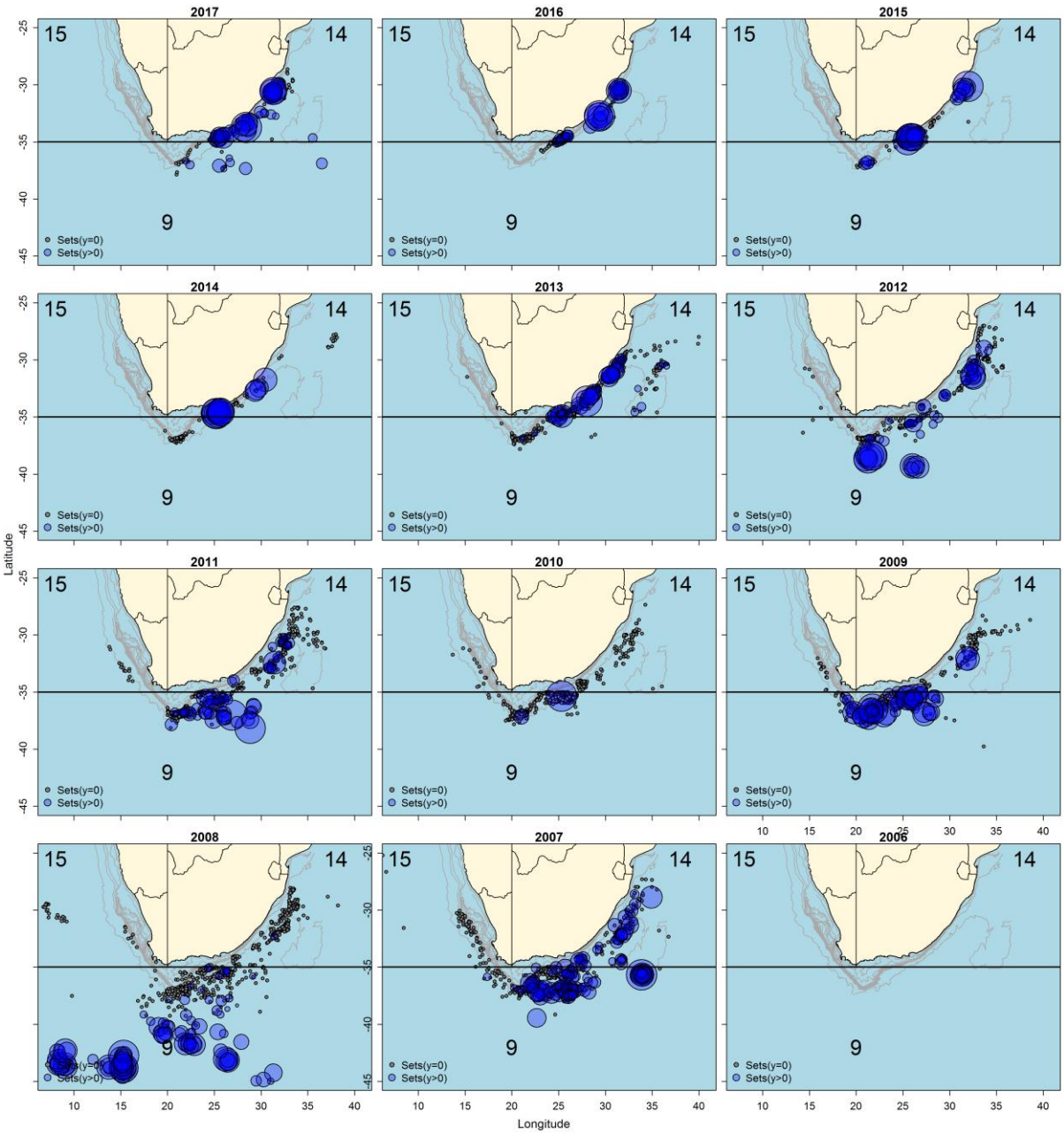

Figure 2. Annual distribution (2006 - 2017) of longline sets for the South African chartered (foreign flagged) vessels (ZAC). The size of the bubble indicates the relative SBT catch per set in kg per 1000 hooks.

Annex 1

Table A1. List of FAO species codes, common names and scientific names of bycatch species observed in 2018

Species code	English name	Scientific name
ALV	*Thresher*	*Alopias vulpinus*
ALX	*Long snouted lancetfish*	*Alepisaurus ferox*
BSH	*Blue shark*	*Prionace glauca*
BTH	*Bigeye thresher*	*Alopias superciliosus*
DCR	*Atlant. yellow-nosed albatross*	*Thalassarche chlororhynchos*
DOL	*Common dolphinfish*	*Coryphaena hippurus*
FAL	*Silky shark*	*Carcharhinus falciformis*
PLS	*Pelagic stingray*	*Dasyatis violacea*
PSK	*Crocodile shark*	*Pseudocarcharias kamoharai*
SMA	*Shortfin mako*	*Isurus oxyrinchus*
SPL	*Scalloped hammerhead*	*Sphyrna lewini*
THR	*Thresher sharks nei*	*Alopias spp*

Table A2: Reporting form for estimation of total mortality of ERS seabird bycatch in CCSBT fisheries for ZAC vessels

Country South Africa Year (calendar year) 2017 ERS: Seabirds

	Total & Observed Effort[1]				Observed Captures						Estimate	Proportion of observed effort with specific mitigation measures				
Stratum (*CCSBT Statistical Areas or finer scale*)	Total Effort[2]	Total Observed Effort[4]	Observer Coverage[3]	Species[4]	Captures (*number*)	Capture Rate[5]	Fate (*numbers*)			Mortality Rate[7]	Estimated total mortalities[6]	TP + NS	TP + WB	NS + WB	TP + WB + NS	Others[8]
							Retained (dead)	Discarded (dead)	Released (live)							
14	205 592	205 592	100	DCR	1	0.005	1	0	0	0.005	1.0	0	0	0	1	
9	25 152	25 152	100	DCR	-	0.000	0	0	0	0.000	0.0	0	0	0	1	
TOTAL	25 152	25 152	100		1	0.0	1	0	0	0	1					

Table A3: Reporting form for estimation of total mortality of ERS seabird bycatch in CCSBT fisheries for ZAD vessels

Country South Africa ZAD Year (calendar year) 2017

	Total & Observed Effort[1]				Observed Captures						Estimate	Proportion of observed effort with specific mitigation measures				
Stratum (*CCSBT Statistical Areas or finer scale*)	Total Effort[2]	Total Observed Effort[4]	Observer Coverage[3]	Species[4]	Captures (*number*)	Capture Rate[5]	Fate (*numbers*)			Mortality Rate[7]	Estimated total mortalities[6]	TP + NS	TP + WB	NS + WB	TP + WB + NS	Others[8]
							Retained (dead)	Discarded (dead)	Released (live)							
9	152 070	11 310	7.4		0	0.000	0	0	0	0.000	0.0	0	0	0	1	
15	213 286	7 250	3.4		0	0.000	0	0	0	0.000	0.0	0	0	0	1	
14	34 300	0	0													
TOTAL	399 656	18 560	4.6		0	0	0	0	0	0.000	0					

Table A4: Total bycatch of seabirds reported in logbooks of the South African longline fishery (incl. non SBT sets) for 2017 and 2018

Year	Species	N Captures	N Dead	Alive	Mortality (%)
2016	Albatrosses nei	9	4	5	44.44
2017	Shy albatross	12	10	2	83.33
2017	White-chinned petrel	1	1	0	100.00

Table A5: Reporting form for estimation of total mortality of ERS sharks bycatch in CCSBT fisheries for ZAC vessels

Country South Africa ZAC Year (calendar year) 2017 ERS: Sharks and Rays

	Total & Observed Effort[1]				Observed Captures						Estimate	Proportion of observed effort with specific mitigation measures				
Stratum (*CCSBT Statistical Areas or finer scale*)	Total Effort[2]	Total Observed Effort[4]	Observer Coverage[3]	Species[4]	Captures (*number*)	Capture Rate[5]	Fate (*numbers*)			Mortality Rate[7]	Estimated total mortalities[6]	TP + NS	TP + WB	NS + WB	TP + WB + NS	Others[8]
							Retained (dead)	Discarded (dead)	Released (live)							
14	205 592	205 592	100	ALV	16	0.075	0	2	14	0.009	1.9	0	0	0	1	
14	205 592	205 592	100	BSH	295	1.392	111	20	164	0.618	127.1	0	0	0	1	
14	205 592	205 592	100	FAL	21	0.099	0	0	21	0.000	0.0	0	0	0	1	
14	205 592	205 592	100	PLS	150	0.708	0	24	126	0.113	23.3	0	0	0	1	
14	205 592	205 592	100	SMA	204	0.962	120	33	51	0.722	148.4	0	0	0	1	
14	205 592	205 592	100	SPL	1	0.005	0	0	1	0.000	0.0	0	0	0	1	
14	205 592	205 592	100	THR	9	0.042	0	0	9	0.000	0.0	0	0	0	1	
9	25 152	25 152	100	BSH	118	3.763	29	4	85	1.052	26.5	0	0	0	1	
9	25 152	25 152	100	PLS	18	0.574	0	6	12	0.191	4.8	0	0	0	1	
9	25 152	25 152	100	SMA	27	0.861	12	6	9	0.574	14.4	0	0	0	1	
9	25 152	25 152	100	THR	3	0.096	0	0	3	0.000	0.0	0	0	0	1	
TOTAL	25 152	25 152	100		862	34.3	272	95	495	23	346					

Table A6: Reporting form for estimation of total mortality of ERS sharks bycatch in CCSBT fisheries for ZAD vessels

Country South Africa ZAD Year (calendar year) 2017 ERS: Sharks and Rays

	Total & Observed Effort[1]				Observed Captures						Estimate	Proportion of observed effort with specific mitigation measures				
Stratum (*CCSBT Statistical Areas or finer scale*)	Total Effort[2]	Total Observed Effort[4]	Observer Coverage[3]	Species[4]	Captures (*number*)	Capture Rate[5]	Fate (*numbers*)			Mortality Rate[7]	Estimated total mortalities[6]	TP + NS	TP + WB	NS + WB	TP + WB + NS	Others[8]
							Retained (dead)	Discarded (dead)	Released (live)							
9	152 070	11 310	7.4	BSH	174	15.385	144	0	30	12.732	1 936.2	0	0	0	1	
9	152 070	11 310	7.4	BTH	1	0.088	0	0	1	0.000	0.0	0	0	0	1	
9	152 070	11 310	7.4	PLS	6	0.531	0	0	6	0.000	0.0	0	0	0	1	
9	152 070	11 310	7.4	PSK	2	0.177	0	0	2	0.000	0.0	0	0	0	1	
9	152 070	11 310	7.4	SMA	252	22.281	252	0	0	22.281	3 388.3	0	0	0	1	
9	152 070	11 310	7.4	THR	9	0.796	0	0	9	0.000	0.0	0	0	0	1	
15	213 286	7 250	3.4	BSH	652	89.931	65	220	367	39.310	8 384.4	0	0	0	1	
15	213 286	7 250	3.4	PLS	6	0.828	0	0	6	0.000	0.0	0	0	0	1	
15	213 286	7 250	3.4	SMA	147	20.276	144	0	3	19.862	4 236.3	0	0	0	1	
15	213 286	7 250	3.4	THR	9	1.241	0	0	9	0.000	0.0	0	0	0	1	
14	34 300	0	0													
TOTAL	399 656	18 560	4.6		1 258	68	605	220	433	35.183	4 236					

Table A7: Total bycatch of turtles reported in logbooks of the South African longline fishery (incl. non-SBT sets) for 2016 and 2017

Year	Species	N Captures	N Dead	N Alive	Mortality (%)
2016	Copper shark	39	11	28	28.21
2016	Hammerhead sharks nei	40	7	33	17.50
2016	Shortfin mako	6	0	6	0.00
2016	Manta rays	1	1	0	100.00
2016	Marine turtles nei	3	0	3	0.00
2016	Oceanic whitetip shark	2	0	2	0.00
2016	Silky shark	170	83	87	48.82
2016	Thresher	7	1	6	14.29
2016	Thresher sharks nei	254	60	194	23.62
2016	Tiger shark	15	0	15	0.00
2017	Blue shark	80	0	80	0.00
2017	Copper shark	214	15	199	7.01
2017	Green turtle	1	0	1	0.00
2017	Hammerhead sharks nei	61	12	49	19.67
2017	Mako sharks	17	0	17	0.00
2017	Manta rays	1	0	1	0.00
2017	Oceanic whitetip shark	2	0	2	0.00
2017	Pelagic stingray	3	0	3	0.00
2017	Porbeagle	2	2	0	100.00
2017	Silky shark	31	22	9	70.97
2017	Thresher	15	4	11	26.67
2017	Thresher sharks nei	282	72	210	25.53
2017	Tiger shark	8	0	8	0.00

Table A8: Total bycatch of turtles reported in logbooks of the South African longline fishery (incl. non-SBT sets) for 2016 and 2017

Year	Species	N Captures	N Dead	N Alive	Mortality (%)
2016	Leatherback turtle	1	0	1	0.00
2016	Loggerhead turtle	9	1	8	11.11
2016	Marine turtles nei	3	0	3	0.00
2017	Leatherback turtle	7	0	7	0.00
2017	Loggerhead turtle	37	0	37	0.00
2017	Marine turtles nei	13	0	13	0.00
2017	Green turtle	1	0	1	0.00