



**Fisheries New Zealand**

Tini a Tangaroa

# **New Zealand Annual Report to the Extended Scientific Committee**

## **New Zealand**

Prepared for the 24th Meeting of the Extended Scientific Committee Meeting (ESC24) of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT)

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# 1 Introduction

## 1.1 BACKGROUND

This review report provides scientific information on the New Zealand southern bluefin tuna (SBT) fishery for the 2018 calendar year and the most recent fishing year, which was from 1 October 2017 to 30 September 2018.

## 1.2 SUMMARY OF HISTORICAL DEVELOPMENTS IN THE FISHERY

Historically, juvenile and adult SBT were distributed around New Zealand. During the 1960s and 1970s, juvenile SBT were encountered on both the east and west coasts of the North Island, and the west coast of the South Island during summer months. Domestically, several tonnes were taken in pole and line and troll fisheries.

In the early 1980s, a concerted effort to develop a domestic SBT fishery was undertaken to service the Japanese market. By 1982, a handline fishery was established with the catch frozen on board a former Japanese longline vessel. Following the high catches of the 1982 season (305 tonnes landed), the handline fishery continued into the late 1980s, albeit at a reduced level (below 100 tonnes until 1989). Around this time, longlining became the dominant fishing method for SBT, and remains so until this day.

In 1989, New Zealand implemented a national catch limit of 420 tonnes per year, which remained until 2008/09. In 2009, the 16<sup>th</sup> Commission Meeting of the Commission for the Conservation of Southern Bluefin Tuna (**CCSBT**) agreed to reduce the global total allowable catch (**TAC**) by 20% and apply revised national allocations for 2010 and 2011. New Zealand's national allocation has increased over the years to 1,088 tonnes for the most recent quota block (2018-2020), which was implemented domestically during the 2017/18 fishing year. On the few occasions when the New Zealand allocation has been exceeded, the domestic catch limit has been reduced in the following year by an equivalent amount.

Since 1 October 2004, SBT has been managed under the quota management system. The introduction to the quota management system saw a change from the "Olympic" race for fish, to fishing spread throughout the season, and was associated with a consolidation of the fleet.

## 1.3 OVERVIEW OF THE MOST RECENT FISHING SEASON

For the 2017/18 fishing year, within New Zealand's national allocation of 1,088 tonnes, there were the following allowances: a total allowable commercial catch (**TACC**, which is the commercial allowance) of 1,047 tonnes; a recreational allowance of 20 tonnes; a customary non-commercial allowance of one tonne; and an allowance for other sources of fishing-related mortality of 20 tonnes.

For the 2017/18 fishing year, commercial removals of SBT were 1,007.9 tonnes (**Table 1**). Given no foreign charter vessels have fished for southern bluefin tuna in New Zealand since 2015, the entire commercial catch was taken by the domestic fleet. Observer authorised discard mortality was for the domestic commercial fleet was estimated at 62 fish, recreational removals were estimated at 12.3 tonnes, and there were no customary removals reported.

# 2 Catch and effort

Total catch for the New Zealand fishery is provided in **Table 1**, while catch and effort by fleet and region are provided in **Table 2**, **Table 3**, **Table 4**, and **Table 5**, **Figure 2** and **Figure 3**.

## 2.1 TRENDS BY GEAR TYPE

Prior to the early 1990s, small vessels handlining and trolling dominated the domestic SBT fishery. Since 1991, surface longlining has been the predominant method for both the domestic and foreign

charter fleet, while handlining and trolling have made up around 4% of the vessel days combined. Since 2008, there has only been a handful of days handlining and trolling for SBT. This represents a major change from the 1980s when most fishing was by handline.

## 2.2 TRENDS BY AREA AND SEASON

Total SBT catch has steadily increased since the early 1990s, with the 2018 catch reaching the highest level to date at 1,008 tonnes (**Table 1 and Figure 1**). No foreign charter vessels have fished since 2015, so current catches are taken entirely by the domestic fleet. Total effort has fluctuated since the early 1990s, and was at its highest between 1999 and 2004, peaking in 2003 before declining back to similar levels as the 1990s (**Table 3 and Table 5**). Catch data shows most SBT are caught off the west coast of the South Island (CCSBT Region 6) and the east coast of the North Island (CCSBT Region 5) from April to July.

For the foreign charter fleet, catch fluctuated around 200 tonnes from the early 1990s to 2016 (**Table 2**). Effort gradually declined from the early 1990s to 2016 when, due to changes in legislation, the vessels left the fishery (**Figure 2**). Catch and effort predominantly occurred in Region 6, with under 10% of total charter catch and effort occurring in Region 5 (**Table 2**).

For the domestic fleet, catch has fluctuated, but generally remained below 300 tonnes up until 2011 when it began increasing year after year, peaking in 2018 at 1008 tonnes (**Table 4**). Effort increased dramatically in both regions from 1994 to 2003, which was followed by a decline to a low level in 2007 and 2008, particularly in Region 6 (**Table 5 and Figure 3**). This decline is associated with a substantial decrease in the number of vessels in the surface longline fleet (**Table 6**), and the removal from the fleet of a domestically-owned freezer vessel that fished in Region 6. Since 2008, domestic vessels have increased effort in Region 6, although in 2018 effort was lower than the previous six years. This increased effort has been reflected in increased catch in Region 6, which reached 429 tonnes in 2017, almost equalling the catch in Region 5 (483 tonnes), but declining to 371 tonnes in 2018 (**Table 4**).

Total effort in the fishery was around 25% less than levels seen prior to the exit of the foreign charter fleet. A longline fishery targeting other highly migratory species also operates outside the SBT fishing season, and these data have been included as “Other” in Tables 2-5, 7 and 8.

## 3 Nominal CPUE

### 3.1 TRENDS BY FLEET

From 2008 to 2015, the foreign charter fleet experienced an increase in CPUE, from around one fish per 1000 hooks to around seven fish per 1000 hooks, peaking in 2010 at nearer eight fish per 1,000 hooks (**Table 7 and Figure 4**).

For the domestic fleet, CPUE was calculated for effort from sets that either caught or targeted SBT. Due to the large changes in the structure of the domestic fleet and the nature of the “Olympic system” under which the New Zealand fishery operated prior to 2004, the trends in the CPUE for the domestic fishery may not provide reliable information on trends in vulnerable biomass, although the CPUE does exhibit similar trends to that of the charter fleet.

From 2009 to 2018, the domestic fleets operating in Regions 5 have experienced an increase in CPUE, from around three fish to 13 fish per 1000 hooks. The domestic fleets operating in Region 6 have also experienced an increase in CPUE since 2008 (six fish) until 2017 and 2018 (17 fish). (**Table 8 and Figure 4**).

### 3.2 TRENDS BY AREA AND SEASON

Associated with a lack of new recruitment (Section 4), CPUE declined dramatically for both charter and domestic fleets in 2003 and remained at these low levels (about one fish per 1000 hooks) for four to five years (**Figure 4**).

CPUE was calculated for the charter fleet in Region 6 for fish thought to be of spawning age (SBT greater than 10 years of age). This was done based on both approximate ageing from observer-derived lengths and on a smaller dataset of SBT that were directly aged. Both series are compared and agree closely with each other. CPUE of SBT greater than 10 years has varied around one fish per 1000 hooks, with a historical low of near-zero fish in 2003 to the highest level of just over two fish in 2015 (**Figure 5**).

## 4 Size composition

Length frequency distributions for the foreign charter and domestic fleets by year are provided in **Figure 6** and **7**. Proportions of catches under 120 and 140 centimetres for the foreign charter and domestic fleets are provided in **Figure 8** and **9**. Length frequency distributions for the foreign charter and domestic fleets for each 10 year period are provided in **Figure 10** and **Figure 11**. For the foreign charter fleet, length frequency distributions for each 10 centimetre interval are provided in **Table 9**, and proportion-at-age distributions, determined from direct aging, are provided in **Figure** (which includes 2016 and 2017 information from the domestic fishery). Proportion-at-length information from the catch documentation scheme is provided in **Figure 14** and **Figure 15**.

### 4.1 TRENDS BY FLEET

Historically, observer coverage was low in the domestic fishery, therefore observer-reported length composition data are not as well estimated for this fleet relative to the foreign chartered fleet. Nevertheless, length composition data for both fleets show similar patterns (**Figure 6** and **Figure 7**). These distributions are now better described by data from the catch documentation system, which provides a complete census of fish lengths for the fishery since 2011 (**Figure 14** and **Figure 15**).

Since 1990, the proportion of the domestic fleet catch sized under 140 centimetres has varied from less than around 20% from 2003 to 2008 to over 60% in 2016, 2017, and 2018, suggesting that there are fewer spawning-age fish (with the proportion continuing to decline since 2016, **Figure 9**).

Since 1989, the proportion of the charter fleet catch under 140 centimetres has varied from less than 10% in 2001–2004 to over 60% in 2010 (**Table 9** and **Figure 8**). In 2013, the proportion dropped to less than 30% as a result of growth (progression of the main length mode). Overall, the proportions fluctuate in a manner consistent with periods of above and below average recruitment (for example, in two to three year cycles).

### 4.2 TRENDS BY AREA AND SEASON

In the 2000s, there was a reduction in the range of sizes of SBT taken in the New Zealand fishery (**Figure 10** and **Figure 11**). There is evidence of growth (shown by progression of modes) over this period, but little evidence of recruitment of smaller fish to the New Zealand fishery (**Figure 8** and **Figure 9**). However, more recent data show a change, with smaller recruits appearing in the fishery (**Figure 6** and **7**).

## 5 Fleet size and distribution

Maps of historical catch and effort by gear type for the fishery are provided in **Figure 16**, **Figure 17**, **Figure 18**, and **18**. The number of vessels catching SBT in New Zealand fisheries waters by year are provided in **Table 6**.

### 5.1 TRENDS BY SEASON

Up until 1991, foreign charter vessels dominated the New Zealand SBT fishery. In 1991, the first domestic longline vessel began fishing for SBT, and then throughout the 1990s and early 2000s the domestic fleet expanded. Since around the time that SBT was introduced into the quota management

system (in 2004), the number of vessels operating in the New Zealand fishery has declined. Thirty three vessels operated in the fishery during the 2017/18 fishing year, all of them domestic (**Table 6**).

## 5.2 TRENDS BY AREA

Historically, the charter fleet, which was primarily composed of the larger -60° freezer vessels, dominated the west coast South Island (Region 6) fishery; however, in 2016, changes in legislation resulted in the charter vessels leaving the fishery (**Figure 16** and **16**).

The domestic fleet is primarily composed of smaller vessels, which operate mainly in the longline fishery off east coast North Island (Region 5); however, in recent years, domestic vessels have increased effort off west coast South Island (Region 6), replacing some of the effort previously made by the foreign charter fleet (**Figure 18** and **Figure 19**). The domestic vessels are typically at sea for only a few days, and land SBT both as a target and as a bycatch of bigeye target sets.

# 6 Research and monitoring to improve estimates of attributable catch

## 6.1 RELEASES AND/OR DISCARDS

### 6.1.1 Current status

Southern bluefin tuna is listed on Schedule 6 of the Fisheries Act 1996, which enables a fish to be returned to the sea or other waters in accordance with the following requirement:

‘A person who is a New Zealand national fishing against New Zealand’s national allocation of southern bluefin tuna may return any southern bluefin tuna to the waters from which it was taken if—

- a) that southern bluefin tuna is likely to survive on return; and
- b) the return takes place as soon as practicable after the southern bluefin tuna is taken’.

Under the Fisheries Act 1996, dead southern bluefin tuna can only be discarded when authorised by an observer, and are required to be reported against annual catch entitlement (counted within the total allowable commercial catch). These SBT include those with shark or orca inflicted damage.

The Resolution on Reporting of all Sources of Mortality of Southern Bluefin Tuna requires that members report the fate of discards. New Zealand does not currently have a moribund category when reporting fate of captures. Moribund fish are included in the ‘dead’ category, reflecting the domestic requirements that only discarded fish that are ‘likely to survive’ can be considered ‘alive’.

Estimates of non-retained catches are required for the CCSBT Data Exchange, and have been provided to the Commission for the charter and domestic fleets from 1989 to 2018 (**Table 12** and **13**). Estimates of dead discards and live releases have been scaled from observed discards and releases to total effort, assuming a similar rate on unobserved vessels (noting that discarding dead SBT would not be in compliance with regulations if not authorised by an observer, and this scaling may therefore overestimate total dead discards).

Since 2004, fishers have also been required to report discards on their catch effort returns, providing another method to estimate non-retained catches. Schedule 6 (i.e. live) releases are also recorded on catch effort returns.

### 6.1.2 Research

There is currently no research in this area.



### 6.1.3 Monitoring

Monitoring of compliance with these requirements is conducted by aerial flights checking for activity on decks of vessels, at-sea inspections, self-reporting, and observer coverage.

On average across the two areas, 24% of catch and 19% of effort was observed during the 2018 calendar year (**Table 14** and **Table 16**), while there have been eleven aerial flights during the 2017/18 and 2018/19 fishing years combined, that reported longline fishing activity within or around SBT target areas.

Discrepancy analysis between observer data and information reported by commercial fishers is currently done on a case by case basis when necessary. Fisheries Officers also conduct observer briefings prior to trips and/or observer debriefs subsequent to trips, in accordance with priorities and/or risk assessments. Routine debrief documentation is completed by the observer programme where no formal debrief is carried out by a Fisheries Officer.

Digital monitoring has the potential allow for increased visibility of vessel movements, processing practices, discards and expedited access to fishing reports. The ability to receive electronic fishing, processing and disposal reports within a 24 hour period has the potential to allow for the early identification of any discrepancies between reports and highlight areas of attention to be addressed by Fishery Officers.

## 6.2 RECREATIONAL FISHING

Reporting of recreational SBT catch is provided in **Table 18** and **Table 19**.

### 6.2.1 Current status

A recreational allowance for SBT was introduced when SBT entered into New Zealand's Quota Management System on 1 October 2004. In the past, New Zealand has based its national catch reporting and carry-forward calculations on the full recreational allowance even though estimates of actual recreational catch were consistently well below the levels set under that allowance.

Historically, a small summer recreational fishery has occurred out of Fiordland on the west coast of the South Island since the 1970s. A recreational fishery for Pacific Bluefin tuna developed in 2005 out of Greymouth or Westport, on the west coast of the South Island, in which SBT are also occasionally taken as bycatch in August and September. At present, there are two distinct recreational fisheries; the west coast of the South Island from January to July, and the east coast of the North Island in June and July, primarily in the eastern Bay of Plenty. The North Island recreational fishery emerged rapidly in 2017, when SBT catches increase dramatically, and SBT catches in 2018 were also high (**Table 19**). It is likely that 2019 recreational catches from this area will also be high.

Compulsory catch returns are required from amateur charter vessels. In 2017/18, amateur charter vessels documented that 12 SBT were caught, with an estimated total weight of 597 kilograms. All twelve were retained.

Recreational catches have been recorded in the months from January to September, and SBT has become a more targeted species for recreational fishers on both coasts of New Zealand, although most catches occur in the recreational fishery on the east coast of the North Island during late June/early July. In 2017, on the east coast on the North Island a mixture of factors, including favourable weather conditions, proximity of fish, and increased recreational interest in SBT, resulted in the high catch levels. An estimate of recreational catch generated from sport fishing club records in 2017 indicated that 266 SBT were landed, with an estimated total weight of 19.4 tonnes and an average weight of over 72 kilograms (with a further 13 fish released alive). Additionally, there were 47 SBT reported by amateur charter vessel logbooks, with an estimated weight of 1.9 tonnes and average weight of 41 kilograms.

In 2018, records from sport fishing clubs suggest that 202 SBT were landed, with an average weight of 78 kilograms for those caught in the North Island fishery. 12 SBT were landed by amateur charter vessels, all from the South Island, with an average weight of 50 kilograms. Combined records from

amateur charter vessel operators, sport fishing clubs, an estimate for catch not reported to clubs, harvest taken from commercial vessels included under section 111 of the Fisheries Act 1996, and an estimate of additional catch in August and September, resulted in a total 2018 SBT recreational harvest estimate of 12.3 tonnes.

## **6.2.2 Research**

A formal reporting regime for the recreational sector applies only to a proportion of the sector (recreational fishing from amateur charter vessels and commercial vessels). Other information sources are required to achieve an overall estimate of recreational catch, which can be particularly challenging for species such as SBT which are not caught frequently enough to result in reliable estimates of catch from national multi-species diary surveys. Fisheries New Zealand analyses data obtained from recreational fishing clubs and amateur charter vessels and has more recently directed research to monitor catch at boat ramps where SBT is likely to be landed.

### **The New Zealand gamefish tagging programme**

The New Zealand gamefish tagging programme is a cooperative project between Fisheries New Zealand, the New Zealand Sport Fishing Council, its affiliated clubs, and anglers. The New Zealand Gamefish Tagging Programme was introduced as a multi species gamefish tagging programme to study the seasonal and short-term movements of gamefish species of importance to recreational New Zealand fisheries. Recaptures from the programme provide information on distance and direction of movement, time at liberty, and in some circumstances the average migration rate of the fish involved.

The most recent report, a Synthesis of New Zealand gamefish tagging data, 1975 to 2014 can be found here: <https://www.mpi.govt.nz/dmsdocument/12135/loggedIn>

Most southern bluefin tuna tagged under this programme are less than 30 kilograms and are tagged off the west coast of the South Island. Recaptures of SBT have been recorded in South Australia and Hokitika. Since the recent development of a recreational SBT fishery off the east coast North Island, where larger southern bluefin tuna have been landed (averaging 78 kilograms in 2018), the New Zealand Sport Fishing Council is encouraging tag and release of SBT as this fishery develops. SBT tagged and released are not counted against the recreational allowance.

### **Estimates of the recreational catch and size composition of SBT**

Following the rapid development of a recreational fishery off the east coast of the North Island in 2017, Fisheries New Zealand approved a research project in 2018, with an overall objective to improve estimates of the recreational SBT catch and size composition in New Zealand.

Specific objectives of this research included designing and implementing an on-site creel survey to estimate recreational harvest in the eastern Bay of Plenty, and to estimate the recreational SBT harvest for the 2018 fishing year using a variety of inputs (the creel survey results, data from amateur charter vessel records, Section 111 landing reports and sport fishing club records).

Additionally, 32 otolith sets from SBT caught on recreational vessels fishing in the eastern Bay of Plenty in 2018 were collected to be part of New Zealand's otolith collection for the CCSBT. Most of the fish from which otoliths were taken were large, with a mode weight at 70-80 kilograms and a mode fork length of 160-165 cm.

### **National Panel Survey of Marine Recreational Fishers**

Nationwide panel surveys are conducted to generate harvest estimates of recreational catch in New Zealand waters. Features of the survey include: meshblock -based face-to-face recruitment, a frequent and adaptable contact regime with a SMS texting option, and a structured questionnaire administered by telephone to record fishing details.

The survey conducted during the most recent fishing year included almost 7,000 fishers who reported their fishing activity throughout the New Zealand fishing year from 1 October 2017 to 30 September

2018. The survey includes information on recreational harvest of highly migratory species, such as skipjack tuna and albacore tuna, but did not capture any information on SBT.

### **6.2.3 Monitoring**

Fisheries New Zealand monitors recreational catch of southern bluefin tuna in a variety of ways. This includes: amateur charter vessel records, reporting of recreational activity from commercial vessels, New Zealand sport fishing club records, the New Zealand gamefish tagging programme, and social media. Further information on the different ways New Zealand monitors SBT recreational catch are outlined below:

#### **Amateur charter vessel records**

Amateur charter vessel records are an important source of information when estimating recreational catch of SBT. Anyone in New Zealand who takes someone fishing where payment is made for the vessel and guide services, is required to be registered as an amateur-fishing charter vessel operator under the Fisheries Act 1996. Fish caught on these types of fishing trips are not entitled to be sold or traded, and the catch is regarded as recreational catch.

Compulsory reporting for recreational charter vessel operators was introduced in November 2010 under the Fisheries (Amateur Fishing) Regulations 2013. This requires amateur charter vessel operators to report catch to Fisheries New Zealand on a number of shared species of interest, including compulsory reporting for southern bluefin tuna and Pacific bluefin tuna.

In 2018, amateur charter vessel records showed that 12 SBT were caught, for an estimated weight of 597 kilograms (average weight of 50 kilograms), all from the South Island. All of them were retained, while in 2017 a total of 47 SBT were recorded with an average weight of 41 kilograms (**Table 18**).

#### **New Zealand sport fishing club records**

The New Zealand Sport Fishing Council has 57 affiliated clubs across New Zealand. Sport fishing club records provide an important source of information on tagging, landings and weights of highly migratory species caught by recreational fishers in New Zealand waters. Records of SBT landings from various sport fishing clubs are provided to Fisheries New Zealand.

Information captured through onsite surveys in 2018 suggests that even though catches are still high, overall, more fish were caught and landed in 2017. The majority of trips targeting southern bluefin tuna landed one fish per trip, with 9% of trips landing two southern bluefin tuna. Feedback from stakeholders has also indicated that most recreational vessel targeting southern bluefin tuna will carry two to three fishers.

In 2018, sport fishing club records reported 202 SBT were landed, with an estimated total weight of 12.3 tonnes, and 13 were fish that were released alive (**Table 19**).

#### **Section 111 reporting**

Section 111 of the Fisheries Act 1996 stipulates that all fish that is on board, landed from, or transhipped from, any registered commercial fishing vessel or fish carrier is deemed to have been taken or possessed for the purpose of sale. However, commercial fishers can apply for an exemption to this provision that allows fish to be retained for recreational consumption subject to conditions requiring the use of recreational gear. Data on this type of recreational catch is captured as part of commercial reporting requirements.

In the 2017/18 fishing year, 19 fish were reported as Section 111 landings weighting 502 kilograms. Over the past four fishing years, the highest catch weight reported under Section 111 was 1,038 kilograms in 2016/17.

#### **Management measures**

Following a significant surge in recreational catch in 2017 on the east coast of the North Island, the national recreational SBT catch allowance was increased for the 2017/18 fishing year from eight to twenty tonnes. In 2018, Fisheries New Zealand then undertook a public consultation to introduce new management measures for the recreational fishery.

In response to this consultation, a recreational bag limit of one SBT per person per day was put into effect for 2019. An SBT recreational management working group was also initiated, in order to monitor progression and changes in the recreational fisheries.

### **Social media**

Social media provides a platform for New Zealand's commercial and recreational fishers alike to share information on SBT. Noted in the past year, fishers have been seen to share information through "fishing forums" on SBT landings and locations, as well as sharing information about where SBT are located in New Zealand waters. A number of New Zealand's sport fishing clubs also share information on social media. Information from social media has been used to substantiate information received through official channels, and can provide insight into the behaviour of the recreational sector.

## **6.3 OTHER SOURCES (E.G. CUSTOMARY, TRADITIONAL AND/OR ARTISANAL FISHING)**

### **6.3.1 Current status**

One of the allowances made under the New Zealand quota management system is to allow for the customary take of species. This customary allowance provides for catches of southern bluefin tuna that are governed by customary fishing regulations. There is no evidence to date that catches of southern bluefin tuna are made in this way. Most, if not all, non-commercial catches are taken subject to general provisions for amateur fishing (rather than under the customary fishing regulations). However, in recognition that the introduction of recreational management constraints in 2019 could result in an increased use of customary provisions, the customary allowance was increased from 1 tonne to 2 tonnes.

### **6.3.2 Research**

Fisheries New Zealand has not conducted additional research or consultation on customary catch in 2018.

### **6.3.3 Monitoring**

Fisheries New Zealand monitors customary permits however no permits have been used to take southern bluefin tuna to date.

## **7 Development and implementation of scientific observer programme**

New Zealand's Observer Programme covers both domestic and foreign charter longline vessels. In 2016, 2017 and 2018, no foreign charter vessels targeting SBT fished in New Zealand's Exclusive Economic Zone, and increased coverage of the domestic fleet was attained. The target coverage level for fisheries targeting SBT is 10% of catch and effort, as specified in the CCSBT Scientific Observer Program Standards. Coverage is measured in two ways, proportion of catch (in numbers of fish) observed and proportion of hooks observed where relevant effort is hooks from sets that either targeted or caught SBT (unraised).

### **7.1 OBSERVER TRAINING**

#### **Overview of training programme provided to scientific observers**

Fisheries New Zealand's Observer Services Unit is responsible for the recruitment and training of Fisheries Observers. The recruitment process include a half day assessment centre, online physiological testing, drug and alcohol testing, a criminal record check, seafarers medical, and referee checks. Successfully shortlisted candidates then undergo a comprehensive 3 week training course which covers a mixture of New Zealand Qualification Authority (NZQA) unit standards, Fisheries New Zealand task specific units, other relevant government agency training modules, and industry representation. Candidates are assessed throughout the training course against the NZQA unit standards. Candidates must complete the entire 3 week course and pass a written exam at the end. Those that successfully pass the training course are deployed on at least one training trip at sea with an experienced observer to train and mentor the new observers. Regular audits are undertaken by the trainer to ensure competency is obtained. Training trips last between 3-7 weeks depending on the vessel type and fishery deployed to. Additional SBT specific training is provided during briefing for relevant fishery deployments.

The 3 week observer training course covers:

- State Services Code of conduct
- Maritime New Zealand training
- Data collection and report writing
- Safety at sea modules, including firefighting, emergency evacuations, communications, first aid
- Overview of NZ's Quota Management System
- Common parts of a vessel
- Commercial fishing methods
- Information display systems
- Catch quantification and species identification
- Biological sampling
- Protected species interaction and monitoring
- Computer training
- Vessel monitoring and compliance
- A day in the life of an observer role play

### **Number of observers trained**

There are over 100 observers in the Fisheries New Zealand's Observer programme. 100% of observers deployed by Fisheries New Zealand have successfully completed full training. 30-40 observers were recruited and trained in 2018.

## **7.2 SCIENTIFIC OBSERVER PROGRAMME DESIGN AND COVERAGE**

The fisheries observer programme is managed and coordinated by Fisheries New Zealand's Observer Services Unit. Fishing industry quota holders are levied or direct charged for observer coverage. Observer coverage for the incoming year is determined by consultation with industry and the requirements of fisheries managers and the Department of Conservation. Observer deployment is managed by shore based staff in Wellington, New Zealand. Observers are deployed throughout New Zealand to cover vessels operating within New Zealand's Exclusive Economic Zone and in international waters as appropriate.

*Which fleets, fleet components, or fishery components were covered by the programme:*

In relation to CCSBT, Fisheries New Zealand observers were deployed to the surface longline targeting southern bluefin tuna, bigeye tuna, and swordfish.

*How vessels were selected to carry observers within the above fleets or components:*

Observer placements are prioritised based on: vessel level of effort and catch, new entrants to the fishery, length of time since previous observation, and compliance risk assessment.

*How was observer coverage stratified: By fleets, fisheries components, vessel types, vessel sizes, vessel ages, fishing areas and seasons.*

The New Zealand domestic SBT fishery currently consists of a largely uniform fleet of smaller longline vessels. New Zealand has previously stratified its observer coverage reporting based on domestic vs foreign charter vessels however this stratification is no longer relevant with the exit of the large foreign vessels from the fishery.

*Details of observer coverage of the above fleets, including:*

In 2016, 23% of the domestic catch and 19% of the domestic effort was observed, and in 2017, 21 % of the domestic catch and 20% of the domestic effort was observed (**Table 14** and **Table 16**).

During the 2017 calendar year, for those vessels targeting SBT, there were 444 sea days and 164 shore days.

### **7.3 OBSERVER DATA COLLECTED**

List of observer data collected against the agreed range of data set out in Attachment 1.

*Catch data: Amount of catch observed of SBT and other species (if collected), by area and season, and % observed out of total estimated SBT catch by area and seasons*  
See **Tables 4** and **5**.

*Effort data: Amount of effort observed (vessel days, sets, hooks, etc), by area and season and % observed out of total by area and seasons*  
See **Table 16**

*Length frequency data: Number of fish measured per species, by area and season.*  
See **Table 11**

*Biological data: Type and quantity of other biological data or samples (otoliths, sex, maturity, Gonosomatic index, etc) collected per species.*  
See **Tables 10** and **11**.

### **7.4 TAG RETURN MONITORING**

Six dart tags were recaptured during observed trips in 2015, none in 2016, two in 2017 and none in 2018.

### **7.5 PROBLEMS EXPERIENCED**

There were no problems experienced.

## **8 Other relevant information**

New Zealand is progressing a Digital Monitoring Programme, which will require vessels to electronically report, use geospatial position reporting, and implement electronic monitoring, including the potential use of cameras.

## **9 Acknowledgements**

Fisheries New Zealand acknowledges Terese Kendrick and John Holdsworth for assistance with various parts of this report. Also, we thank Colin Millar for his assistance to New Zealand in the preparation of the data.

## 10 Appendix – Tables

**Table 1:** Commercial catches of SBT in New Zealand fisheries waters (tonnes, whole weight) by calendar year and New Zealand fishing year (1 October to 30 September).

Year	Calendar year catches	Fishing year catches
1980	130.0	130.0
1981	173.0	173.0
1982	305.0	305.0
1983	132.0	132.0
1984	93.0	93.0
1985	94.0	94.0
1986	82.0	82.0
1987	59.0	59.0
1988	94.0	94.0
1989	437.2	437.1
1990	529.2	529.3
1991	164.5	164.5
1992	279.2	279.2
1993	216.6	216.3
1994	277.0	277.2
1995	436.4	434.7
1996	139.3	140.4
1997	333.7	333.4
1998	337.1	333.0
1999	460.6	457.5
2000	380.3	381.7
2001	358.5	359.2
2002	450.3	453.6
2003	389.6	391.7
2004	393.3	394.0
2005	264.4	264.0
2006	238.2	238.2
2007	382.6	383.1
2008	319.0	318.8
2009	418.5	417.3
2010	500.8	500.0
2011	547.1	547.2
2012	775.5	775.4
2013	756.4	758.2
2014	825.6	825.8
2015	922.3	922.2
2016	950.8	949.6
2017	913.3	913.9
2018	1008.0	1007.9

**Table 2:** Catch (tonnes) for the foreign charter fleet by year and CCSBT region. Based on raised catches. (No foreign charter vessels fished in 1996, nor in 2016, 2017, 2018.)

Calendar Year	Region 5	Region 6	Other*
1989		296.3	0.3
1990	66.7	174.9	
1991	23.0	102.6	
1992	4.8	214.5	0.5
1993	20.2	120.5	9.5
1994		234.1	
1995	1.6	228.7	0.2
1996			
1997	52.3	186.2	
1998	83.9	117.3	
1999	9.8	190.7	
2000	2.5	132.5	
2001		139.3	
2002		148.4	
2003		82.1	
2004		126.4	
2005	34.4	53.0	
2006	9.9	95.3	
2007	53.0	161.0	
2008		200.0	
2009	17.0	201.2	
2010		207.8	
2011		199.1	
2012		240.1	0.1
2013		183.9	
2014		223.9	
2015		256.8	
2016			
2017			
2018			

\*Most often erroneous position data



**Table 3:** Effort (1000s of hooks) for the foreign charter fleet by year and CCSBT region based on raised hooks. Note that this includes some non-SBT target effort in Region 5. (No foreign charter vessels fished in 1996, nor in 2016, 2017, 2018).

Calendar Year	Region 5	Region 6	Other*
1989		1596	3.5
1990	259	1490.6	
1991	306	1056.5	
1992	47.6	1386.8	3
1993	174.1	1125.7	101.4
1994		799.1	
1995	27.1	1198.7	13.5
1996			
1997	135.2	1098.7	
1998	225	616	
1999	57.2	955.1	
2000	30.3	757.9	
2001		639.4	
2002		726.4	
2003	3	866.6	
2004		1113.5	
2005	137	498.9	
2006	39.4	562.5	
2007	271.6	1136.1	
2008		568.3	
2009	66.8	731.0	
2010		484.9	
2011		495.9	
2012		548.4	3.4
2013	13.2	450.8	
2014		655.8	
2015		625.9	
2016			
2017			
2018			

\*Most often erroneous position data

**Table 4:** Catch (tonnes) for the domestic commercial fleet by year and CCSBT region based on raised catches.

Calendar Year	Region 5	Region 6	Other*
1980			130.0
1981			173.0
1982			305.0
1983			132.0
1984			93.0
1985			94.0
1986			82.0
1987			59.0
1988			94.0
1989	0.1	140.5	
1990	6.9	278.7	2.0
1991	0.9	37.8	0.1
1992	6.2	53.2	
1993	49.4	16.3	0.8
1994	6.5	35.6	0.8
1995	15.0	184.9	6.1
1996	34.2	103.8	1.3
1997	57.9	36.2	1.1
1998	83.4	52.2	0.4
1999	194.7	64.8	0.6
2000	184.0	60.9	0.4
2001	113.1	105.7	0.4
2002	135.7	162.9	3.2
2003	216.7	89.7	0.1
2004	101.0	165.9	
2005	165.2	11.6	0.3
2006	122.8	10.2	
2007	162.5	2.1	
2008	80.5	38.1	
2009	133.5	66.7	0.2
2010	204.8	88.2	
2011	237.2	110.8	
2012	249.1	285.8	
2013	344.1	227.2	
2014	334.0	267.6	
2015	406.1	259.3	0.1
2016	563.5	386.3	1.1
2017	483.6	428.6	1.1
2018	636.5	371.3	0.3

\* Includes erroneous position data and data without positions.

**Table 5:** Effort (1000s hooks that caught or targeted SBT) for the domestic commercial fleet by year and CCSBT region based on raised hooks.

<b>Calendar Year</b>	<b>Region 5</b>	<b>Region 6</b>	<b>Other*</b>
1989			
1990	41.7		
1991	31.5	49.2	
1992	71.7	12.1	
1993	644.0	108.1	7.7
1994	122.6	143.3	5.8
1995	221.5	760.4	26.7
1996	417.9	564.3	11.5
1997	736.4	8.9	17.3
1998	633.6	314.5	1.2
1999	1221.4	382.9	5.5
2000	1164.0	454.4	8.5
2001	1027.6	751.5	1.9
2002	1358.6	1246.8	13.5
2003	1868.7	1569.1	4.3
2004	1154.1	1431.9	1.2
2005	1133.0	153.6	2.4
2006	1036.4	122.4	0.9
2007	681.2	19.0	
2008	527.8	94.0	
2009	733.9	165.4	1.3
2010	1116.7	294.3	
2011	955.7	197.8	
2012	858.9	629.3	
2013	905.3	565.0	1.2
2014	595.0	540.2	
2015	716.0	524.1	0.7
2016	883.8	565.9	12.6
2017	867.1	589.6	7.9
2018	1027.5	505.9	3.9

\* Includes erroneous position data and data without positions.

**Table 6:** Number of commercial vessels catching SBT in New Zealand fisheries waters by calendar year and New Zealand fishing year (1 October to 30 September).

<b>Year</b>	<b>Calendar year vessel numbers</b>	<b>Fishing year vessel numbers</b>
2001	132	132
2002	151	155
2003	132	132
2004	99	101
2005	57	58
2006	56	57
2007	44	45
2008	35	36
2009	40	39
2010	44	42
2011	42	42
2012	43	44
2013	39	39
2014	37	38
2015	34	33
2016	32	32
2017	32	32
2018	33	33

**Table 7:** CPUE (number of fish per 1000 target hooks) for the foreign charter fleet by year and Region, based on raised catches and effort. (No foreign charter vessels fished in 1996, nor in 2016, 2017, 2018.)

Calendar Year	Region 5	Region 6	Other*
1989		2.24	1
1990	2.98	1.61	
1991	0.91	1.43	
1992	1.32	2.48	2.52
1993	1.72	1.69	2.35
1994		4.51	
1995	0.65	2.60	0.24
1996			
1997	4.68	2.25	
1998	5.48	2.94	
1999	2.50	2.78	
2000	1.04	2.78	
2001		3.77	
2002		3.33	
2003	0.00	1.34	
2004		1.37	
2005	2.65	1.18	
2006	2.91	1.95	
2007	1.93	1.70	
2008		4.88	
2009	2.42	4.55	
2010		7.80	
2011		6.39	
2012		7.33	0.29
2013	0.08	6.49	
2014		6.10	
2015		6.74	
2016	NA	NA	NA
2017	NA	NA	NA
2018	NA	NA	NA

**Table 8:** CPUE (number of fish per 1000 target hooks) for the domestic commercial fleet by year and Region, based on raised catches and effort.

Calendar Year	Region 5	Region 6	Other*
1989			
1990	1.32		
1991	0.40	0.74	
1992	1.00	1.35	
1993	0.9	1.83	1.60
1994	0.69	3.62	2.38
1995	0.72	4.63	4.26
1996	1.17	2.68	2.37
1997	1.11	1.52	0.52
1998	2.22	1.82	7.00
1999	2.58	2.13	1.70
2000	2.37	1.99	0.75
2001	1.84	2.63	3.63
2002	1.55	2.20	3.53
2003	1.54	0.82	0.52
2004	1.16	1.46	0.0
2005	1.79	0.70	1.43
2006	1.44	0.88	0.0
2007	2.65	0.43	
2008	1.84	5.99	
2009	2.50	7.85	2.50
2010	2.75	7.29	
2011	3.98	11.12	
2012	4.84	9.78	
2013	6.15	8.11	2.00
2014	8.93	10.14	
2015	9.35	10.19	1.67
2016	12.34	16.48	1.83
2017	10.74	17.43	1.46
2018	12.69	16.85	1.17

**Table 9:** Frequency of catch from the foreign charter fleet under 110, 120, 130, and 140 centimeters (cm) for 1989 to 2016. (No charter vessels fished in 1996, nor in 2016, 2017, 2018.)

Year	< 110 cm	< 120 cm	< 130 cm	< 140 cm
1989	0.006	0.026	0.045	0.071
1990	0.041	0.101	0.131	0.164
1991	0.114	0.158	0.274	0.317
1992	0.052	0.237	0.392	0.556
1993	0.217	0.316	0.472	0.594
1994	0.028	0.122	0.229	0.380
1995	0.019	0.05	0.161	0.326
1996	NA	NA	NA	NA
1997	0.038	0.057	0.098	0.162
1998	0.094	0.209	0.247	0.321
1999	0.033	0.082	0.157	0.216
2000	0.067	0.194	0.279	0.370
2001	0.093	0.196	0.378	0.519
2002	0.037	0.135	0.245	0.398
2003	0.002	0.009	0.094	0.241
2004	0.001	0.001	0.004	0.042
2005	0.000	0.000	0.002	0.008
2006	0.035	0.041	0.051	0.059
2007	0.042	0.058	0.087	0.109
2008	0.080	0.181	0.230	0.289
2009	0.033	0.196	0.384	0.485
2010	0.062	0.106	0.366	0.633
2011	0.035	0.073	0.135	0.403
2012	0.062	0.142	0.212	0.328
2013	0.039	0.089	0.175	0.258
2014	0.050	0.177	0.321	0.438
2015	0.044	0.077	0.159	0.284
2016	NA	NA	NA	NA
2017	NA	NA	NA	NA
2018	NA	NA	NA	NA

**Table 10:** Number of otoliths collected and aged by observers from the foreign charter and domestic fleet catch for the years 2000 – 2017. (At the time of submitting this report, 2018 information was not yet available.)

Year	Foreign charter fleet		Domestic fleet	
	Otoliths	Number aged	Otoliths	Number aged
2000	149	0		
2001	777	198		
2002	1199	197		
2003	838	197		
2004	1141	196	120	23
2005	417	252	3	3
2006	443	249		
2007	714	254		
2008	745	253		
2009	1066	268		
2010	875	258		
2011	604	270		
2012	1252	255		
2013	1019	252		
2014	1241	257		
2015	1231	254		
2016			111	89
2017			121	119

**Table 11:** Biological specimens taken by observers.

Calendar Year	2017		2018	
<b>Region</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>6</b>
<b>LF #s</b>	2,003	2,051	2,428	855
<b>Sexed</b>	1,086	1,416	2,308	839
<b>Head</b>	0	0	0	0
<b>Viscera</b>	0	0	0	0
<b>Stomach log</b>	1,696	1,731	2,037	743
<b>Otolith</b>	54	67	0	6
<b>Tail</b>	10	0	0	0
<b>Anal fin</b>	12	0	0	0
<b>Entire specimen</b>	0	0	0	0
<b>White muscle</b>	452	701	1,037	226
<b>Photo</b>	30	23	43	3
<b>Gill raker</b>	1	19	0	0
<b>Stomach contents</b>	0	13	8	0
<b>Gonads</b>	0	0	10	0



**Table 12:** Number of releases and discards observed and the estimated total number of discards (separated by life status<sup>1</sup> - alive and dead) based on observer coverage and the life status of the observed discards for the foreign charter fleet. Note that numbers are rounded to the nearest whole fish. (No foreign charter vessels fishing in 1996, 2016, or 2017).

Year	Observed numbers		Scaled estimate		
	Alive	Dead	Alive (released)	Dead	Total
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	18	4	55	13	68
1994	27	9	40	13	53
1995	2	3	4	9	13
1996	0	0			
1997	0	23	0	38	38
1998	0	20	0	20	20
1999	18	15	18	15	33
2000	0	3	0	4	4
2001	3	3	3	4	6
2002	2	3	2	3	5
2003	0	2	0	2	2
2004	0	2	0	2	2
2005	0	0	0	0	0
2006	2	2	2	2	5
2007	2	1	4	2	5
2008	0	0	0	0	0
2009	5	0	6	0	6
2010	10	2	12	3	15
2011	10	0	14	0	14
2012	36	0	43	0	43
2013	64	4	82	5	87
2014	65	0	78	0	78
2015	16	0	20	0	20
2016		No charter vessels fishing in New Zealand waters this year			
2017		No charter vessels fishing in New Zealand waters this year			
2018		No charter vessels fishing in New Zealand waters this year			

<sup>1</sup> The Resolution on Reporting all Sources of Mortality of Southern Bluefin Tuna requires that members report the fate of discards. New Zealand does not currently use the moribund category when reporting fate of captures. Moribund fish are included within the “dead” category reflecting the domestic requirement that only discarded fish which are “likely to survive” can be considered “alive”.

**Table 13:** Actual number of releases and discards observed and the estimated total number of discards (separated by life status - alive and dead) based on observer coverage and the life status of the observed discards for the domestic commercial fleet. Note that numbers are rounded to the nearest whole fish.

Year	Observed numbers		Scaled estimate		
	Alive	Dead	Alive (released)	Dead*	Total
1989	0	0			
1990	0	0			
1991	0	0			
1992	0	0	0	0	0
1993	0	0			
1994	0	0	0	0	0
1995	1	3	10	20	30
1996	4	1	25	6	31
1997	0	1	0	4	4
1998	0	0	0	0	0
1999	0	0	0	0	0
2000	0	0	0	0	0
2001	2	3	8	10	18
2002	2	2	24	30	53
2003	0	0	0	0	0
2004	0	1	0	7	7
2005	4	1	33	8	42
2006	1	0	16	0	16
2007	1	1	8	8	15
2008	2	0	13	0	13
2009	1	1	12	12	24
2010	24	2	282	25	307
2011	37	7	442	84	526
2012	61	5	745	65	810
2013	50	0	1180	0	1180
2014	48	19	697	276	973
2015	62	15	910	214	1124
2016	534	66	2770	342	3113
2017	193	31	975	159	1133
2018	186	62	1084	361	1445

\*Dead discards can only occur when authorised by observers, so the scaled estimates should be treated with caution. These SBT included those with shark or orca-inflicted damage.

**Table 14:** Observer coverage in terms of catch (proportion of individual SBT observed) for the domestic surface longline commercial fleet for 2017 and 2018 calendar years.

Country/ Fishing Entity	Calendar Year	Fishery		CCSBT statistical area	Total SBT catch numbers	Observed SBT catch numbers	Observer coverage (%)
		Gear Code	Fleet Code				
NZ	2017	SLL	NZD	5	9,372	2181	21%
				6	9,953	2,195	28%
NZ	2018	SLL	NZD	5	11,701	2,629	19%
				6	7,527	923	29%

**Table 15:** Observer coverage in terms of estimated catch (proportion of total estimated weight) for the domestic surface longline commercial fleet for 2017 and 2018 calendar years.

Country/ Fishing Entity	Calendar Year	Fishery		CCSBT statistical area	Total SBT Catch (kgs)	Observed SBT Catch (kgs)	Observer coverage (%)
		Gear Code	Fleet Code				
NZ	2017	SLL	NZD	5	403,592	106,786	26%
				6	356,652	92,140	26%
NZ	2018	SLL	NZD	5	485,383	118,627	24%
				6	284,108	32,362	11%

**Table 16:** Observer coverage in terms of effort (proportion of hooks observed) for the domestic commercial fleet for 2017 and 2018 calendar years.

Country/ Fishing Entity	Calendar year	Fishery		CCSBT statistical area	Total Effort (no. of hooks)	Observed Effort (no. of hooks)	Observer coverage (%)
		Gear code	Fleet code				
NZ	2017	SLL	NZD	5	837,804	149,174	19%
				6	564,695	127,997	26%
NZ	2018	SLL	NZD	5	907,681	155,323	18%
				6	445,185	76,580	19%

**Table 17:** Observer coverage in terms of days for the domestic commercial fleet for the 2017 and 2018 calendar years.

Country/ Fishing Entity	Calendar Year	Fishery		CCSBT statistical area	Total Effort (vessel days)	Total Effort (vessel days)	Observer coverage (%)
		Gear Code	Fleet Code				
NZ	2017	SLL	NZD	5	932	153	17%
				6	508	117	26%
NZ	2018	SLL	NZD	5	990	149	16%
				6	404	73	20%

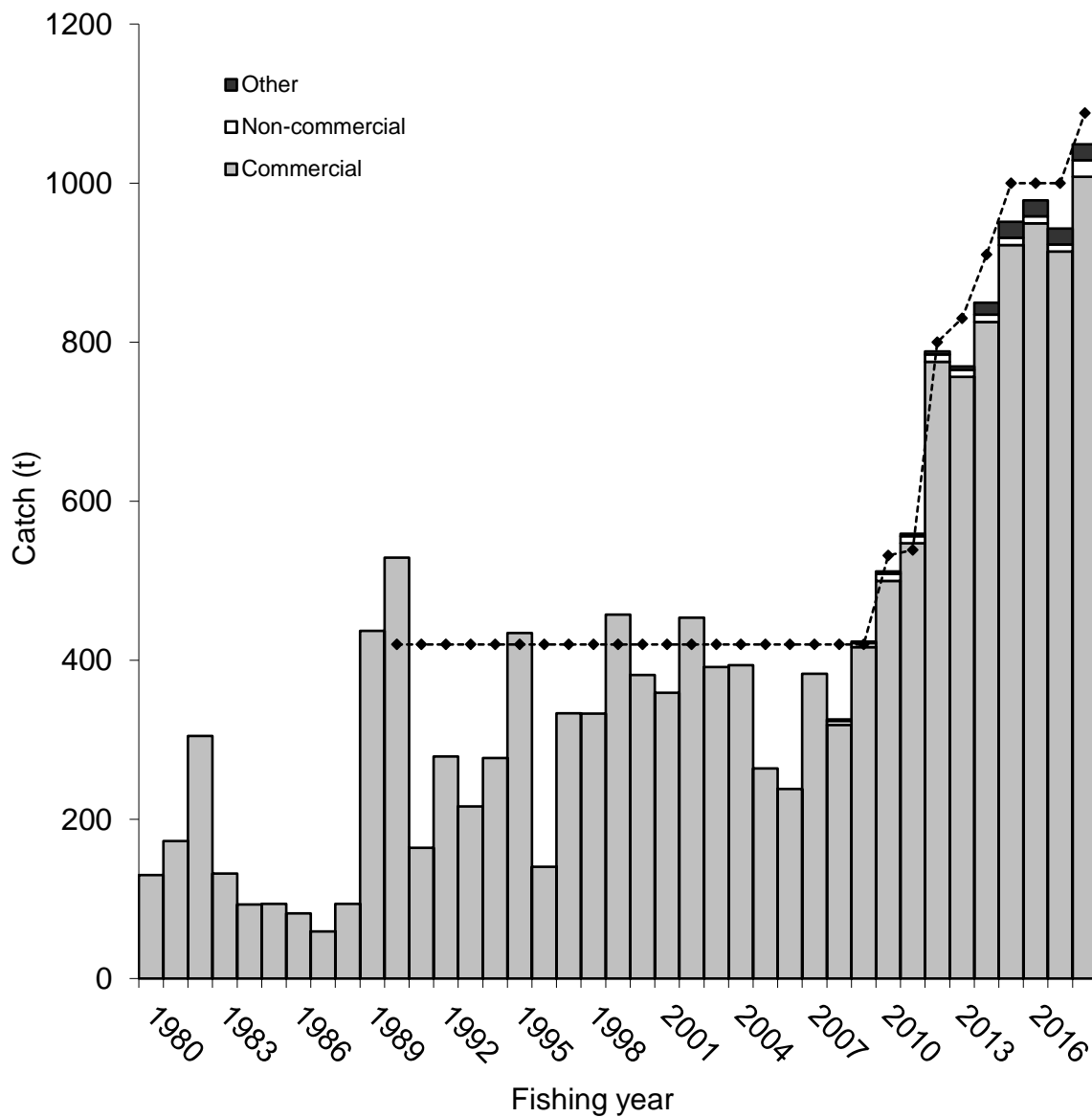
**Table 18:** Number of landed SBT recorded through amateur charter vessel reporting for 2013-2018 calendar years.

Calendar year	2013	2014	2015	2016	2017	2018
Amateur charter vessel reporting SBT landed (number)	12	0	5	36	47	12

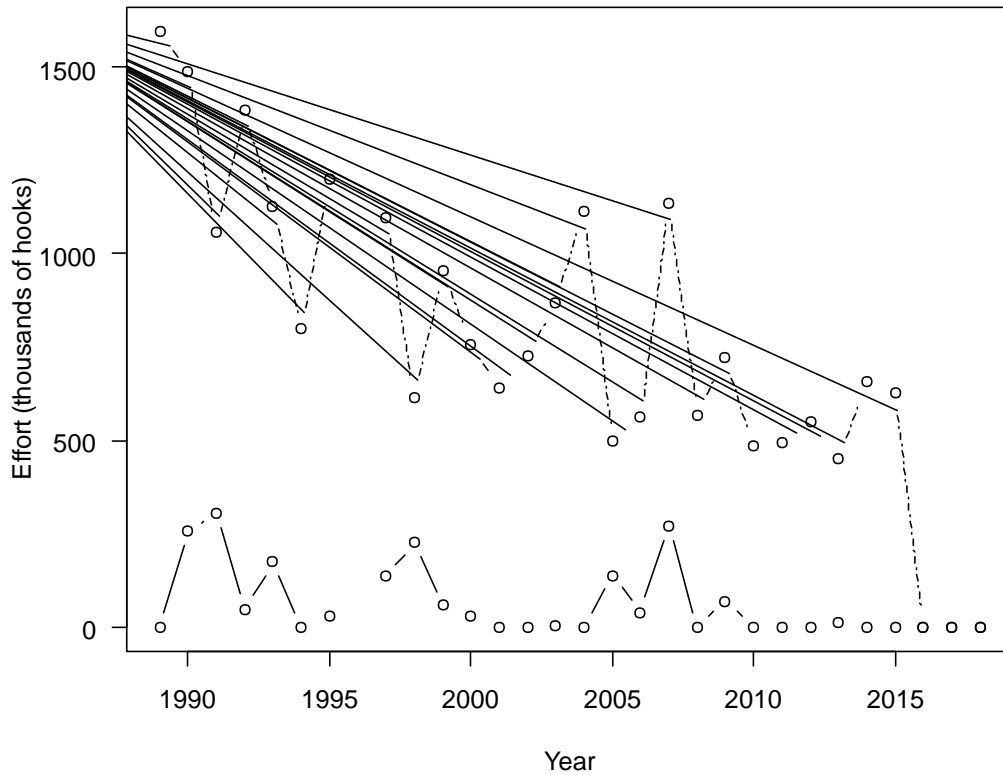
**Table 19:** Number of landed SBT reported through New Zealand sport fishing clubs for 2013-2018 calendar years.

Calendar year	2013	2014	2015	2016	2017	2018
New Zealand sport fishing clubs landed SBT (number)	0	2	1	7	266	171

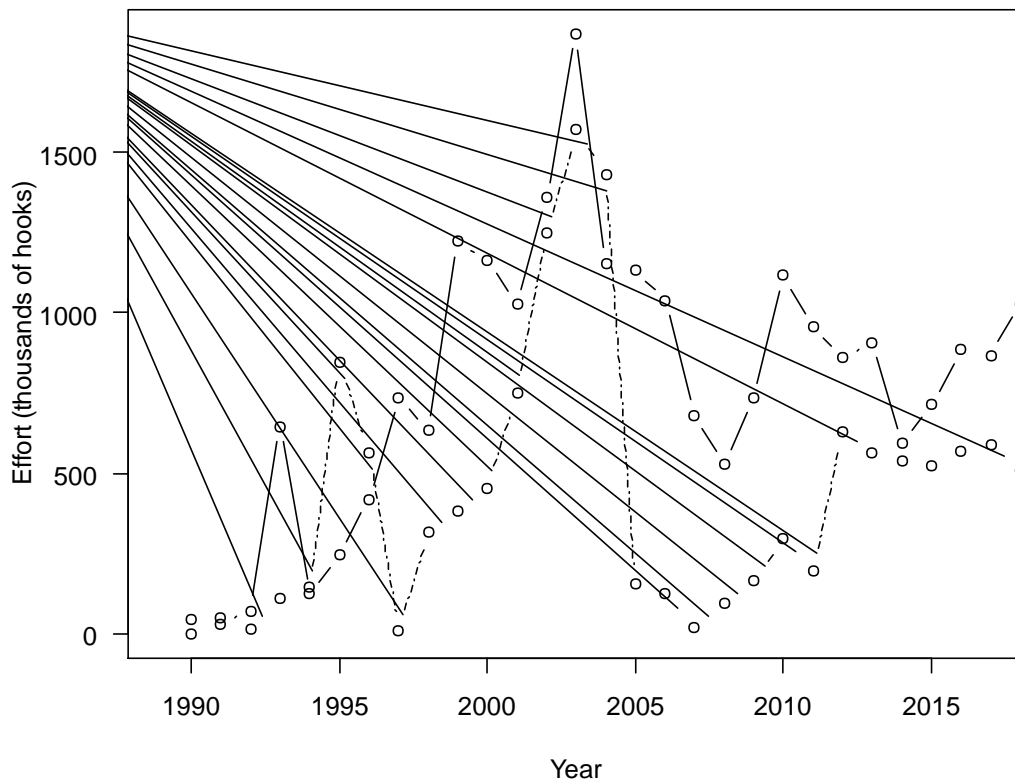
# 11 Appendix – Figures



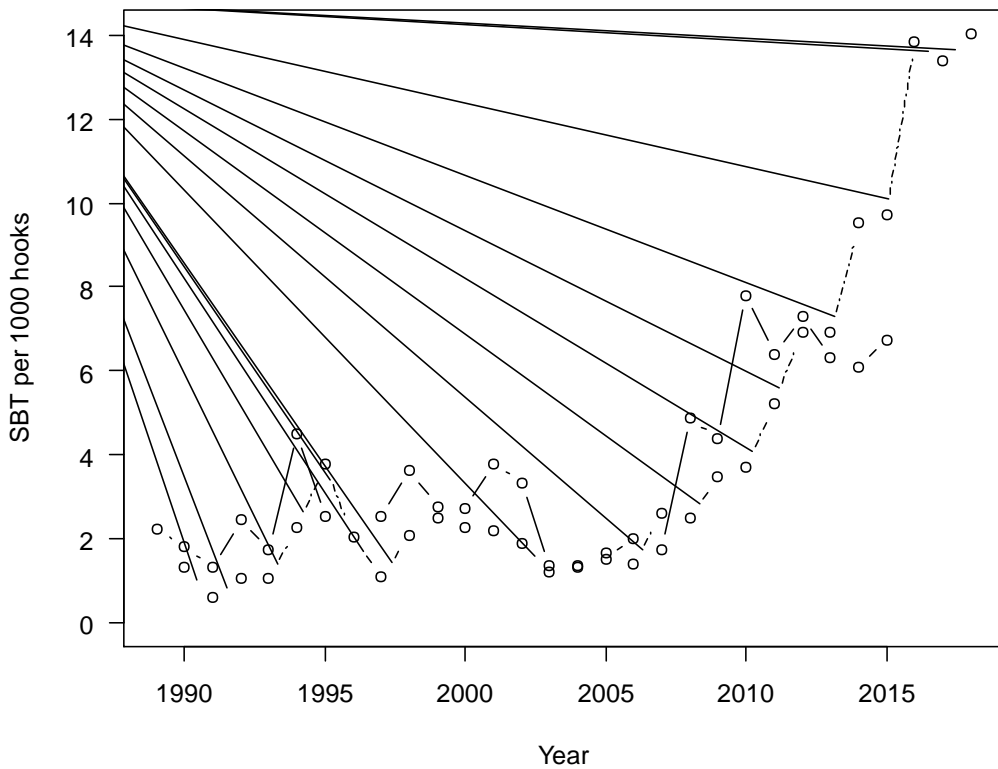
**Figure 1:** Commercial catches of SBT (tonnes, whole weight) by New Zealand fishing year. From 1998/99 to 2000/01, commercial catch information is from Licensed Fish Receivers, and from 2001/02, commercial catch information is from Monthly Harvest Returns from permit holders. The dashed horizontal line refers to the catch limit for New Zealand. From the 2007/08 fishing year, estimates of non-commercial catch and discard mortality (included as 'other') are provided.



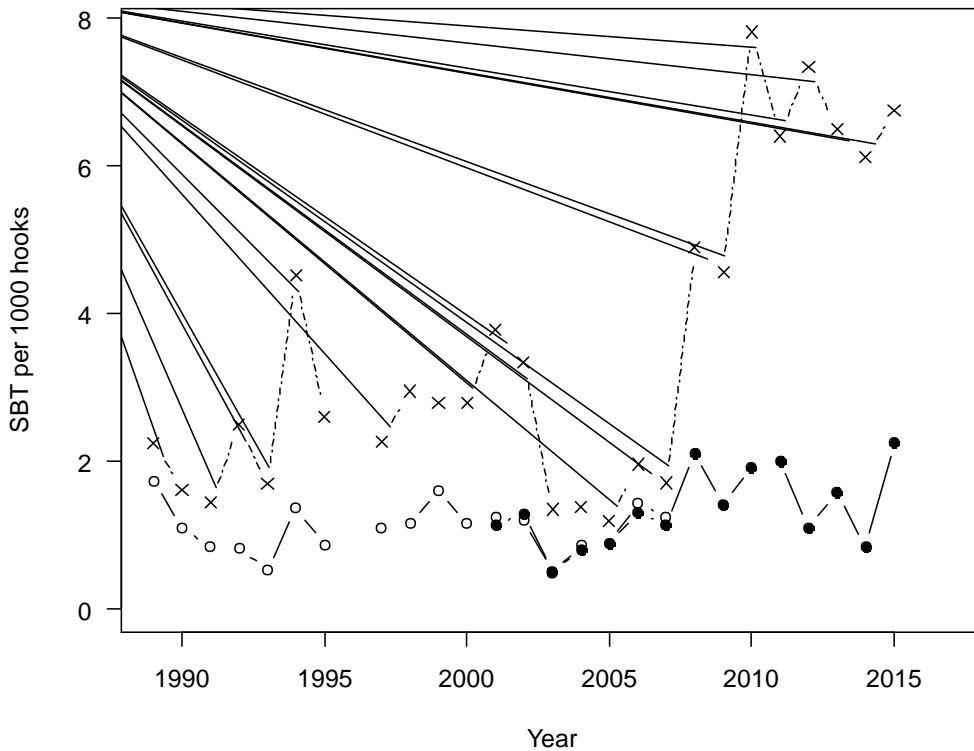
**Figure 2:** Effort (1000s of hooks) for the foreign charter fleet in Region 5 (solid line) and Region 6 (dashed line). Note that this includes some non-SBT target effort in Region 5 and that no foreign charter vessels fished in 1996, 2016, 2017, or 2018.



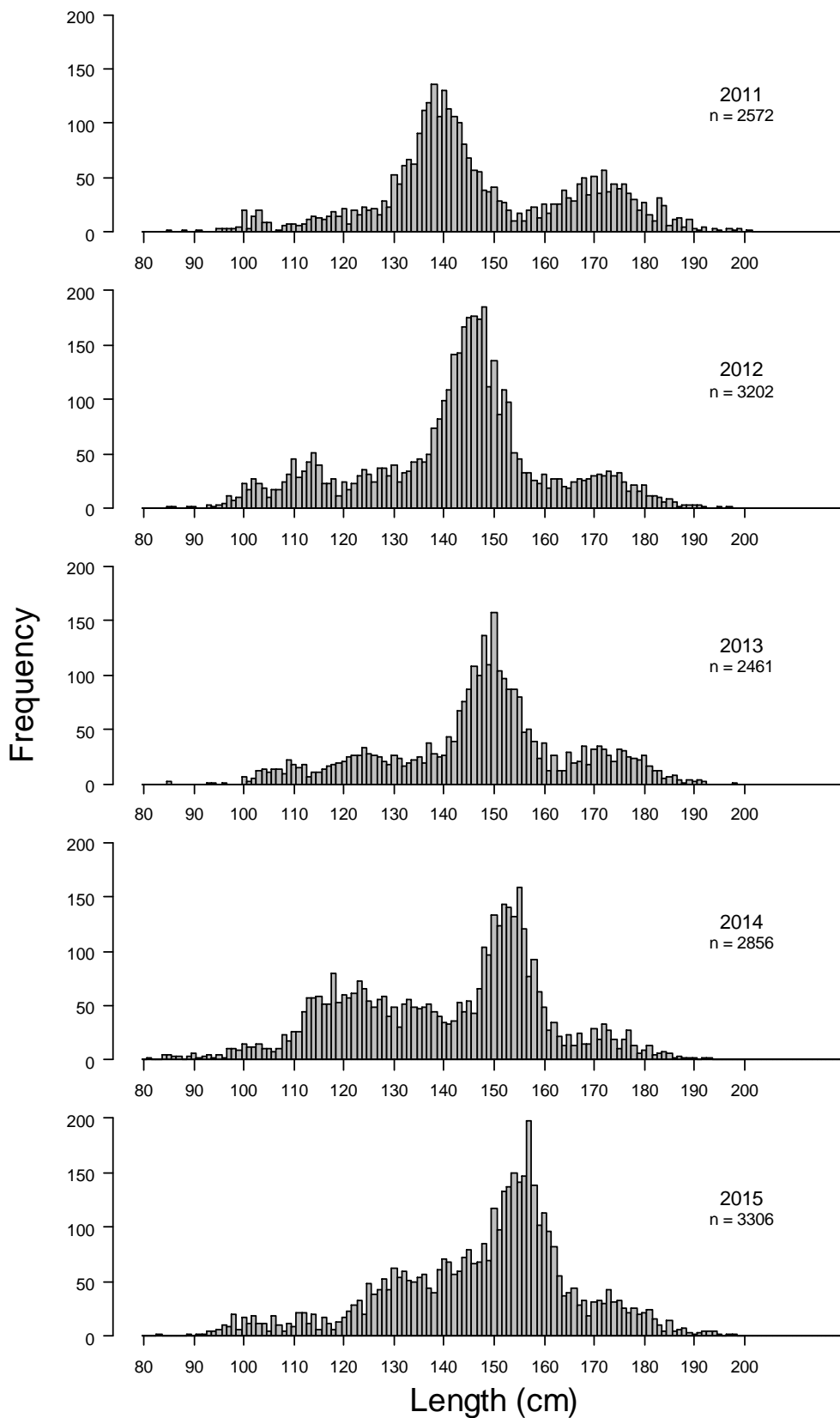
**Figure 3:** Target effort (1000s of hooks, hooks from sets that either targeted or caught SBT) by the domestic commercial fleet for Region 5 (solid line) and Region 6 (dashed line).



**Figure 4:** CPUE (number of SBT per 1000 hooks) by calendar year for the charter (solid line) and domestic (dashed line) longline fleets based only on effort from sets that either targeted or caught SBT. Note that no charter vessels fished in 1996, 2016, 2017, or 2018.



**Figure 5:** CPUE (number of SBT per 1000 hooks) from the foreign charter fleet in Region 6 (west coast South Island) for all southern bluefin tuna (dashed line) and for fish greater than 10 years of age based on approximate ageing from length frequency data (solid line, open symbols) and based on direct ageing data (solid line, solid symbols). Note that no foreign charter vessels fished in 1996, 2016, 2017, or 2018.



**Figure 6:** Length frequency of SBT catch (raised) by the foreign charter fleet for the most recent five calendar years (no foreign charter vessels fished in 2016, 2017, or 2018).



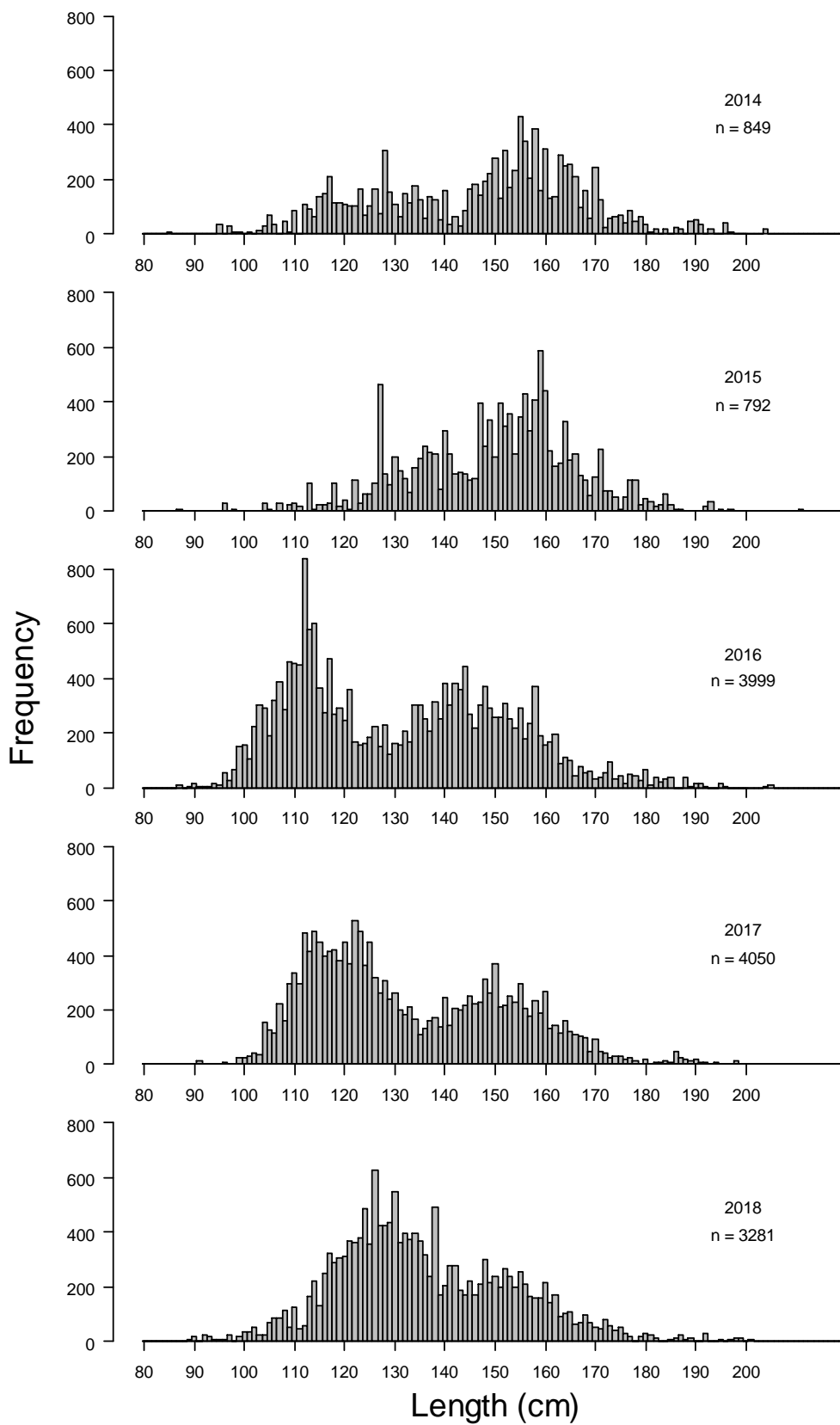
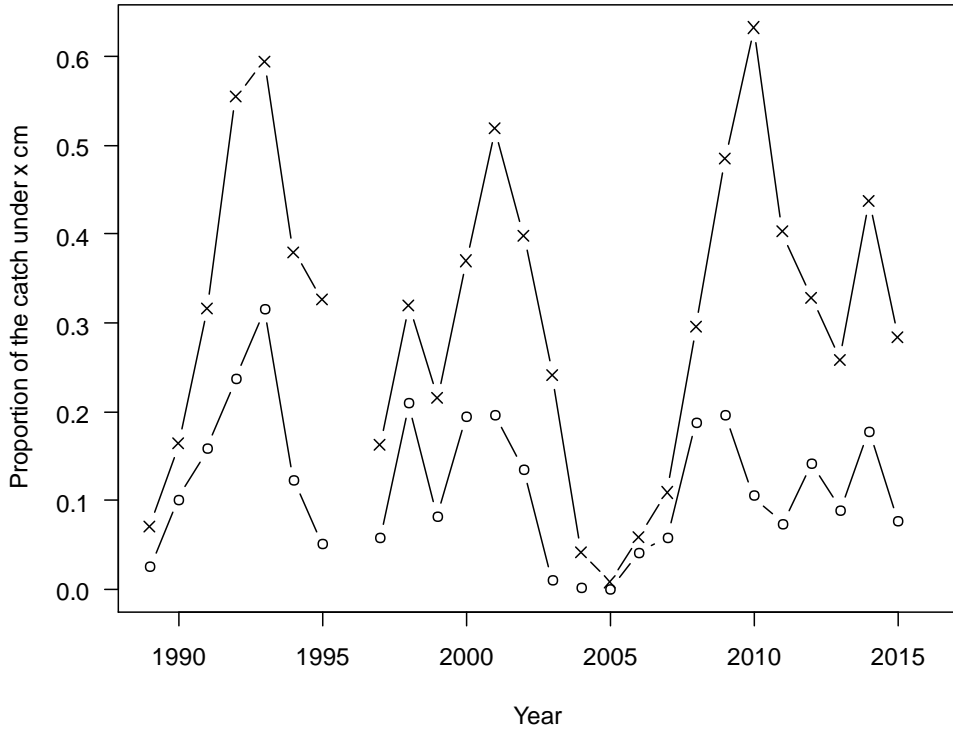
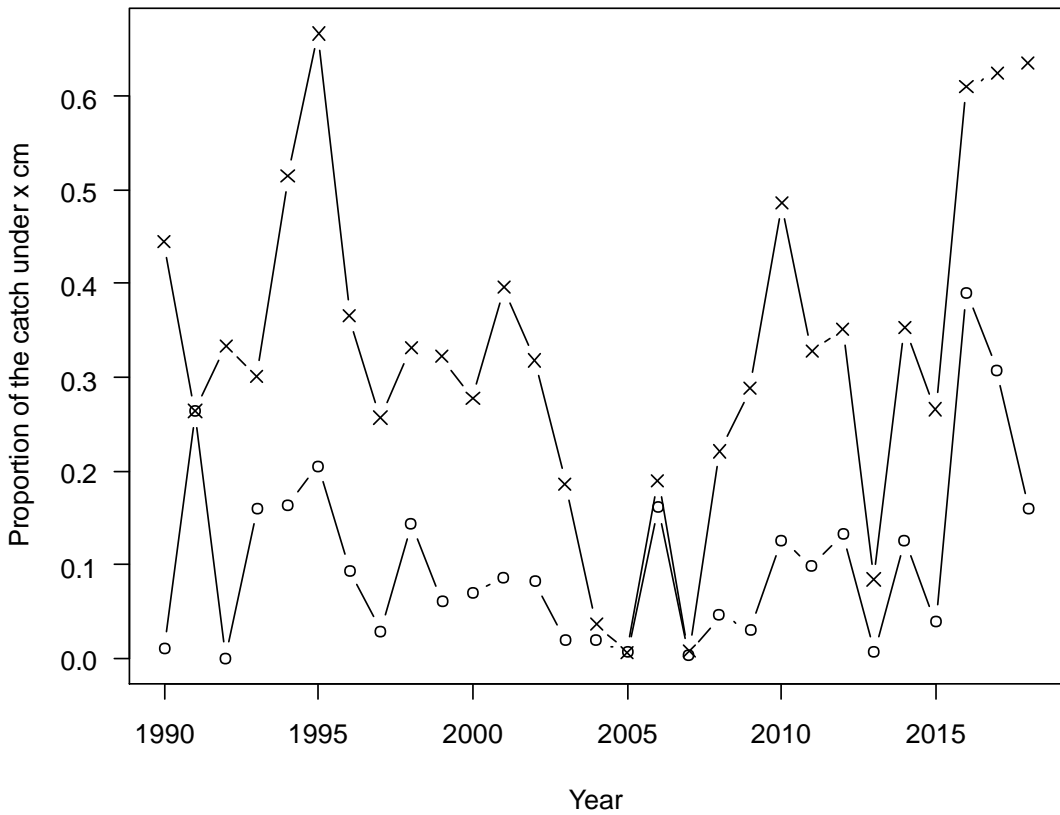


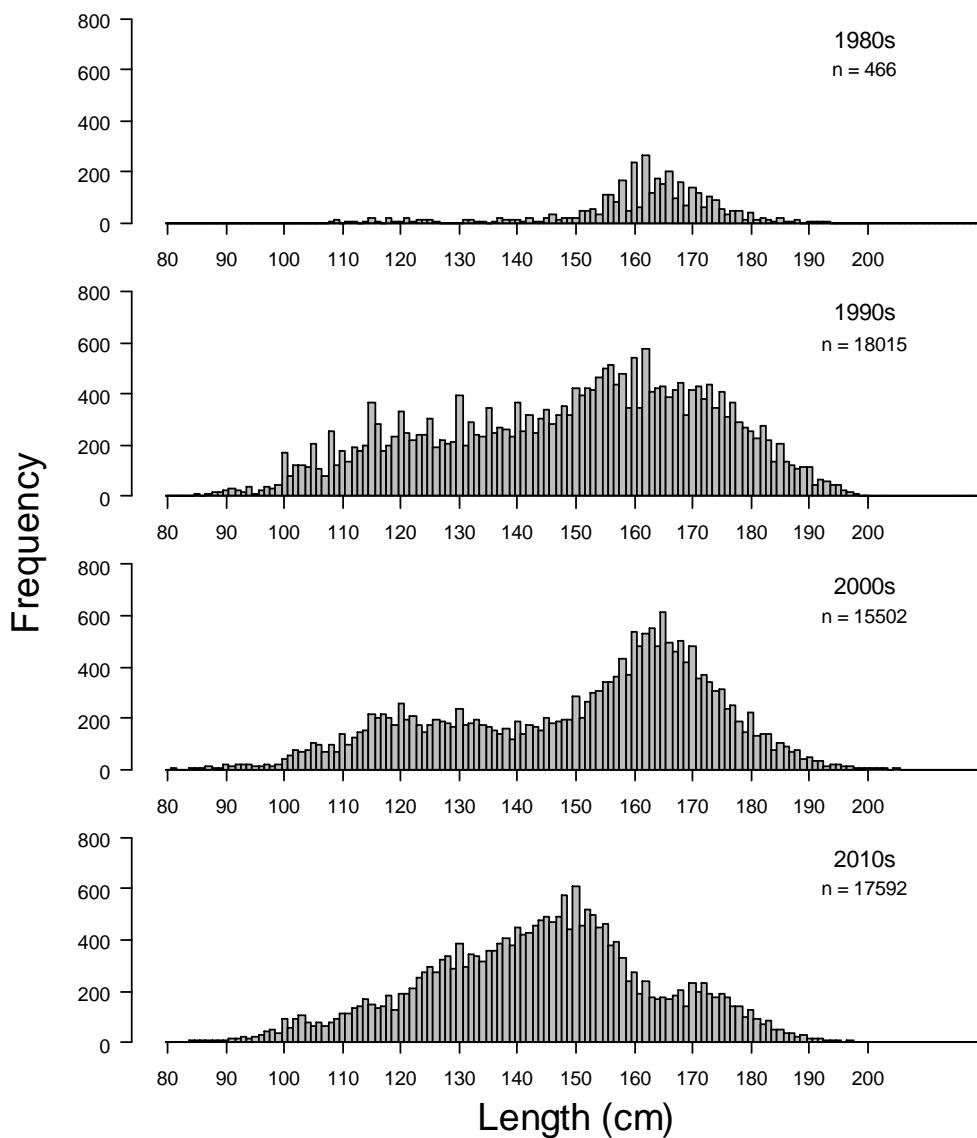
Figure 7: Length frequency of SBT catch by the domestic commercial fleet for the five most recent calendar years.



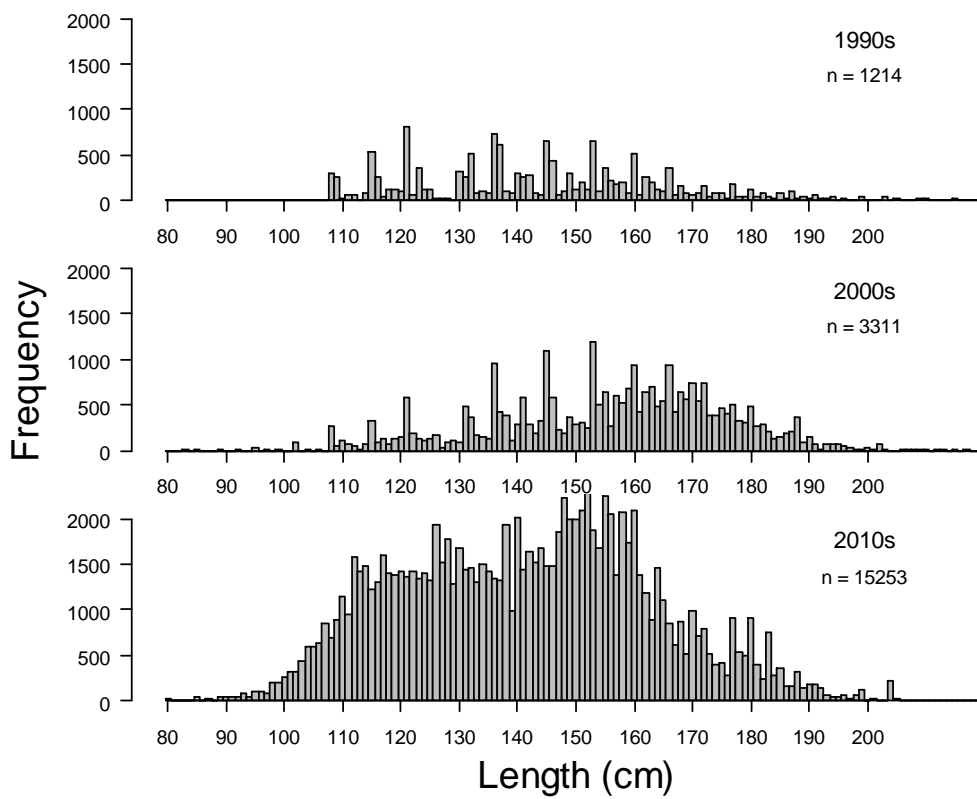
**Figure 8:** Proportion of the catch from the foreign charter fleet under 120 cm (o) and 140 cm (x) since 1989 (no foreign charter vessels fishing in 1996, 2016, 2017, or 2018).



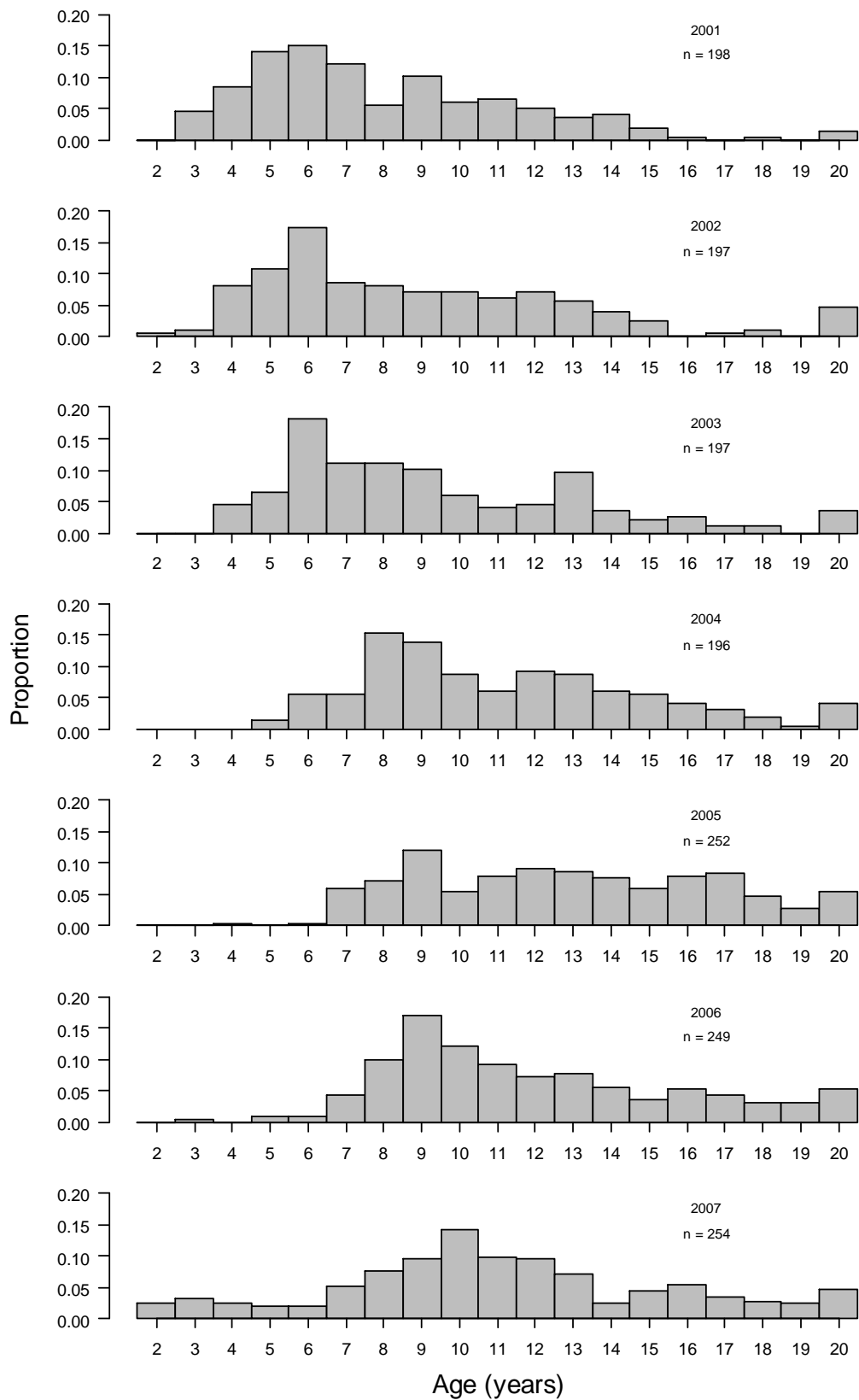
**Figure 9:** Proportion of the catch from the domestic commercial fleet under 120 cm (o) and 140 cm (x) for 1989 to 2018.



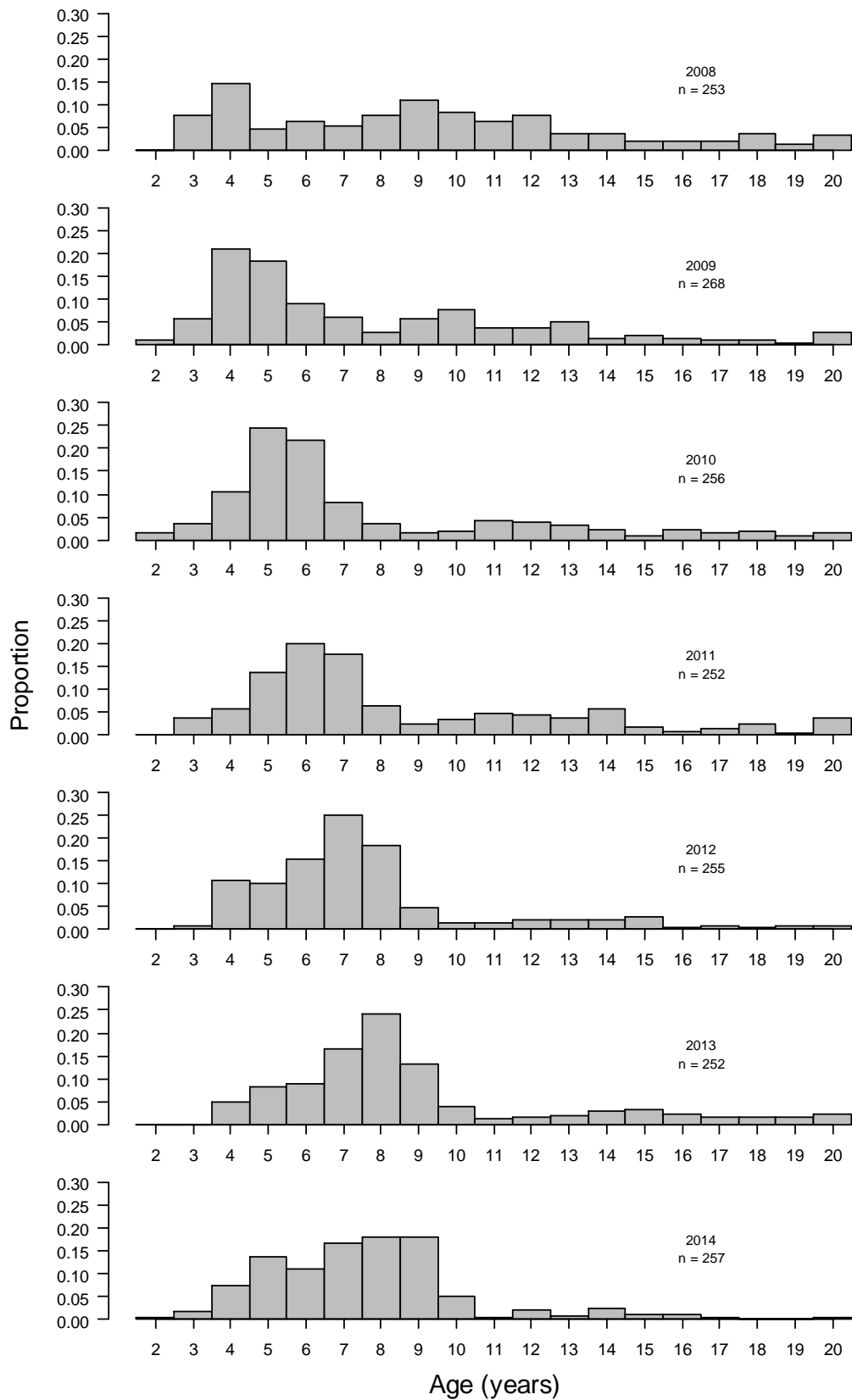
**Figure 10:** Length frequencies (raised) for the foreign charter fleet in the 10 year periods 1990-99, 2000-09, and 2010-present. (No foreign charter vessel fished in 2016, 2017, or 2018.) n= number of fish measured



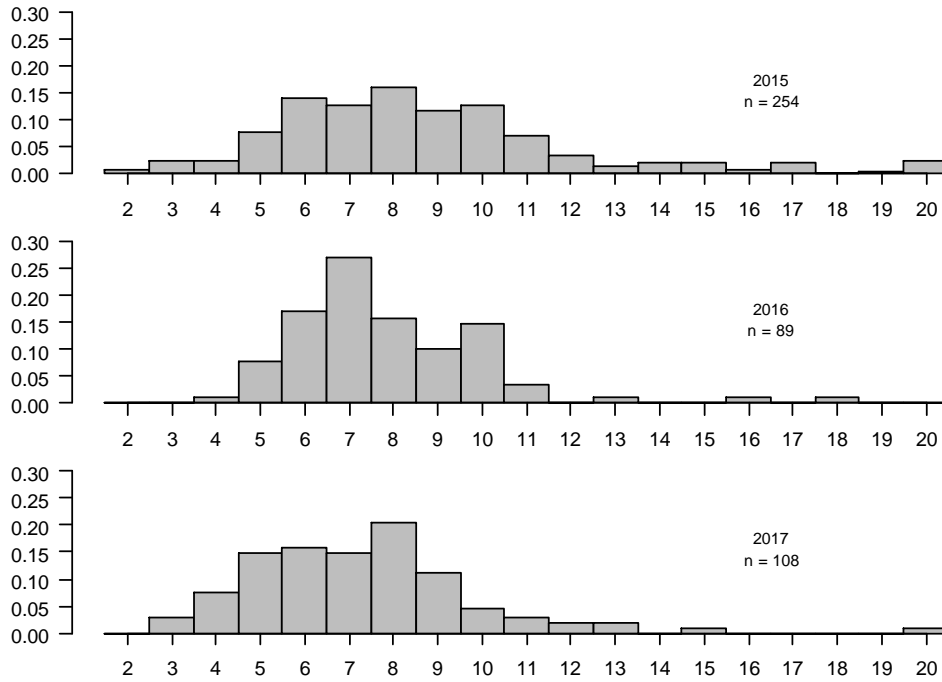
**Figure 11:** Length frequencies (raised) for the domestic commercial fleet in the 10 year periods 1990-99, 2000-09, and 2010-present n= number of fish measured



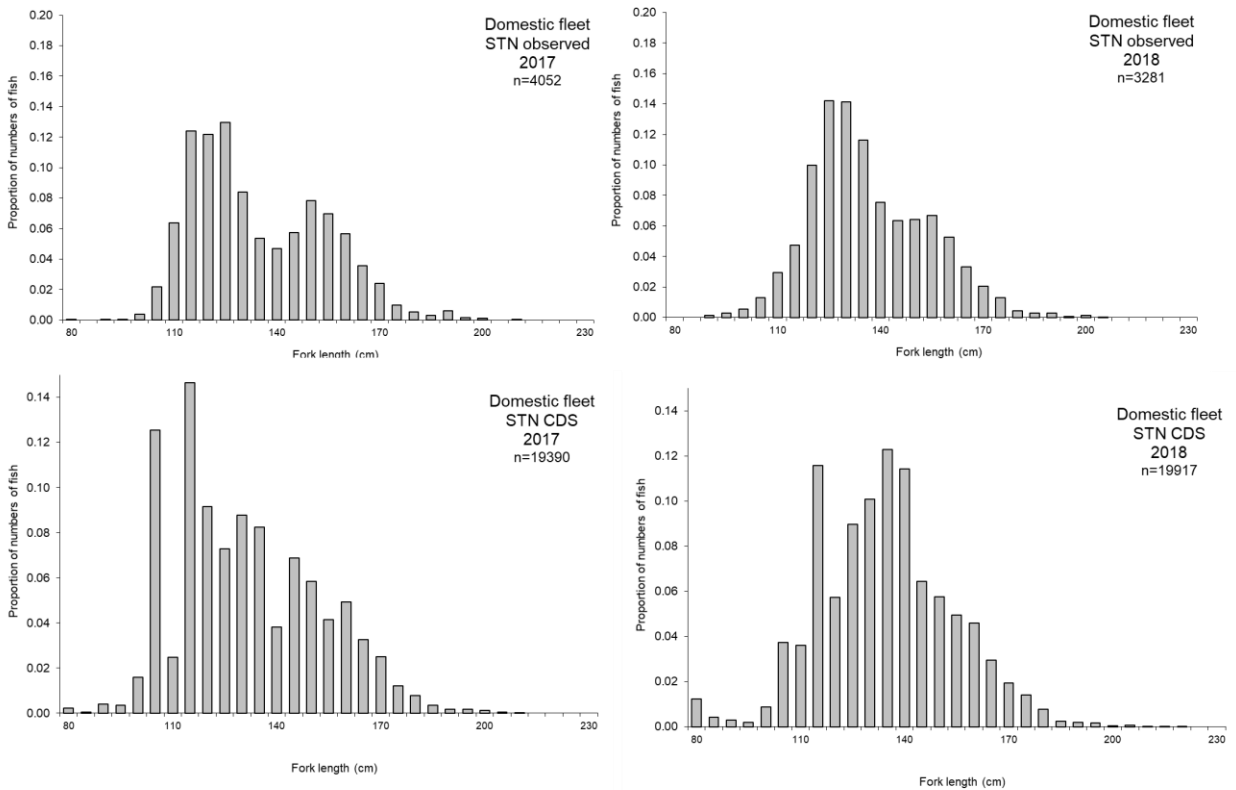
**Figure 12:** Proportion-at-age for the foreign charter fleet for 2001 to 2015, and for the domestic commercial fleet for 2016 to 2017, based on direct ageing. Age 20 is a plus group.



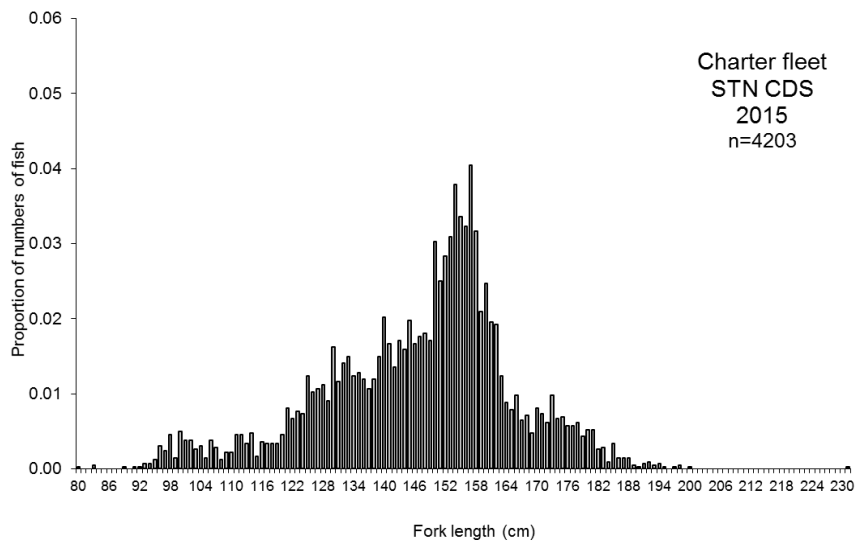
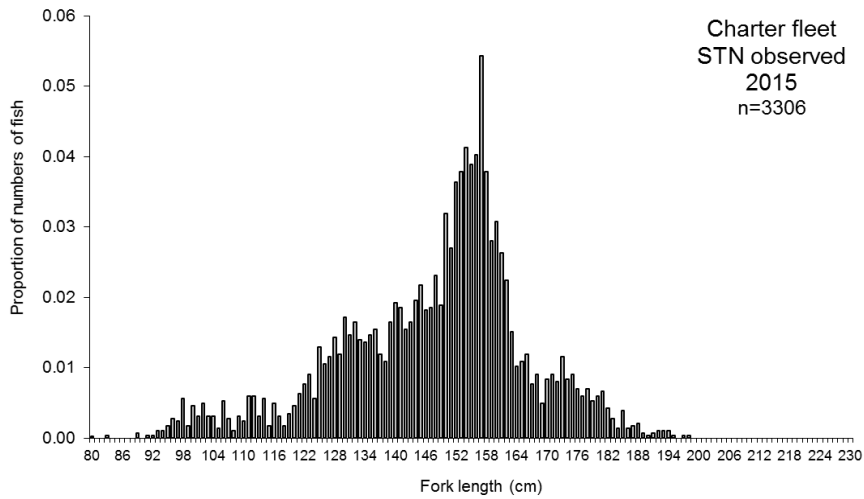
**Figure 13 (continued):** Proportion-at-age for foreign charter fleet for 2001 to 2015, and for the domestic commercial fleet for 2016 to 2017, based on direct ageing. Age 20 is a plus group.



**Figure 12 (continued):** Proportion-at-age for the foreign charter fleet for 2001 to 2015, and for the domestic commercial fleet for 2016 to 2017 based on direct ageing. Age 20 is a plus group.

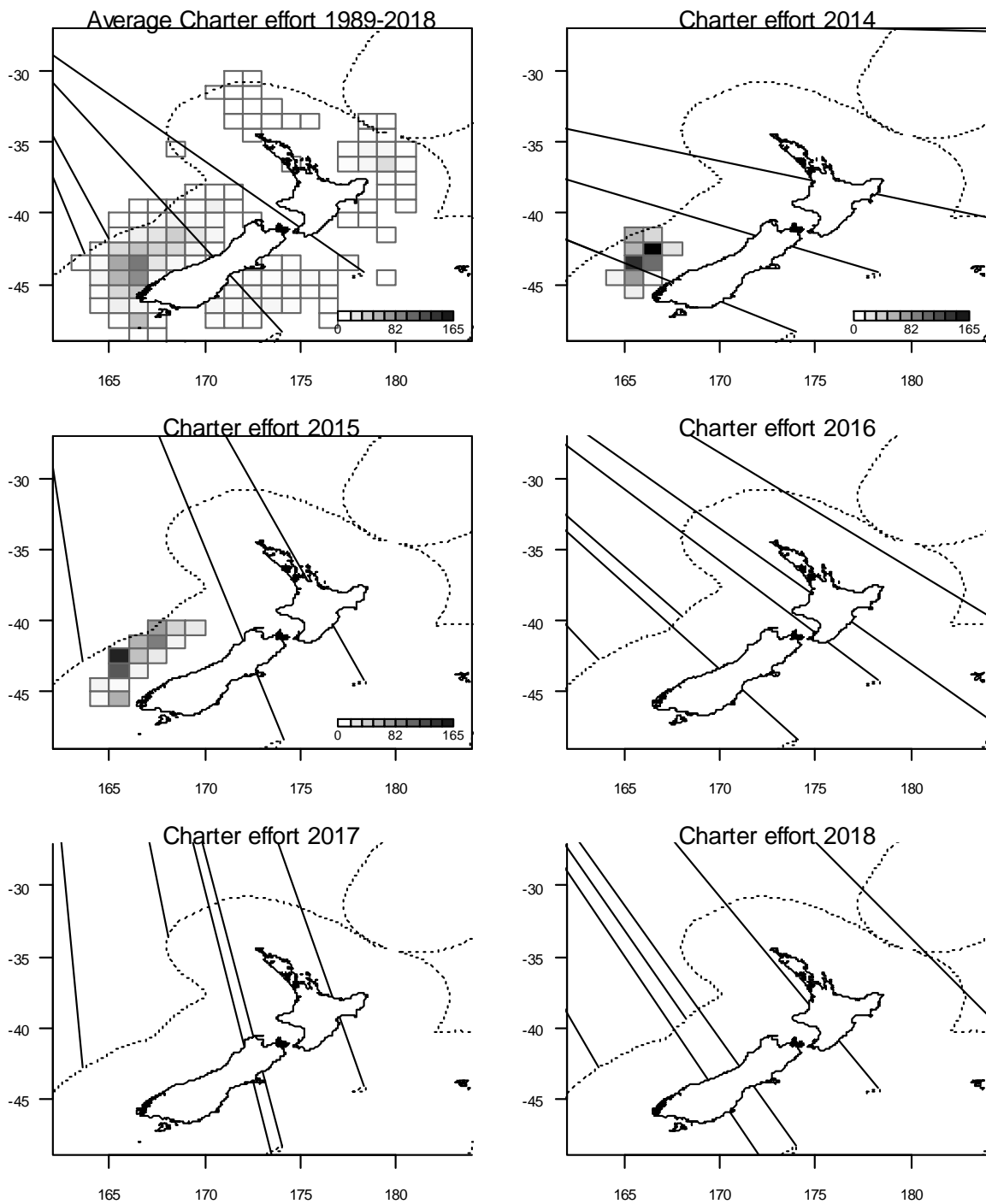


**Figure 14:** Proportion-at-length for SBT catches from 2017, and 2018 for the domestic commercial fleet measured by observers, and reported on CDS forms.

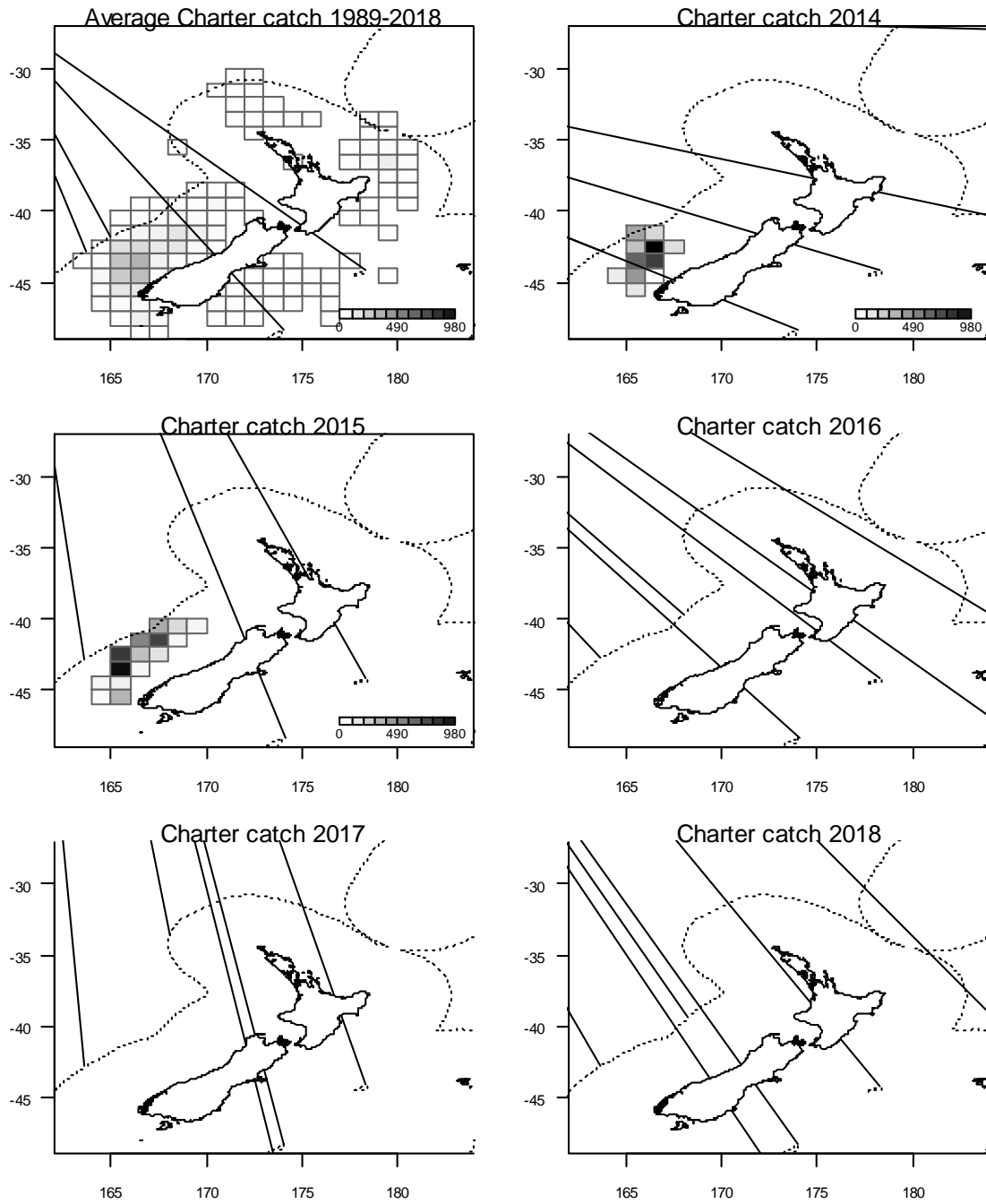


**Figure 15:** Proportion-at-length for the SBT catches from 2015 for the foreign charter fleet measured by observers, and reported on CDS forms.

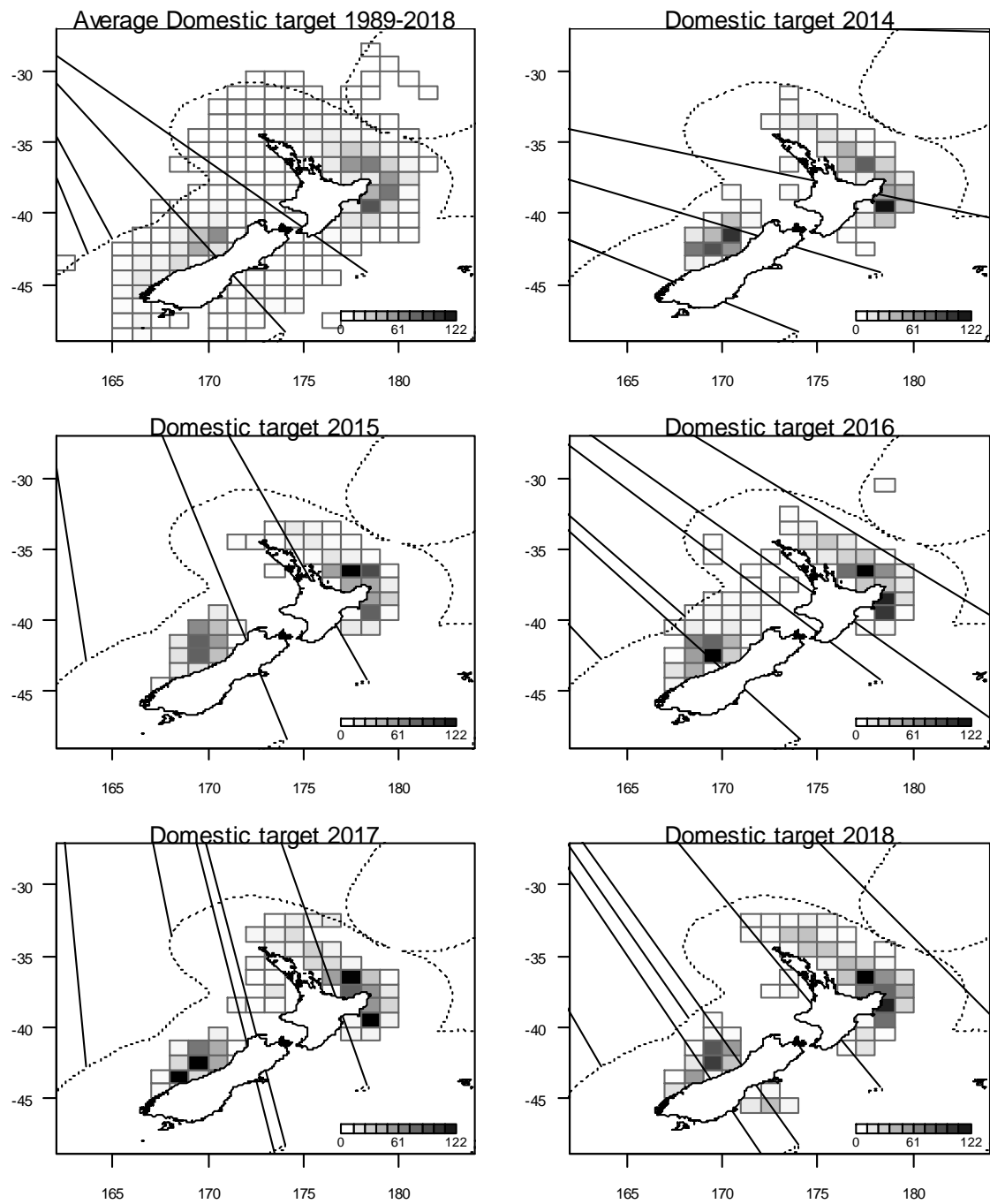




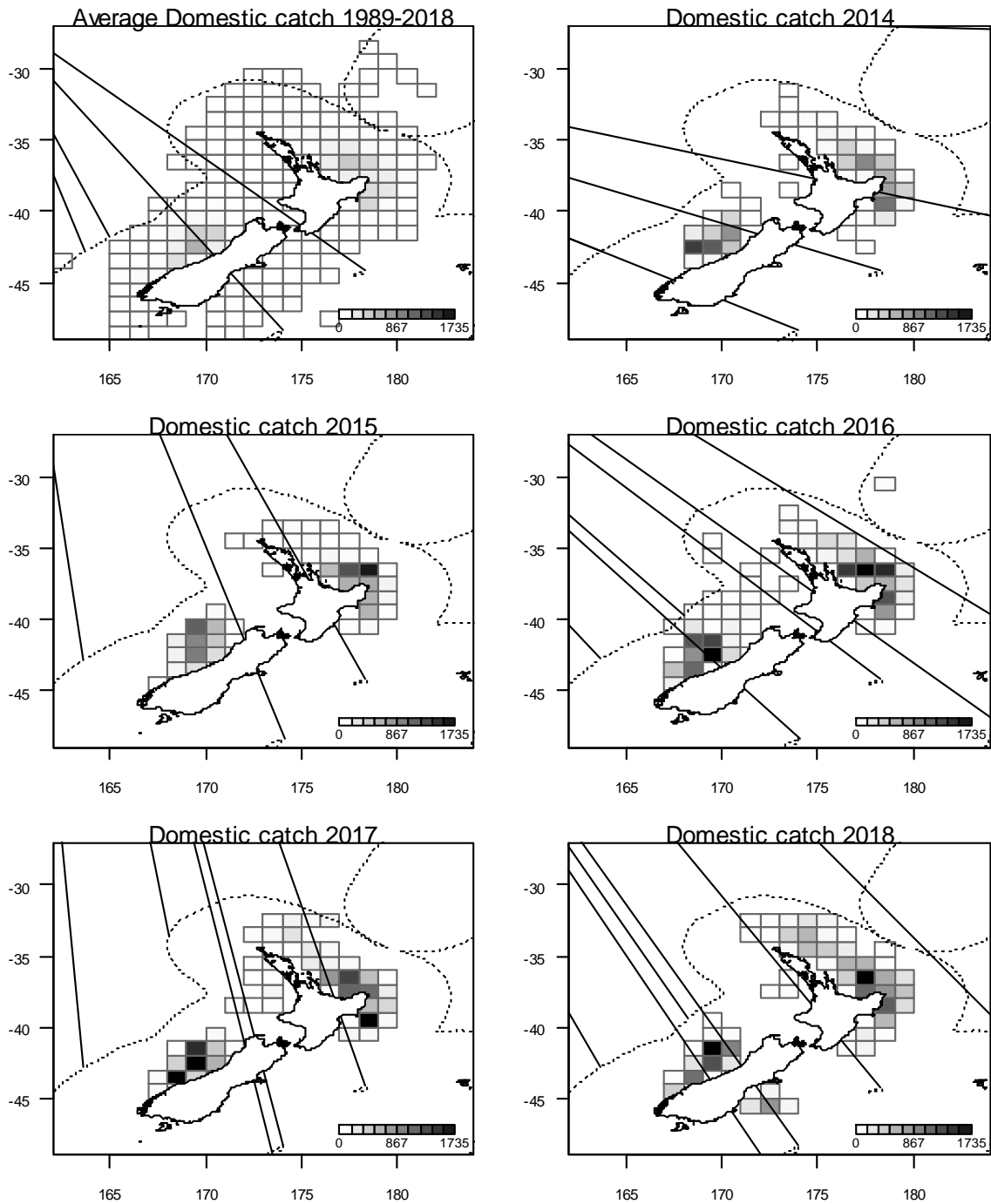
**Figure 16:** Distribution of longline effort (1,000s of hooks per one degree square) for the foreign charter fleet: average for the time series (1989 to 2018), and annually for 2014 to 2018. (No foreign charter vessels fished in 2016 to 2018.)



**Figure 17:** Distribution of longline catches (number of fish per one degree square) for the foreign charter fleet: average for the time series (1989 to 2018), and annually for 2014 to 2018. (No foreign charter vessels fishing in 2016 to 2018.)



**Figure 18:** Distribution of longline effort (1,000s of hooks per one degree square) for the domestic commercial fleet that was targeted at SBT: average for the time series (1989 to 2018), and annually for 2014 to 2018.



**Figure 19:** Distribution of longline catches (number of fish per one degree square) for the domestic commercial fleet: average for the time series (1989 to 2018), and annually for 2014 to 2018.