

CCBST-ESC/0809/SBT Fisheries - New Zealand

**Annual Review of National SBT Fisheries for the
Scientific Committee**

New Zealand

2008

Executive Summary

This report describes the New Zealand SBT fishery for the 2006/07 fishing year and also includes both historical data and some preliminary data for the 2007/08 season which is currently underway.

Since the 2004/05 fishing season New Zealand's allocation of 420 t has been allocated between commercial (413 t) and non-commercial sectors (5 t) with an allowance also made for other fishing related mortality (2 t). After two years when commercial catches were less than 300 t, commercial landings of SBT were around 379 t for the 2006/07 season. This increase is attributed to both an increase in effort and increased abundance of small fish as indicated in the CPUE and size composition data. The estimate of non-commercial SBT catch as bycatch from the recently developed Pacific bluefin tuna fishery was four tonnes and a further two tonnes was caught and released. From observer data, it is estimated that ten dead SBT were discarded during the 2006/07 season and though no size data on the discards is available, the total weight was likely less than one ton. Overall New Zealand's catch against its allocation was about 384 t ($379 + 4 + 1$) for the 2006/07 fishing season.

CPUE in 2006/07 was similar to that observed in 2005/06, an increase from the three years of very low CPUE (2002/03 to 2004/05). There has been an increase in the proportion of small fish in New Zealand catches after an absence of a few years. Preliminary size data for the 2007/08 season indicate further increases in the abundance of smaller fish.

The 10% observer catch and effort coverage levels were exceeded for both the Charter and domestic fleet in 2006/07. Two of the four Charter vessels were covered and that provided 60 % and 55 % coverage for catch (numbers) and effort (hooks) respectively. For the domestic fishery we achieved 16 % coverage of catch and 13 % coverage of effort. Observers aboard the Charter vessels collected 714 otoliths.

New Zealand has been participating in two SBT electronic tagging programmes targeting small and large SBT. For the smaller SBT, 19 implantable tags were deployed in 2007 and two of the 2006 releases were recovered from the Australian surface fishery. Fifteen larger (80 kg +) SBT were tagged with pop-off tags in 2007 and 12 tags have reported their data with a further three due to pop-off in mid-July 2008. Of particular note was the movement of one fish to the spawning ground south of Indonesia. There are currently no plans to continue these programmes at this time, but New Zealand welcomes the opportunity to collaborate with other members on the analysis of these and other tagging data.

1 Introduction

Historically both adult and juvenile southern bluefin tuna (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 – with several tonnes taken in pole and line and troll fisheries. From the late 1970s and early 1980s, a concerted effort to develop a domestic fishery to service the Japanese market was undertaken. By 1982 the handline fishery was established with the catch frozen onboard a former Japanese longline vessel. The handline fishery continued, albeit at a reduced level, following the record 1982 season (305 tonnes landed) into the early 1990s when longlining became the dominant fishing method for SBT.

SBT has never been the focus of a large non-commercial fishery, it is occasionally targeted in some places and is now taken as a bycatch in the newly developed fishery for Pacific bluefin tuna (*Thunnus orientalis*).

The New Zealand SBT fishery has been constrained by a national catch limit of 420 tonnes per year since 1989. During the few occasions when New Zealand exceeded its catch limit, the subsequent year's catch limit has been reduced to adjust for the over-catch (Figure 1; Table 1).

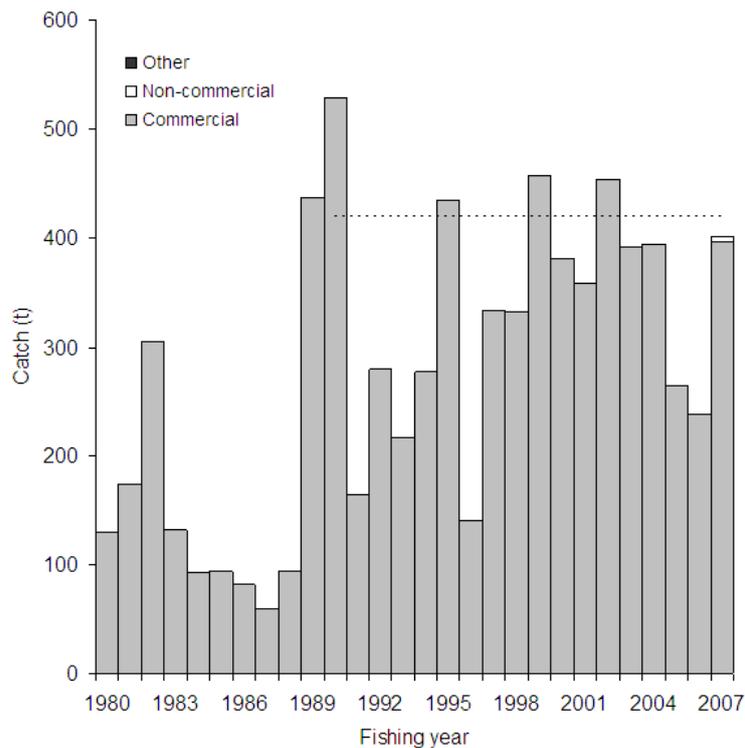


Figure 1: Commercial catches of southern bluefin tuna (tonnes whole weight) by New Zealand fishing year (1 October to 30 September). Annual total catch is from Licensed Fish Receiver returns for 1998/99 to 2000/01, and from Monthly Harvest Returns from permit holders since 2001/02. The dashed horizontal line refers to the limit of 420 t that has been in place since 1989. For the 2006/07 fishing year, estimates of non-commercial catch, and discard mortality are included

All but a few tonnes of the domestic SBT catch is now taken by longline, and SBT catches are chiefly off the southwest coast of the South Island (WCSI) and off the east coast of the North Island (ECNI) from April to July. Longlining off the WCSI is almost entirely targeted at SBT.

The fleet operating off the southwest coast is primarily composed of the larger –60° freezer vessels of the Charter fleet. The generally heavier weather conditions off the WCSI compared to the ECNI means that few of the smaller domestic owned and operated vessels operate in this area.

The longline fishery off the ECNI is dominated by smaller domestically owned and operated “ice boats” that are typically at sea for only a few days, and includes landings of SBT both as a target and as a bycatch of bigeye target sets.

SBT was introduced into the Quota Management System (QMS) from 1 October 2004 with a Total Allowable Commercial Catch (TACC) of 413 t, the remainder of New Zealand’s TAC of 420 t being allocated to recreational (four tonnes) and customary non-commercial fishers (one tonne), and other sources of fishing-related mortality (two tonnes). The introduction to the QMS has seen a change from the “Olympic” race for fish seen in previous years. This introduction has been associated with a consolidation of the fleet.

The 2005/06 fishing season resulted in the lowest NZ catch in 10 years (238 t). This was attributed to two main factors: the absence of new recruitment into the NZ longline fishery leading to decreased vulnerable biomass (as illustrated in the continued period of low CPUE in the Charter fleet); and the decline in longline effort from the domestic fleet and Charter fleets. There has been a subsequent recovery with 379 t taken in 2006/07.

2 Catch and Effort

Catches for the Charter fleet by calendar year and CCSBT Region are provided in Table 2 and effort is provided in Figure 2 and Table 3. Most catch and effort occurs in Region 6 which covers the west coast of the South Island (WCSI) fishing grounds. Over the period 2001-2004 there was no targeting of SBT (and no catches of SBT) by the Charter fleet in Region 5 which covers the east coasts North Island (ECNI) fishing grounds. During 2005/06 and 2006/07 there were some Charter vessels operating in the later part of the season in Region 5.

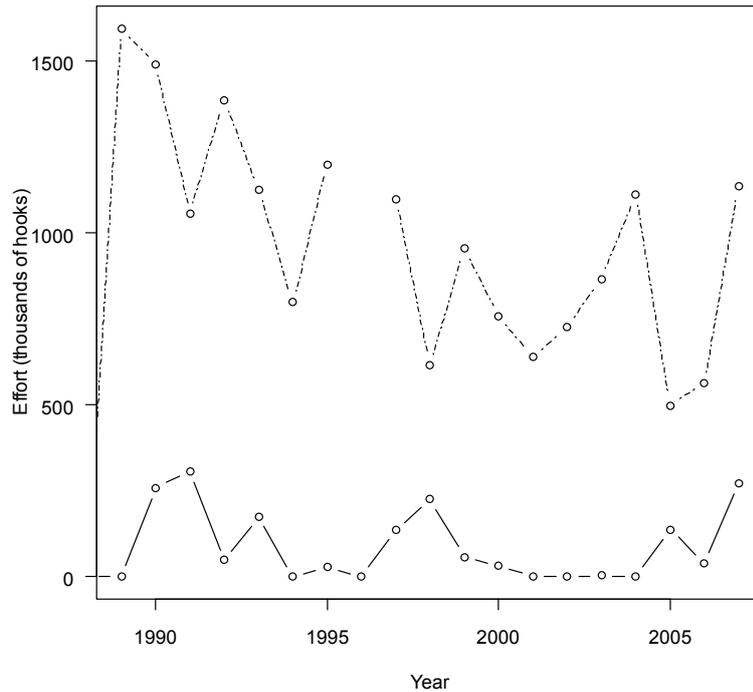


Figure 2: Effort (thousands of hooks) for the Charter fleet in Region 5 (solid line – east coast North Island) and Region 6 (dashed line – west coast South Island). Note that this includes some non-SBT target effort in Region 5 and that no Charter vessels fished in 1996.

Catches for the domestic fleet by calendar year and CCSBT Region are provided in Table 4 and SBT target effort is provided in Table 5. There is a significant longline fishery that operates outside the SBT fishing season. It is important to separate these data out to better understand the New Zealand SBT fishery. For catches, the importance of the two Regions has varied since 1995. While target effort increased dramatically in both Regions from 1995 to 2003, it has decreased since then, particularly in Region 6.

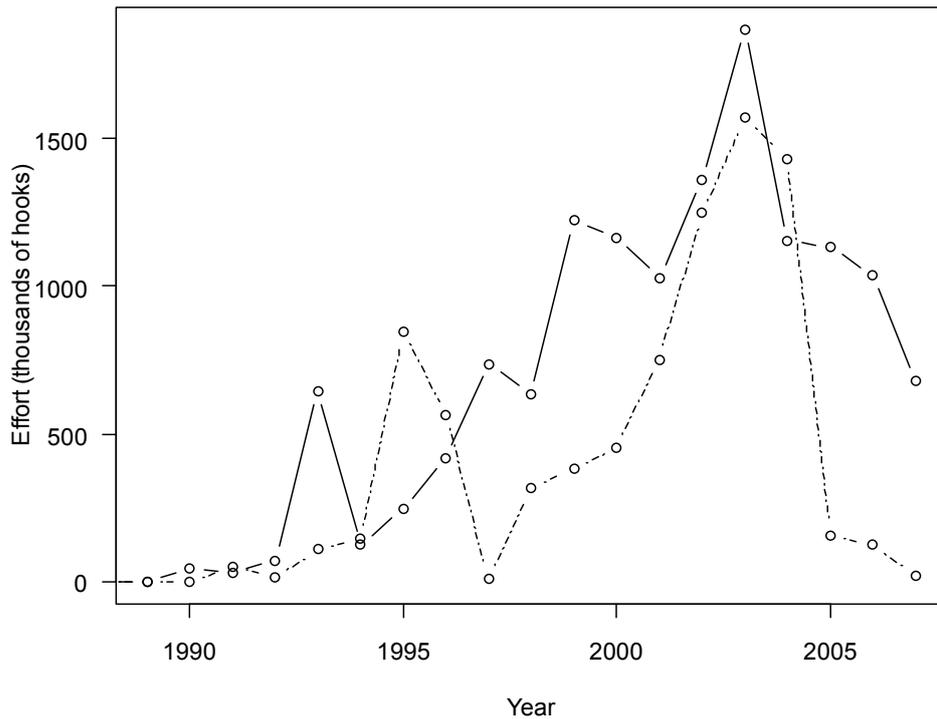


Figure 3: Target effort (hooks from sets that either targeted or caught SBT – thousands of hooks) by the domestic fleet for Region 5 (solid line – east coast North Island) and Region 6 (dashed line – west coast South Island).

3 Nominal CPUE

Nominal CPUE was calculated by fleet, year, and CCSBT Region. For the domestic fleet, CPUE was calculated for effort from sets that either caught or targeted SBT (referred to as target effort). It is noted that due to the large changes in the structure of the domestic fleet and the nature of the “Olympic system” which the NZ fishery operated under prior to 2004, the trends in the CPUE for the domestic fishery are not thought to provide reliable information on trends in vulnerable biomass. Notwithstanding this, with a reduced fleet now operating in this fishery we will continue to assess the utility of developing a CPUE series for this fleet.

Nominal CPUE by fleet across all Regions based on targeted longline effort is provided in Figure 4. Charter CPUE averaged around three SBT per 1000 hooks over 1997-2002. Associated with the lack of new recruitment (Section 4), CPUE declined dramatically in 2003 and stayed at these historically low levels for three consecutive years until a slight increase in 2006 for the Charter fleet. Figure 5 indicates that this increase occurred in the core area of their fishery (e.g. Region 6) and may be due to the appearance of some small recruits. The domestic fleet operating in area 5 have experienced a similar increase in 2007.

Nominal CPUE was also 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 the proportional ageing of observer lengths and on the smaller dataset of SBT that were directly aged. The series are compared in Figure 6 and agree closely with each other in describing no overall trend over the available time series but that CPUE varies around one SBT per 1000 hooks with an historical low point in 2003.

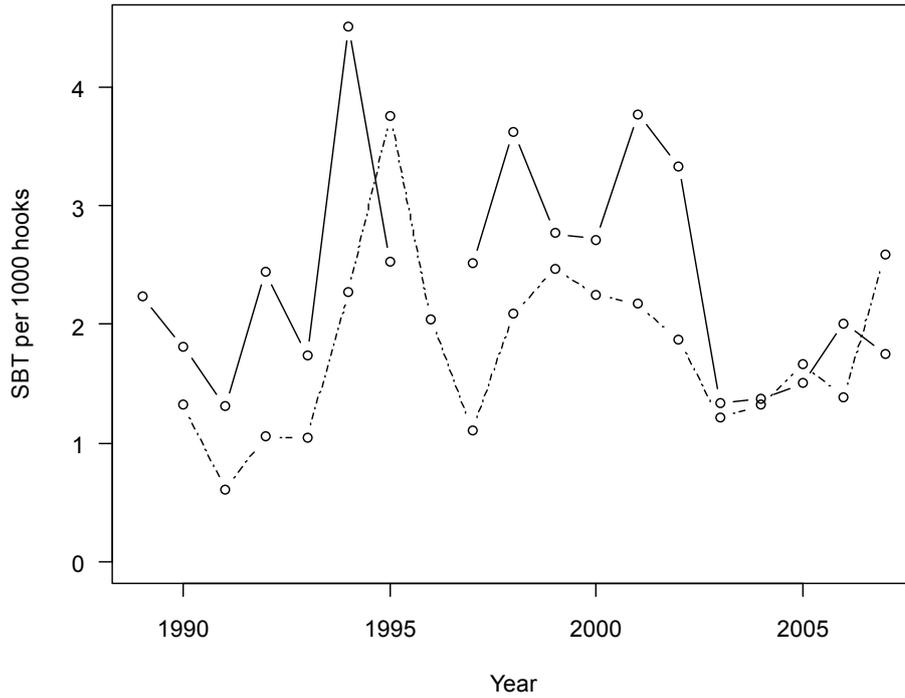


Figure 4: Catch per unit effort (number of SBT per thousand hooks) by calendar year for the Charter (solid line) and domestic (dashed line) longline fleets based only on effort from sets that either targeted or caught southern bluefin tuna.

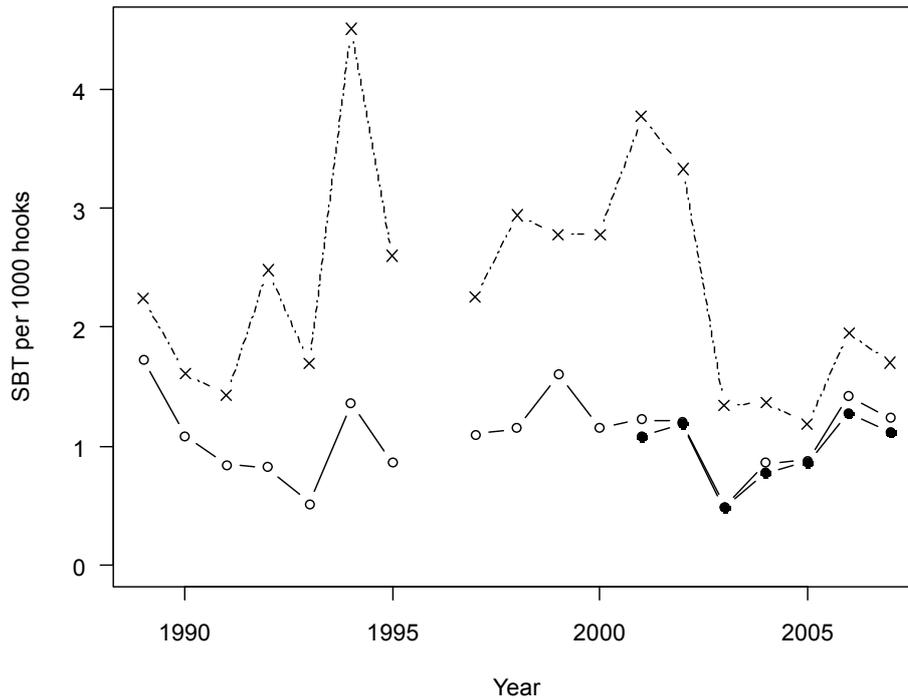


Figure 5: Catch per unit effort (number of SBT per thousand hooks) from the Charter fleet in Region 6 (west coast South Island) for all southern bluefin tuna (dashed line) and for fish greater than 10 years of age based on proportional ageing data (solid line, open symbols) and based on direct ageing data (solid line, solid symbols).

4 Size composition

For fish length we consider data collected from 1989 to 2008. The data collected in 2008 is preliminary, but does represent sampling from three of the four Charter vessels¹. Further direct ageing has also been undertaken, and the data are presented here (see report from SC 10 for discussion of issues relating to New Zealand direct ageing data).

4.1.1 Size composition data

As noted at SC10 and SC11, there was a very clear reduction in the range of sizes of SBT taken in the New Zealand fishery between 2001 and 2006. There is evidence of the growth (progression of modes) over this period, but little evidence of recruitment of smaller fish to the New Zealand fishery. New data suggests a change in this trend, with fish from a wide range of smaller sizes appearing in 2006 through 2008 (Figure 6).

Due to lower levels of observer coverage historically in the domestic fishery, size composition data are not as well estimated for that fleet. Nevertheless, size composition data for the domestic fleet (based on observer reports) are provided in Figure 7 and show similar patterns to that observed in the Charter fleet.

An examination of the proportion of the Charter fleet catch under a given size since 1989 (Table 6; Figure 8) indicates that fish under 140 cm generally represent over 25% of the catch from the Charter fleet, but were 10% or less for the three years between 2004 and 2006. Overall, the proportions do fluctuate in a way consistent with periods of above and below average recruitment (e.g. two to three year cycles).

4.1.2 Proportional ageing data

The lack of small fish reflected in the length data corresponds to a series of weak (or absent) cohorts in the proportional ageing data (Figure 9). The data suggests at least four consecutive extremely weak year classes during 1999 to 2002. While there is a scattering of 2 and 3 year old fish in 2006 and 2007 (Figure 9), the abundance of these juveniles is still much weaker than seen historically (e.g. see relative abundance of three year olds in 2001).

4.1.3 Direct ageing data

At SC10 New Zealand provided proportions at age determined from direct ageing of fish caught by the Charter fleet for the years 2001 to 2004. It was noted that there were technical difficulties associated with assigning ages to fish taken in the middle of the year and these have not yet been overcome (see discussion in SC-10 report). These difficulties were particularly important for the younger fish in the samples and did not appear to have an impact for older fish (e.g. over 10 years).

While the issues have yet to be resolved, a further three years (2005 to 2007) of samples have been aged and the data are provided here (Figure 10). It is noted that the direct ageing showed considerably fewer 'plus group' fish than were estimated from proportional ageing. Direct ageing data have also been used to calculate the annual catch rates for SBT that are greater than 10 years of age (spawning age fish) (Figure 5).

¹ For one vessel observers measured the fish, while for the other two fishers measured the first 15 fish caught on each set.

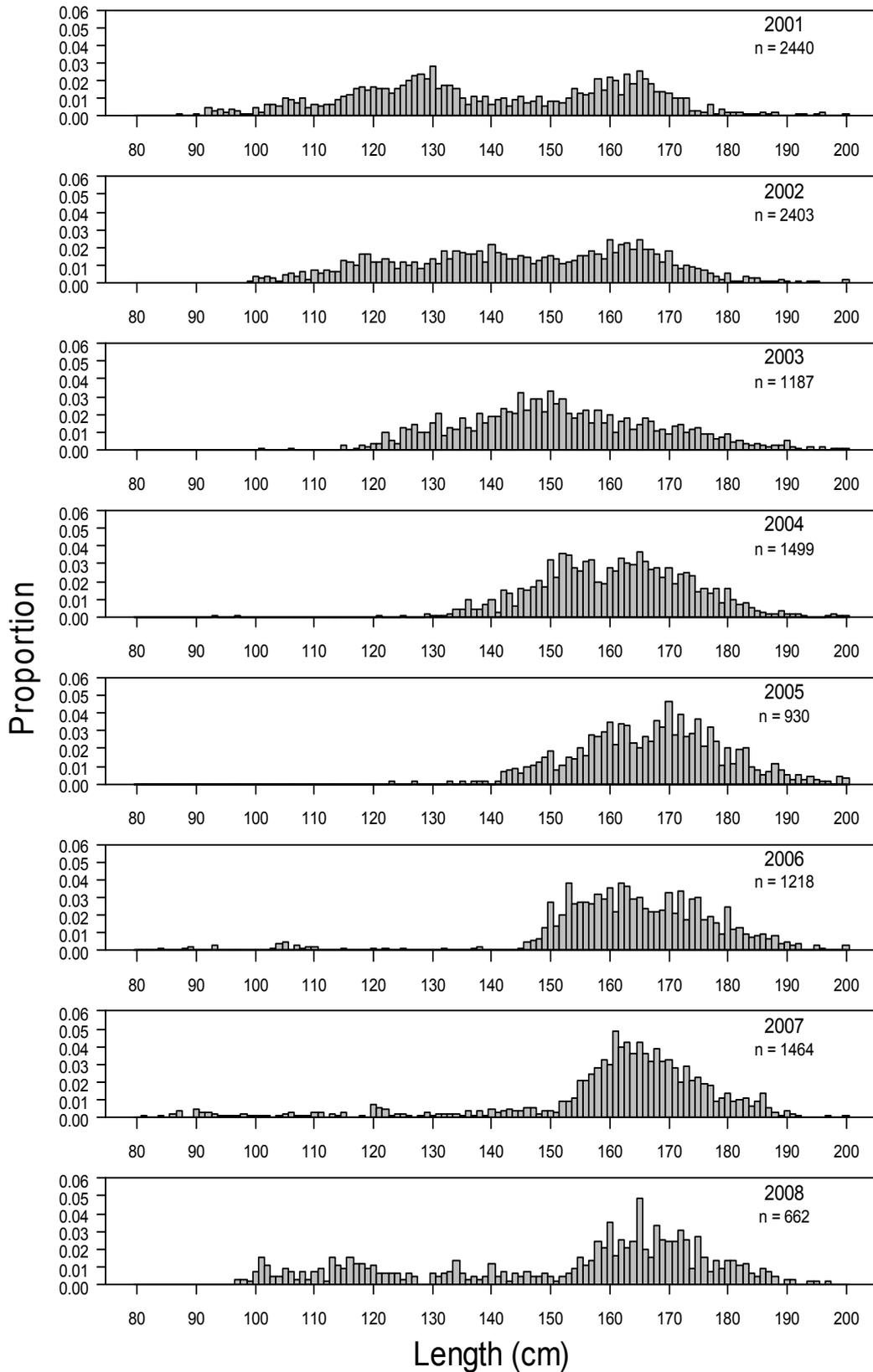


Figure 6: Proportion at length for the Charter fleet for 2001 to 2008. Note the data for 2008 are preliminary.

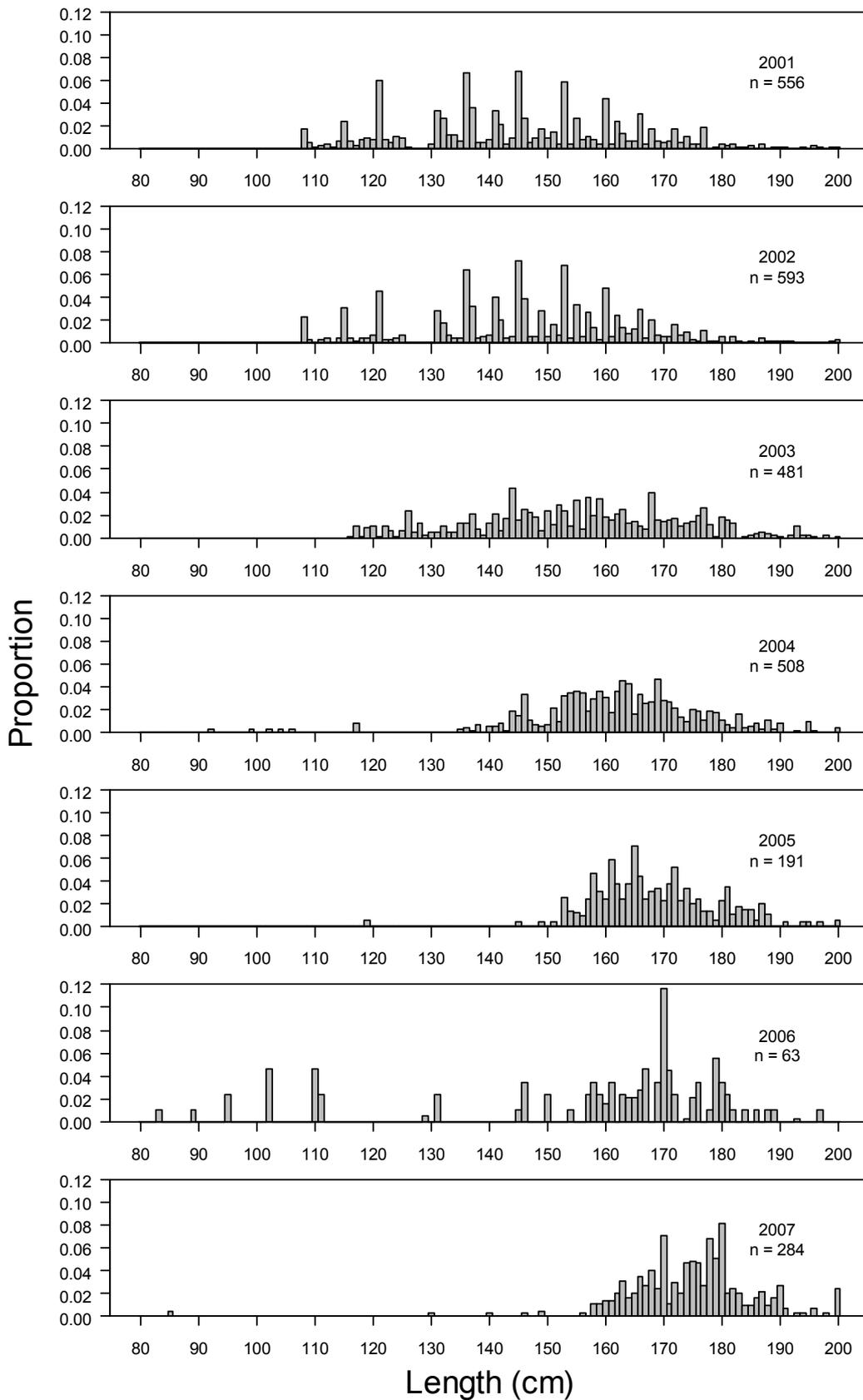


Figure 7: Proportion at length for the domestic fleet for 2001 to 2007.

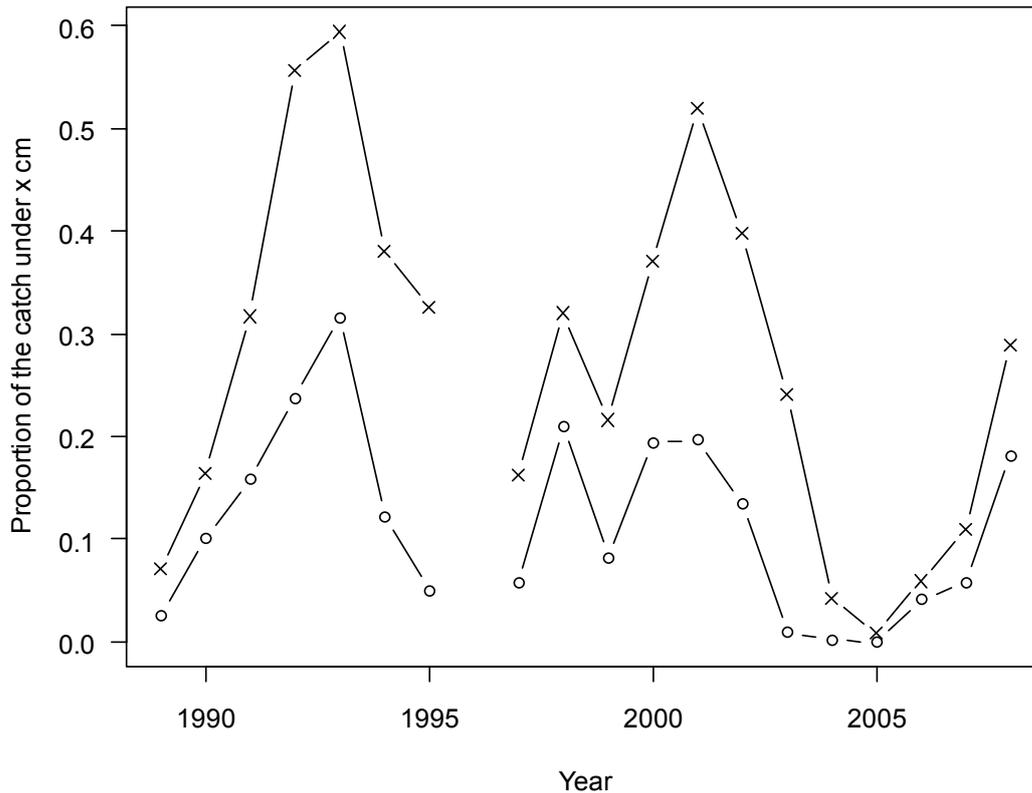


Figure 8: Proportion of the catch from the Charter fleet under 120 cm (o) and 140 cm (x) for 1989 to 2008. Note the data for 2008 are preliminary.

5 Fleet size and distribution

The number of vessels fishing by surface longline peaked in 2002 and has since declined to only 44 vessels in 2007 (Table 7). In 2005 and 2006 only two Charter vessels fished for SBT in New Zealand fisheries waters, but in 2007 this increased again to four.

The spatial distribution of fishing effort and SBT catches from the Charter fleet are provided in Figures 11 and 12. Most of the Charter catch and effort occurs off the WCSI, though there has been some effort off the ECNI each year since 2005.

The spatial distribution of target fishing effort and SBT catches from the domestic fleet are provided in Figures 13 and 14. While most target effort occurs off the ECNI, a substantial domestic fishery operated off the WCSI – mostly due to one large domestic vessel that has not fished in recent years.

The distribution of catches is similar to that of target effort, though proportionally more catch (compared to effort) was taken in the WCSI fishery compared to the ECNI fishery prior to 2005.

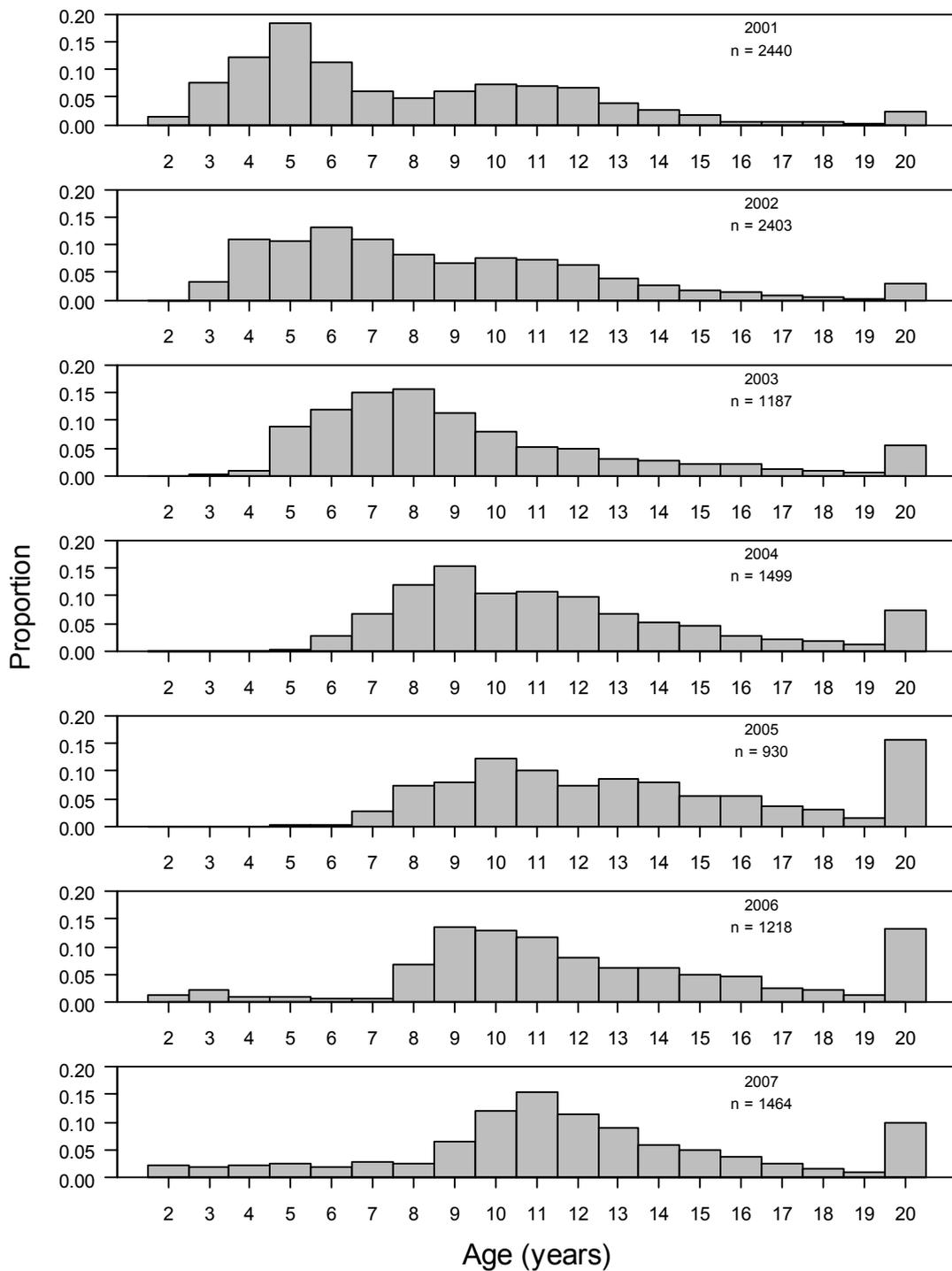


Figure 9: Proportion at age for the Charter fleet for 2001 to 2007 based on cohort slicing using the SC(2001) growth curve. Age 20 is a plus group.

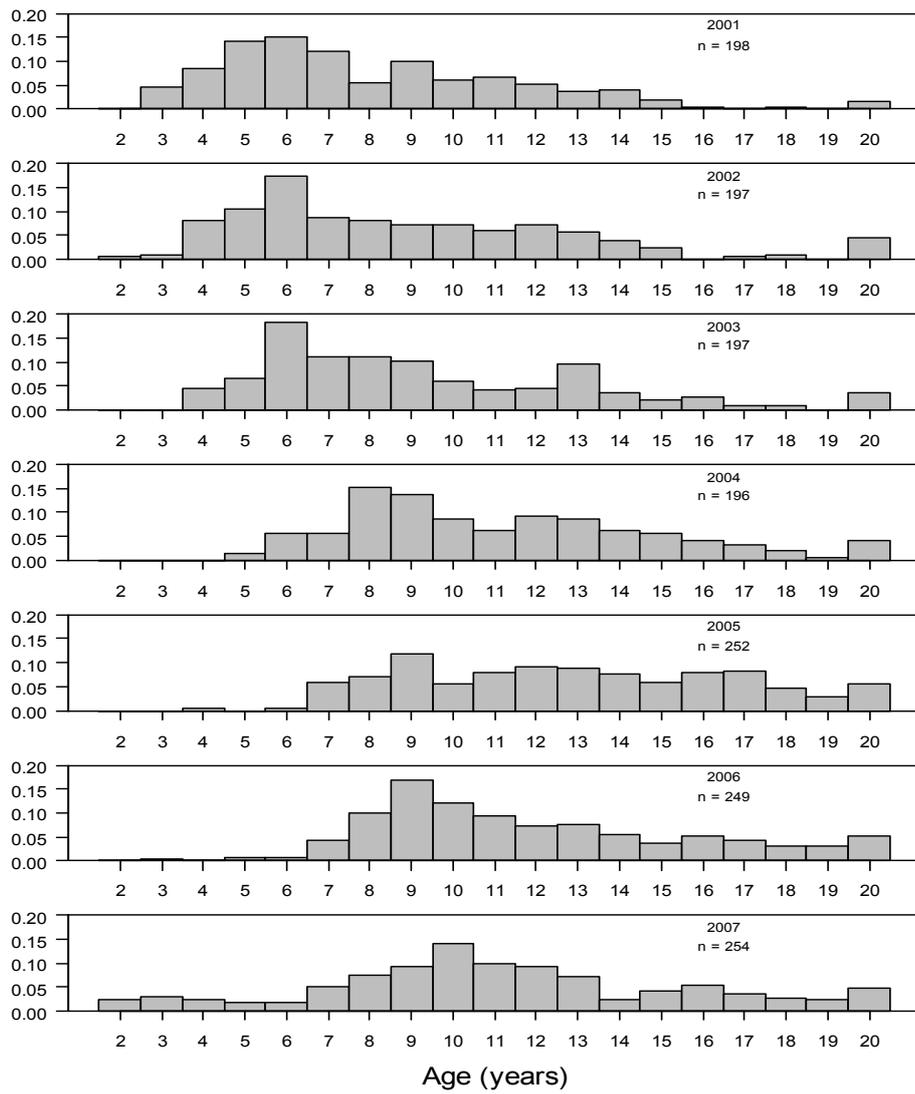


Figure 10: Proportion at age for the Charter fleet for 2001 to 2007 based on direct ageing. Age 20 is a plus group.

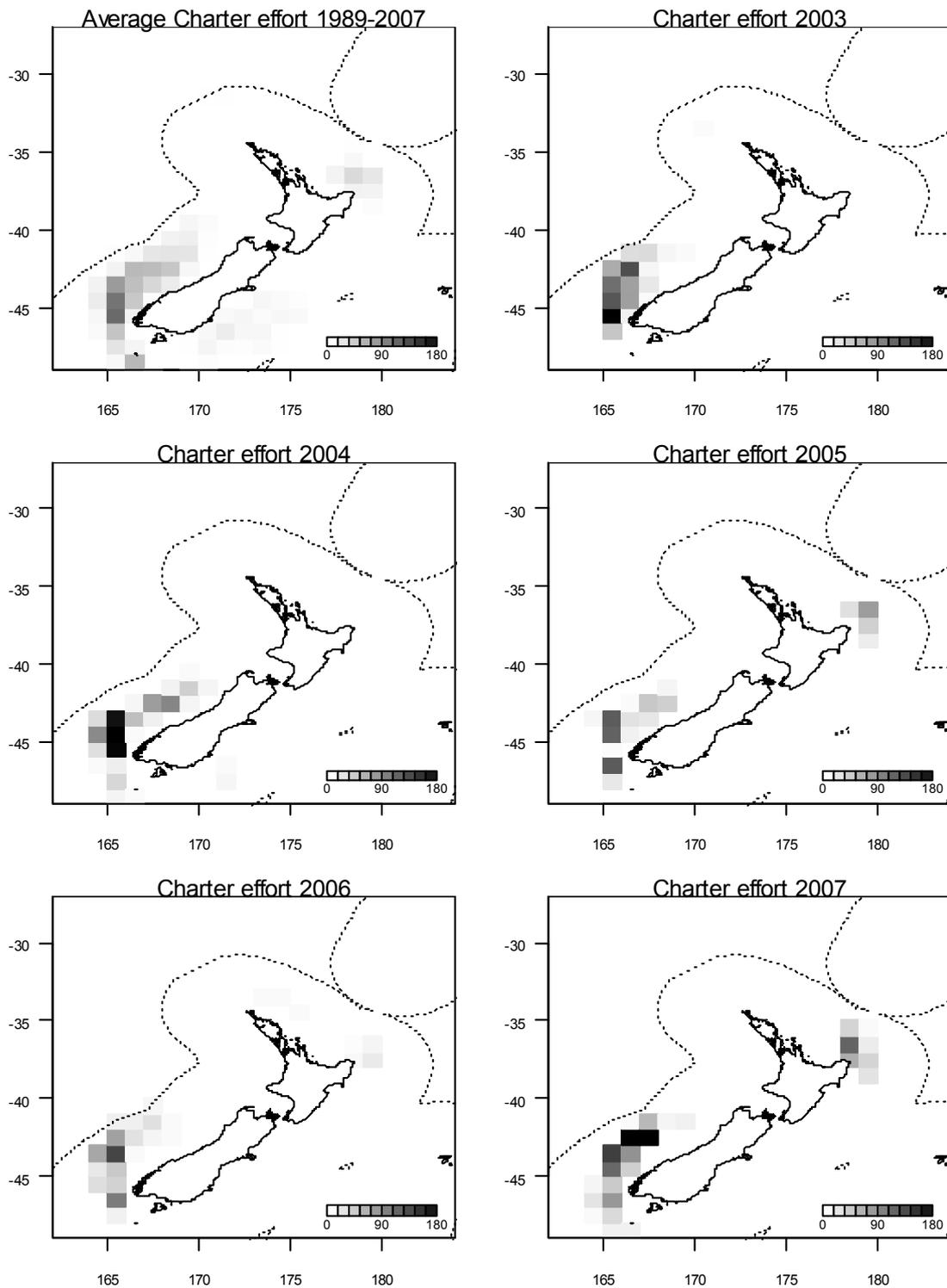


Figure 11: Distribution of longline effort (thousands of hooks per 1 degree square) for the Charter fleet: average for the time series (1989-2007), and annually for 2003 to 2007.

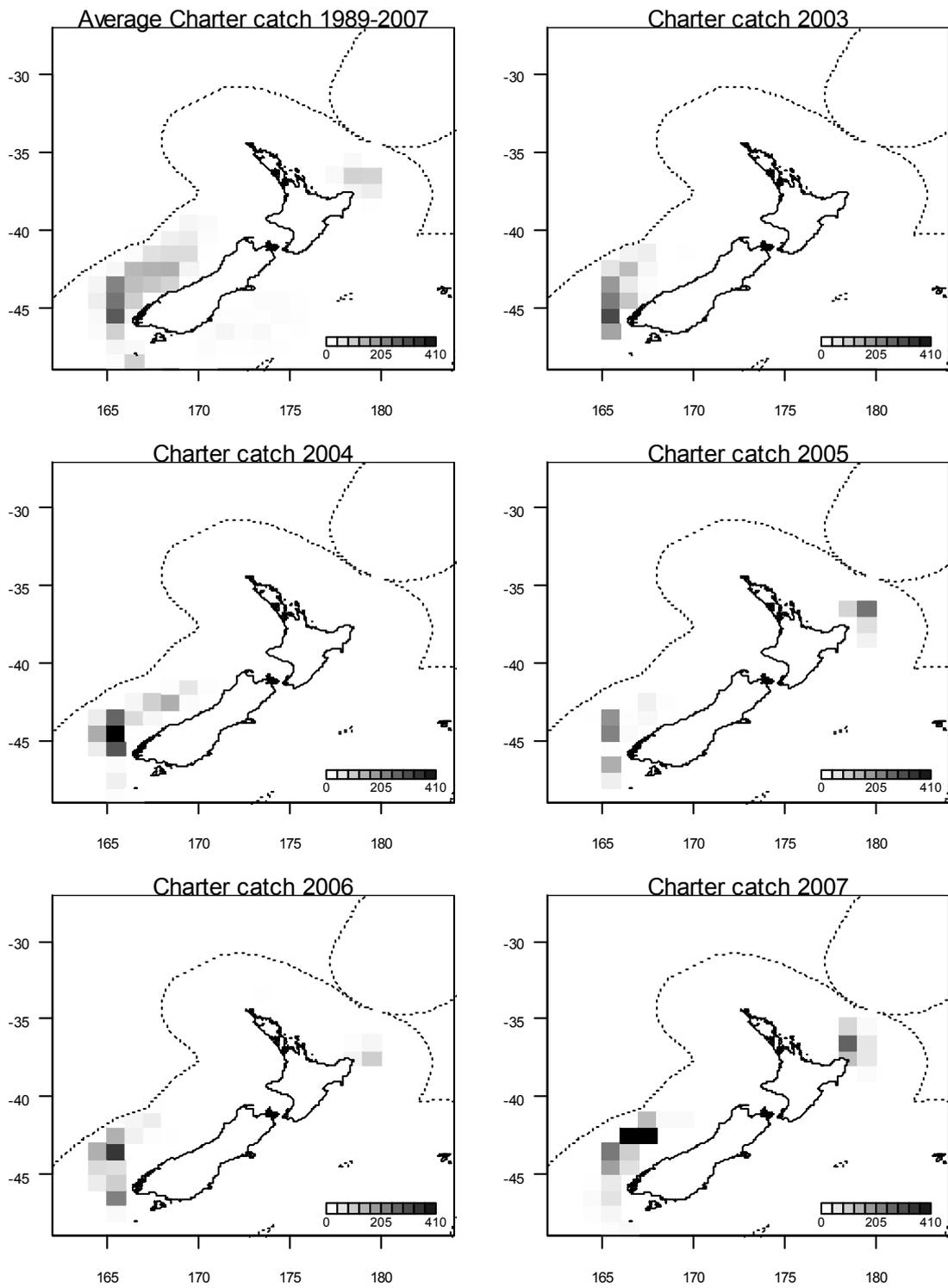


Figure 12: Distribution of longline catches (number of fish per 1 degree square) for the Charter fleet: average for the time series (1989-2007), and annually for 2003 to 2007.

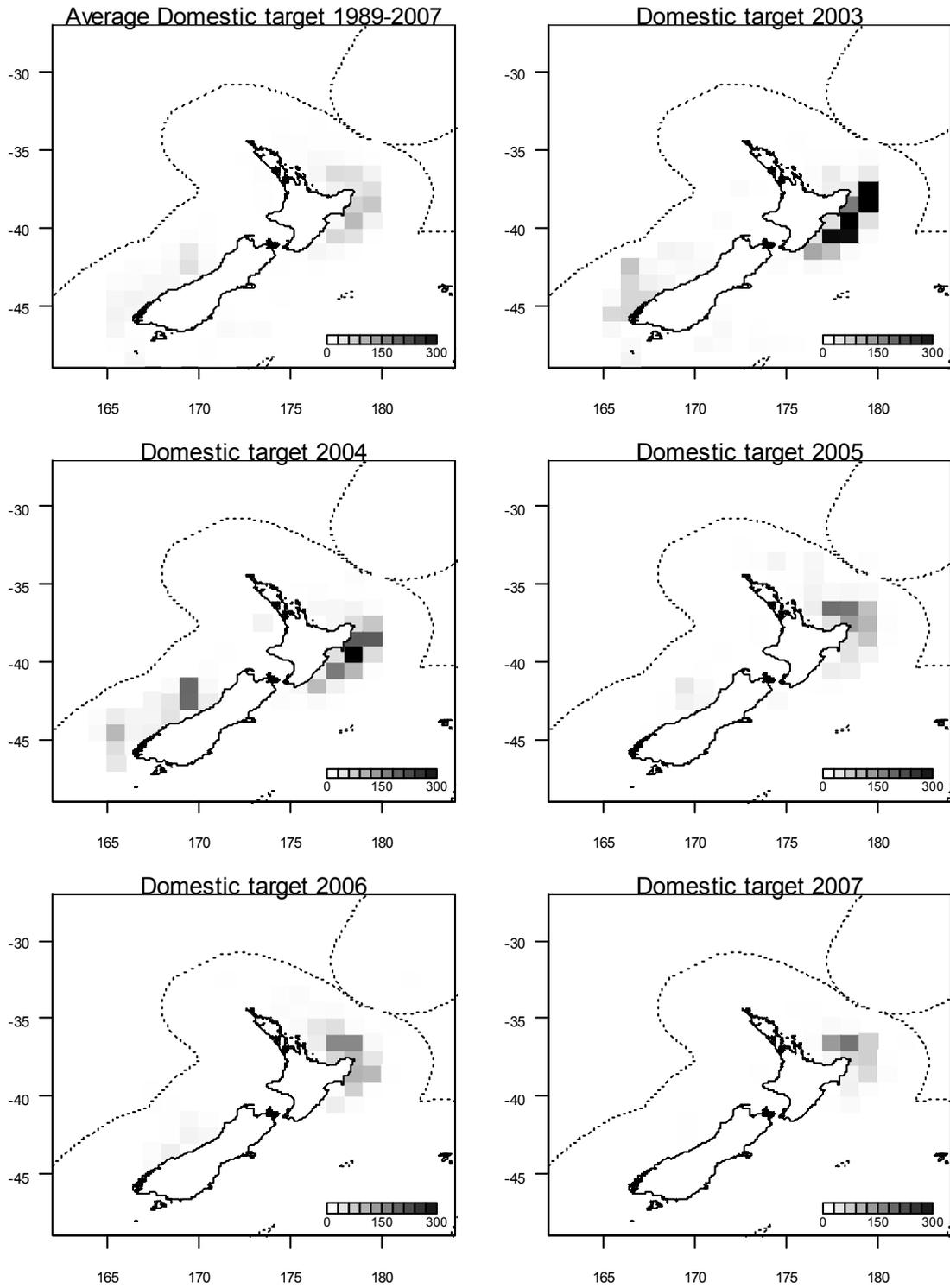


Figure 13: Distribution of longline effort (thousands of hooks per 1 degree square) for the domestic fleet that was targeted at southern bluefin tuna: average for the time series (1989-2007), and annually for 2003 to 2007.

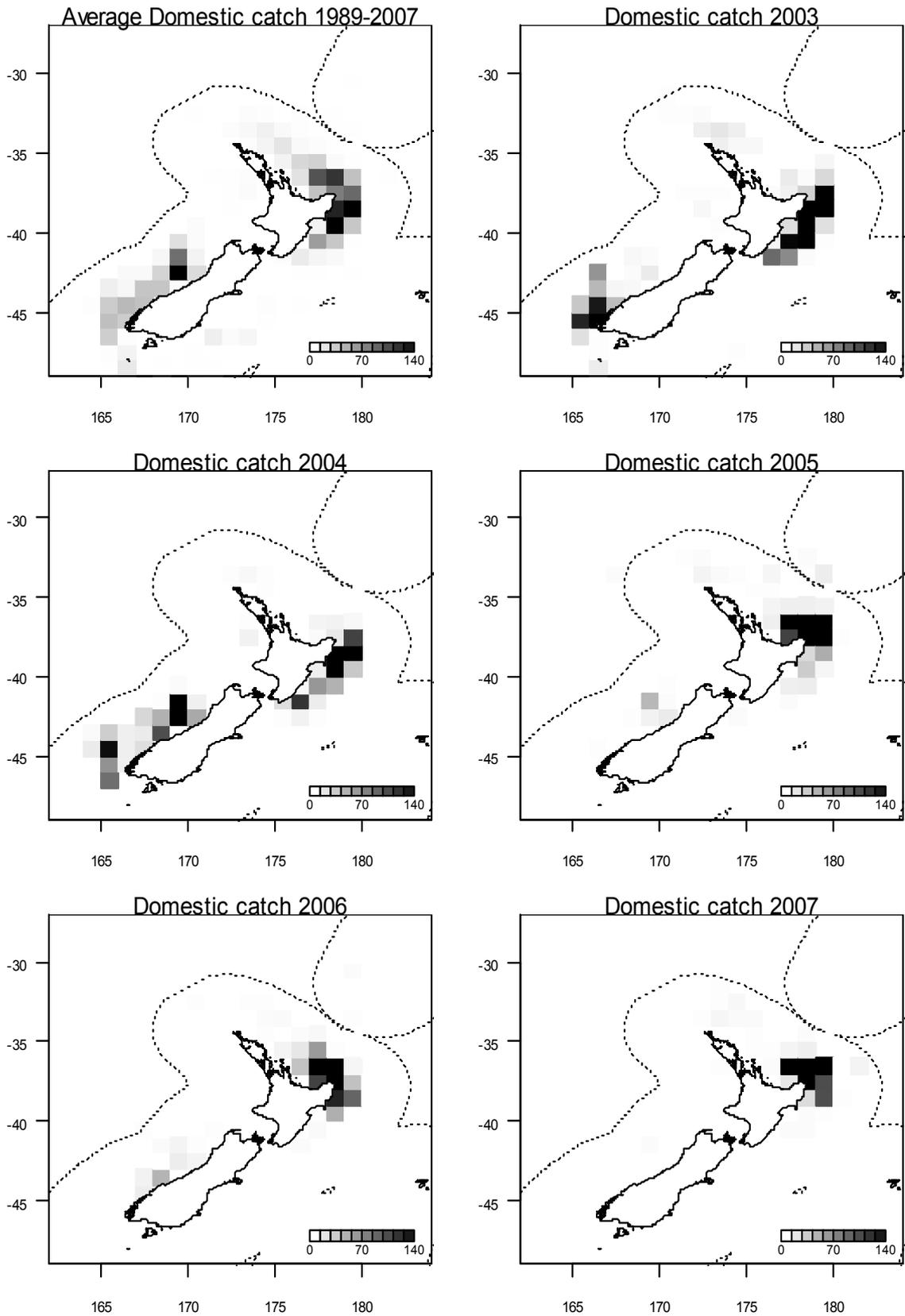


Figure 14: Distribution of longline catches (number of fish per 1 degree square) for the domestic fleet: average for the time series (1989-2007), and annually for 2003 to 2007.

6 Other relevant information

6.1.1 Scientific observer programme

New Zealand has a Scientific Observer Programme (SOP) that covers both domestic and Charter longline vessels. Before 2006 all trips on Charter vessels were covered by at least one observer, but in 2007 and 2008 only two of the four vessels have been observed. The target coverage level for the domestic fleet is 10% of the effort to reflect 10% of the catch.

Coverage is measured in two ways, proportion of catch (in numbers of fish) observed (Table 8) and proportion of hooks observed (Table 9). In terms of catches, over 99% of the catch was observed (and measured) in the Charter fleet in 2006 and around 60% in 2007. For the domestic fleet, 9% of the catch was observed in 2006 and 15.5 % in 2007. In terms of effort, 88% of hooks were observed on the Charter vessels in 2006, but only 55% in 2007. For the domestic fleet 6% of the effort was observed in 2006 and 13% in 2007.

Because only one observer is present on the vessel, and the observer takes breaks during the long hauling process on the Charter vessels, it is not possible to observe all hooks on these vessels. The observer accurately reports the portions of the haul that are not observed. The proportion of the catch observed is higher than hooks observed, because some unobserved catches are recorded (and sometimes measured) as they are available to the observer after their break. Unobserved catches which are measured are noted.

6.1.2 Otolith collection

Observers onboard the Charter vessels collect otoliths from as many SBT caught as possible. Due to the smaller size of the domestic vessels and the different processing practices, it is not feasible to collect otoliths from the domestic fleet at this time.

In 2007, 714 otoliths were collected by observers from the two boats. This is higher than the previous two years due to observers sampling a higher proportion of the catch. A sub-sample of the otoliths from 2001 to 2007 have been aged and the information is described in this report. The total otoliths collection is described in Table 10.

6.1.3 Estimation of non-retained catches

As required for the CCSBT data exchange, estimates of non-retained catches of SBT from the New Zealand Charter and domestic fleets for the years 1989-2007 were provided to the Commission (Tables 11 and 12). The totals are based on observer estimates of discards scaled to total effort. The discards are not split by month and 5x5 square at this stage, but we intend to do this in the future. These are preliminary, but are not expected to vary greatly. There is still some minor work required to ensure that the most appropriate estimates of total effort are used in the scaling.

There was no auxiliary information on the size structure of the discards, so it is assumed that they are representative of the retained catch. Discards have been separated into the categories alive and dead based on the annual proportions of alive/dead discards reported by observers.

Since 2004, fishers have also been required to report discards on their catch effort returns, providing another method to estimate non-retained catches (Table 13).

6.1.4 Non-commercial catches

Since 1 October 2004 New Zealand has allowed five tonnes for non-commercial catches under its national allocation. Due to the locations and seasons during which SBT are found in New Zealand waters (e.g. winter months and areas with little recreational fishing), it is unlikely that this allowance has been approached in the past.

There have been reports of bycatch of SBT in the recently developed sport fishery for Pacific bluefin (*Thunnus orientalis*) off the west coast of the South Island. Generally, the SBT are only taken early in the season (July) with the catch being almost entirely Pacific bluefin by August – September when most effort occurs. In 2007 a programme was initiated to estimate of the number and weight of fish kept or released. About four tonnes was reported as being caught and retained while a further two tonnes of SBT were caught and released.

6.1.5 Tagging of southern bluefin tuna

New Zealand has participated in two electronic tagging programmes in relation to SBT. The first is the Global Spatial Dynamics Programme (GSDP) to electronically tag juvenile SBT throughout the range of the stock. The second is deployment of pop-off tags (PSATs) on large SBT which is being done in collaboration with Australia. New Zealand had hoped to tag 50 SBT per year (2004-2006) as part of the GSDP and 25 large SBT as part of the pop-off tagging project.

Progress in both programmes was slow due to the state of the fishery in the early years of the programme, but at the time of writing over 90 tags had been released with a further 17 to be released during the 2008 fishing season (Table 14). CSIRO has provided considerable technical support for both programmes and supplied over half the implantable tags deployed.

Of the seventy five implantable tags deployed, three recoveries have been reported from the Australian surface fishery. Further returns are expected as this seasons surface fishery catch is harvested. Unfortunately, data were only recovered from one of these tags due to tag software problems with one tag and damage to the other.

Of the 15 pop-off tags deployed, data were received from 13 and the remainder are due to pop-off in mid July 2008. The attachment times for these 12 fish ranged from 21 – 358 days with an average of around 160 days. The track for the two 350+ day deployments have not yet been reconstructed, but the estimated tracks of the other seven STN tracks longer than 100 days are provided in Figure 15 along with the one implantable tag track.

The most exciting finding was the tagged fish (163 cm) that went to the spawning grounds between Indonesian and Western Australia. There were also several fish of similar size that did not appear to head towards the spawning grounds. This suggests that either the fish were not mature, or mature SBT do not spawn every year.

After the remaining 17 tags are released in 2008, there are currently no plans to continue these programmes at this time. Out next priority is beginning to examine the wealth of data provided by these tags. In this regard New Zealand welcomes the opportunity to collaborate with other members on the analysis of these and other tagging data.

7 Acknowledgements

MFish acknowledges Terese Kendrick, John Holdsworth, Tim Sippel, and Michael Manning for assistance with various parts of this report. Also, we thank Bob Kennedy for his assistance to New Zealand in the preparation of its data.

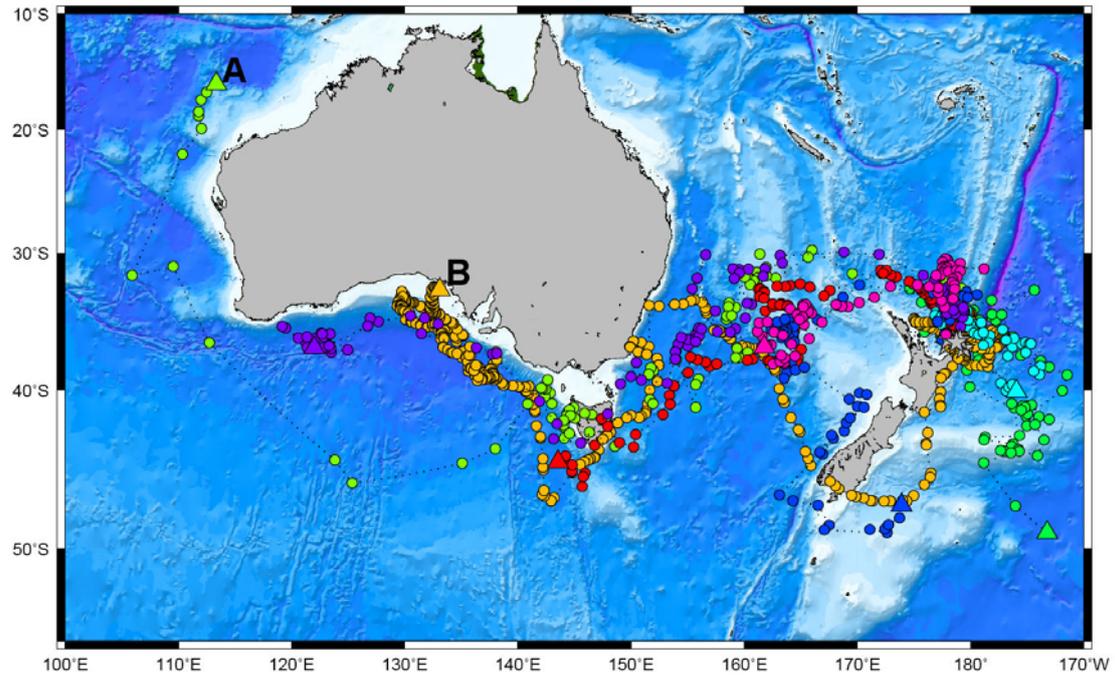


Figure 15: Reconstructed movements of seven STN tagged with pop-off tags and one tagged with an implantable tag. The track of each fish is a different colour with the stars representing the tagging location and the coloured triangles representing the pop-off or capture (for the implantable tagged fish) location. “A” represents the pop-off location for the fish that made it to the spawning ground and “B” is the capture location for the STN that carried at implantable tag.

Table 1: Recent catches of southern bluefin tuna 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	378.5	379.0

Table 2: Catch (t) for the Charter fleet by year and CCSBT Region.

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	

*Most often erroneous position data

Table 3: Effort (thousands of hooks) for the Charter fleet by year and CCSBT Region.

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	

*Most often erroneous position data

Table 4: Catch (t) for the domestic fleet by year and CCSBT Region.

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	

* Includes erroneous position data and data without positions

Table 5: Effort (thousands of target[#] hooks) for the domestic fleet by year and CCSBT Region.

Calendar Year	Region 5	Region 6	Other*
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	

* Includes erroneous position data and data without position data

Effort for sets that either targeted or caught southern bluefin tuna

Table 6: Proportion of the catch from the Charter fleet under 110, 120, 130, and 140 cm for 1989 to 2007.

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

Table 7: Number of vessels catching southern bluefin tuna in New Zealand fisheries waters by Calendar year and New Zealand fishing year (1 October to 30 September).

Year	Calendar year vessel numbers	Fishing year vessel numbers
2001	132	132
2002	151	155
2003	132	132
2004	99	101
2005	57	58
2006	56	57
2007	44	45

Table 8: Observer coverage in terms of catch (proportion of numbers observed) for the Charter (NZC) and domestic (NZD) fleets for 2006 and 2007.

Calendar year	NZC	NZD
2006	1.00	0.04
2007	0.60	0.16

Table 9: Observer coverage in terms of effort (proportion of hooks observed) for the Charter (NZC) and domestic (NZD) fleets for 2006 and 2007.

Calendar year	NZC	NZD
2006	0.88	0.06
2007	0.55	0.13

Table 10: Number of otoliths collected by observers from the Charter fleet catch for the years 2001 – 2007.

Year	Otoliths
2000	149
2001	777
2002	1199
2003	838
2004	1141
2005	417
2006	443
2007	714

Table 11: Actual number of 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 Charter fleet. Note that numbers are rounded to the nearest whole fish.

Year	Observed	Scaled estimate		
	Numbers	Alive	Dead	Total
1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	
1993	22	55	13	68
1994	36	40	13	53
1995	5	4	9	13
1996				
1997	23	0	38	38
1998	20	0	20	20
1999	33	18	15	33
2000	3	0	4	4
2001	6	3	4	7
2002	5	2	3	5
2003	2	0	2	2
2004	2	0	2	2
2005	0	0	0	0
2006	4	2	2	4
2007	3	4	2	6

Table 12: Actual number of 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 fleet. Note that numbers are rounded to the nearest whole fish.

Year	Observed	Scaled estimate		
	Numbers	Alive	Dead	Total
1989				
1990				
1991				
1992	0	0	0	0
1993				
1994	0	0	0	0
1995	4	10	20	30
1996	5	25	6	31
1997	1	0	4	4
1998	0	0	0	0
1999	0	0	0	0
2000	0	0	0	0
2001	5	8	10	18
2002	4	24	30	54
2003	0	0	0	0
2004	1	0	7	7
2005	5	33	8	41
2006	1	16	0	16
2007	2	8	8	16

Table 13: Estimated number of non-retained SBT (separated by life status - alive and dead) for the domestic fleet based on fisher reporting.

Year	Alive	Dead	Total
2005	19	5	24
2006	48	0	48
2007 [‡]	23	0	23

[‡] Released under 6th schedule provisions which require the fish to be alive

Table 14: Number of tags deployed each year with the number of tags for which we have the resulting data provided in ().

	Year				
	2004	2005	2006	2007	2008
Implantable	6 (1)	1	30 (2)	19	19
Pop-off tags				15 (12)	