

The New Zealand southern bluefin tuna fishery in 2003

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INTRODUCTION

Long-term trends in the New Zealand southern bluefin tuna (SBT) fishery have been described previously (Murray & Richardson 2001; Murray 2003). This paper focuses on the five most recent years, 1999 to 2003, a period during which reporting practices have improved greatly and uses a slightly different approach that better incorporates the catch and effort reported on log sheet forms for gear types other than longline to collate the available catch effort data.

The New Zealand SBT fishery has been constrained by a national catch limit of 420 t since 1989 and during this time has exceeded its quota on five occasions. When the catch limit has been exceeded, the subsequent year's catch limit has been reduced to adjust for the over-catch. The SBT catch in the two most recent years (2002/03 and 2003/04) was 388 t and 397 t respectively. All but a few tonnes of the domestic SBT catch is taken by longline chiefly off the southwest coast of the South Island and off the northeast coast of the North Island in April to June.

Longline effort targeting SBT in these two areas has increased linearly since 1999 to reach 8733 hooks in the south and 1250 hooks in the north. In contrast CPUE from SBT target sets in both areas has declined by 40 to 60 % in the north and by about 50% in the south since 1999.

CATCH AND EFFORT

Data sources and methodology

In this paper we use a new approach to collate the available catch effort data from the various catch and effort form types used in New Zealand. While less relevant to SBT, which are almost entirely reported on a single form type (Tuna Longline Catch & Effort or TLCER form), this report is taken from a wider characterisation study that includes other tuna species, fishing methods and reporting forms.

Effort is summarised at trip / method / month / statistical area / target species strata. Whole weight is the estimated weight of the catch at the end of each fishing trip (converted from processed weight using a conversion factor of 1.15) and apportioned among trip strata on the basis of reported catch (in numbers of fish). Average fish size (weight) is calculated for a trip, and CPUE in numbers of fish is available at strata resolution if the reported catch can be shown to have been in numbers (rather than weight) of fish.

The domestic statistical areas reported on the daily form are grouped by latitude for both the east and west coasts of New Zealand, and effort from the longline form, reported in latitudes/longitudes, has been combined into the same bands.

Some resolution is lost in this approach, which has been developed to allow data from both form types (TLCER and CELR) used in New Zealand to be included in characterisation studies.

Catch history

Southern bluefin tuna (SBT) catches have been restricted to a national competitive catch limit of 420 t, based on the New Zealand fishing year (1 October to 30 September), since 1989 and have usually been below this limit. When the catch limit has been exceeded, the subsequent year's catch limit has been reduced to adjust for the over-catch. The catch in the 2001–02 fishing year exceeded the national allocation and the catch limit for the 2002–03 fishing year was reduced accordingly. Catches in 2002–03 slightly exceeded the reduced limit (Figure 1). Southern bluefin tuna catches by calendar year and fishing year (1 October to 30 September) are given in Appendix 1.

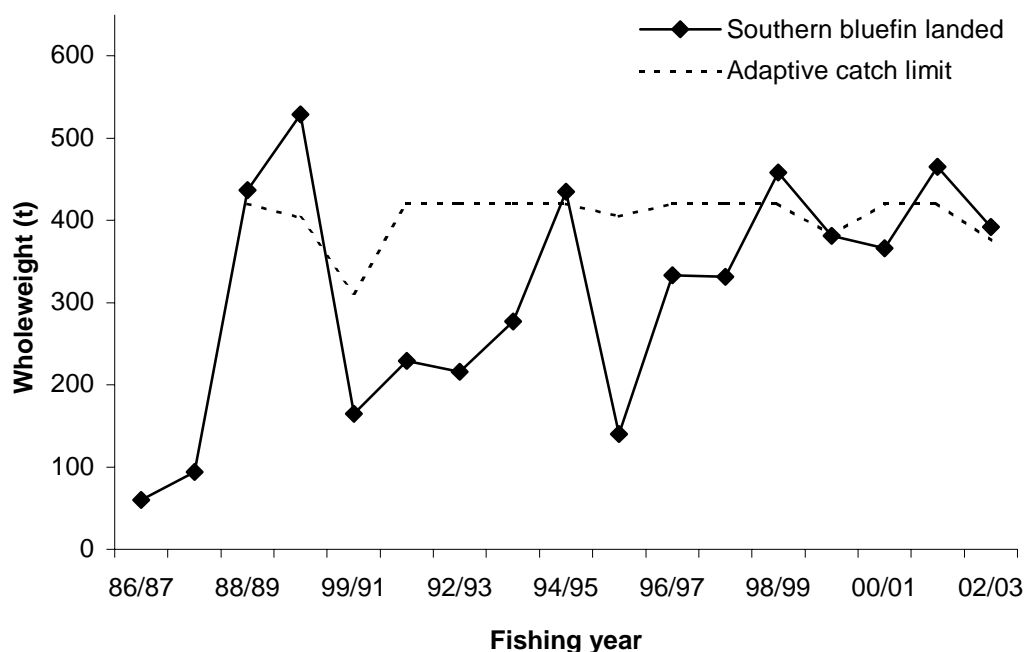


Figure 1: Recent history of catches of southern bluefin in the New Zealand EEZ (tonnes whole weight) by fishing year, and the effect of the competitive catch limit set at 420 t since 1989. The maximum limit is reduced by the equivalent of any over catch in the previous fishing year (adaptive catch limit). Annual total catch is from Licensed Fish Receiver returns for 1999 to 2001, and from Monthly Harvest Returns from permit holders for 2002 and 2003.

Catch and effort in 2003

Nearly all of the SBT caught in the New Zealand domestic fishery is taken by longline during the months of March/April through June/July from latitudes south of 35° S. There are two main areas of fishing activity, south of 40° S off the west coast of New Zealand's South Island, and north of 40° S at the same time off the east coast of New Zealand's North Island (Figure 2).

Catches of SBT have, however, previously been reported throughout the year and, during peak months, throughout the EEZ. In 2003 the catch limit was reached in June, and longline fishing effort (off both coasts) then shifted north of 37° S, as the fleet began targeting bigeye tuna (Figure 3)

In 2003, most SBT was caught in targeted sets, with just 50.1 tonnes taken as bycatch of fisheries for other tuna species (primarily bigeye tuna), and 1.1 tonnes was taken as bycatch of non-tuna fishing using a range of gear types.

Handlining is no longer a significant fishing method with small catches by this method last reported in 2001. Catches in the other gear type category include a bycatch each year from the hoki (*Macruronus novaezelandiae*) fishery, taken by mid-water trawl outside of the main SBT season (Table 1).

Table 1: The annual catch (tonnes whole weight) for calendar years 1999 to 2003, by fishing method. Annual total catch adjusted to Licensed Fish Receiver returns for 1999 to 2001, and to Monthly Harvest Returns for 2002 and 2003. 0.0 = less than 100 kg.

Fishing method	Calendar year				
	1999	2000	2001	2002	2003
Longline	453.3	375.6	355.8	460.0	387.2
Troll	4.3	2.2	0.1	0.5	0.1
Handline	2.0	0.3	0.0	0.0	0.0
Other	1.1	2.3	2.5	2.1	1.4
Total (t)	460.6	380.3	358.5	462.6	388.7

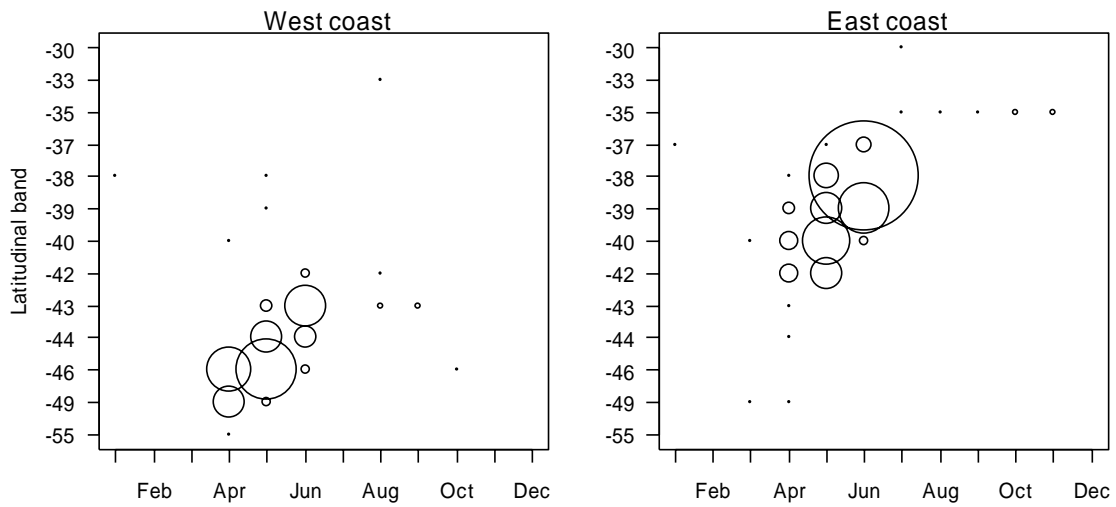


Figure 2: The spatial and seasonal distribution of all EEZ southern bluefin catches (whole weight) in 2002–03, for all methods (almost entirely longline; see Table 1), off the West coast [left] and off the East coast [right] of New Zealand. The largest circle, [east of New Zealand, in June] represents 146.8 tonnes of Southern bluefin tunas. The vertical axis labels approximate the lower boundaries of latitudinal bands corresponding to statistical reporting areas.

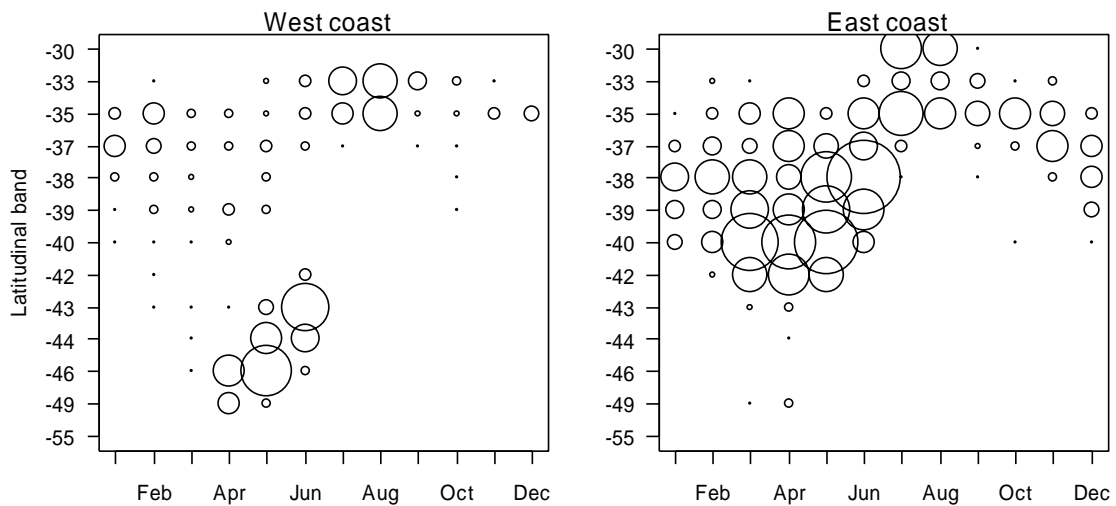


Figure 3: The spatial and seasonal distribution of total surface longline effort (number of hooks) targeting tuna in New Zealand waters. The largest circle, [east of New Zealand, in June] represents 756,000 hooks set. The vertical axis labels approximate the lower boundary of latitudinal bands corresponding to statistical reporting areas.

Trends in effort and CPUE from 1999 to 2003

Total effort in New Zealand tuna longline fisheries peaked in 2002 at over 10.5 million hooks and then declined in 2003 to less than 10 million hooks. Much of the increase since 1999 has occurred either in the waters north of 37° S, or outside the main SBT season. However, the proportion of longline effort occurring during the peak SBT months of April to July has increased steadily

(from 33% in 1999 to 57% in 2003), as has the proportion of total effort reported as targeting SBT (increasing from 6 to 24 % over the same period, Table 2).

A high but declining proportion (from 59% in 1999 to 19% in 2003) of SBT caught north of 42° S has been landed from sets primarily targeting bigeye tuna.

South of 42° S, almost all longline effort (86 – 97 % annually) from 1999 through 2003, occurred between April and July and was reported to be targeting SBT, while over 99% of landed SBT (by weight) in each year came from SBT target sets (Table 2).

Table 2: Total longline effort 1999 to 2003, the percentage that was seasonally effective for SBT (April – July), the percentage that was reported to be targeted at SBT, total SBT catch, percentage taken within the main SBT fishing season, the percentage taken in sets reported to be targeted at SBT, summarized for the two main areas of activity (See Figure 2).

	Calendar year	Total hooks (thousands)	Percentage of effort		Total SBT catch (t)	Percentage of catch	
			Apr - Jul	Targeted		Apr - Jul	Targeted
North of 42° S	1999	5862	33	6	225	73	41
East coast NZ	2000	6822	35	10	221	93	67
	2001	8638	36	10	164	92	77
	2002	9444	41	15	200	96	76
	2003	8733	57	24	260	99	81
South of 42° S	1999	944	93	92	235	97	97
West coast NZ	2000	989	95	95	160	99	99
	2001	940	86	86	195	100	100
	2002	1231	93	93	262	99	99
	2003	1250	98	97	128	100	100

In both the south-west and the north-east fishing areas, there has been a decline in nominal catch rates of SBT in the five most recent years, whether total or targeted longline effort is used. Off the north-east coast CPUE has steadily declined by 40–60% while off the south-west coast, CPUE increased in 2001; was maintained at near that level in 2002, and then declined in 2003 to half of the catch rate seen in 1999 (Figure 4).

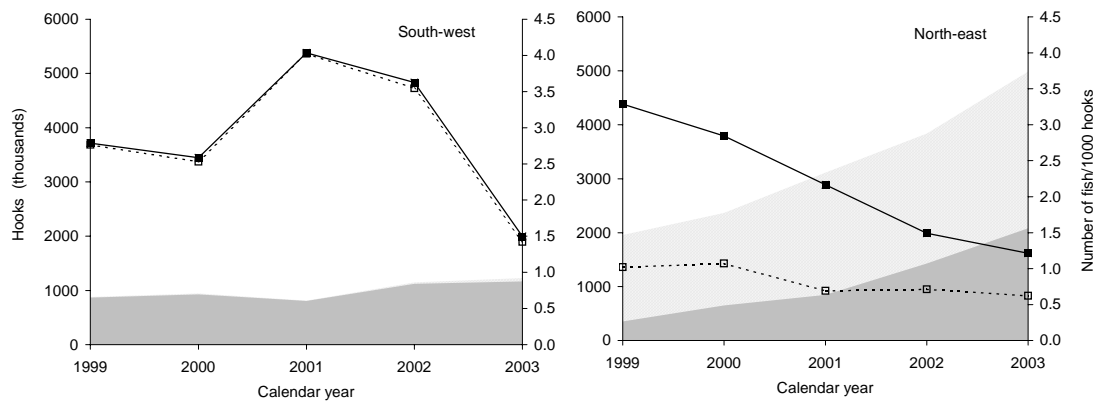


Figure 4: Total longline effort (number of hooks set) in each year 1999 to 2003 [light grey area] Number of those hooks that were targeted at southern bluefin tuna [dark grey area], simple annual catch rate of southern bluefin tuna in targeted sets [dark line] and in all tuna sets [dashed line].

When all targeted effort is summarised for the New Zealand EEZ, a decline in the nominal CPUE of around 50%, from 3 to 1.5 fish per thousand hooks, since 1999 is evident. The proportion of unsuccessful effort (at trip strata level) has also increased steadily over the five years since 1999 (Figure 5).

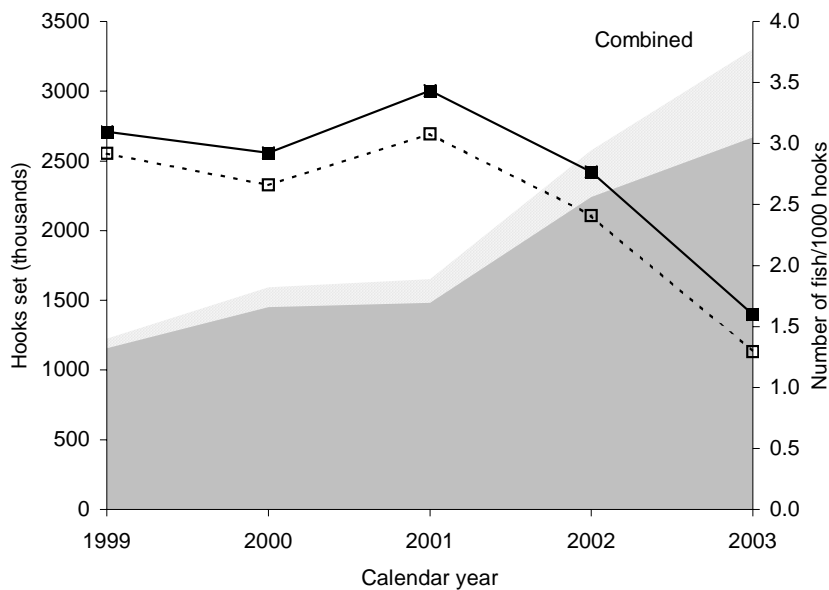


Figure 5: Total number of hooks set in the New Zealand domestic fishery targeting SBT [light area], number of hooks in successful strata [dark area], overall catch rate [dashed line] and catch rate in successful strata [dark line], for calendar years 1999 to 2003. A stratum = effort within a fishing trip that is executed within a single area / month, uses one fishing method, and is targeted one species.

FISH SIZE COMPOSITION

The catch at the end of each fishing trip (converted back to whole weight) was used to calculate average fish size for those trips that reported catches in numbers of fish. This allowed information from both form types used in New Zealand to be included, and, over the five years, 1999 to 2003, represents an increasing proportion of the total landed catch, as reporting practices have improved, from 75 % in 1999 to 99% in 2003.

There is no overall trend in average fish size in the most recent five years, but a mode of smaller fish around 50 kg in weight, evident in the catch in 1999, has subsequently shown a shift in the size distribution towards larger fish over the most recent three years. In 1999 the average fish weight was 73 kg, increasing slightly to 76 kg in 2000. The average southern bluefin was slightly smaller in the following two years at 69 kg, and increased markedly in 2003 to 83kg (Figure 6).

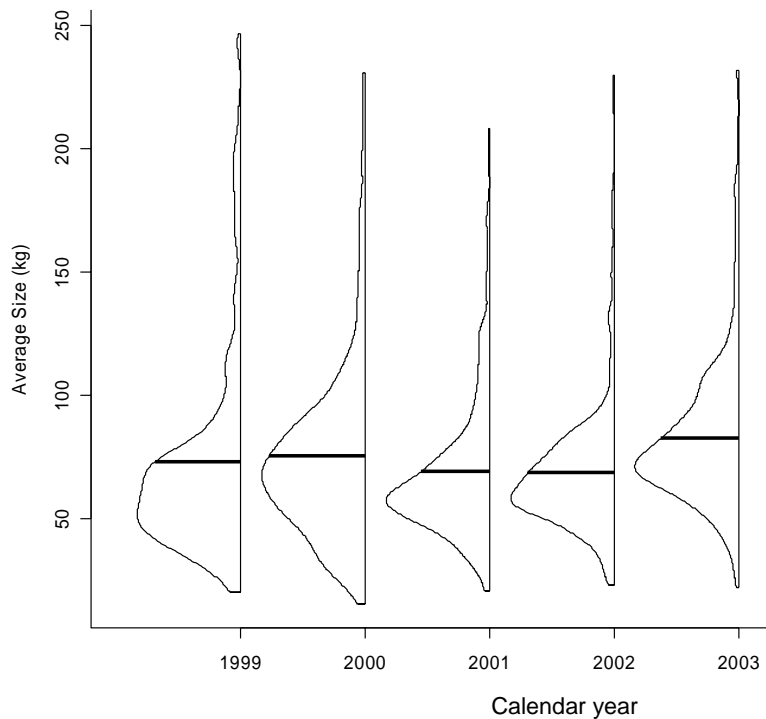


Figure 6: Distributions of average (for a fishing trip; kg) fish-size for calendar years 1999 to 2003. Average whole weights are indicated by the heavy line in each year.

FLEET SIZE AND DISTRIBUTION

Of the 128 vessels that fished by longline in 2003 and landed one of the main commercial tuna species, 118 of them reported catching southern bluefin tuna. Just 94 of those vessels were targeting southern bluefin, the others reporting targeting other tuna species, principally bigeye tuna. Six large trawlers also reported small catches of southern bluefin as a bycatch (mainly in the hoki mid-water trawl fishery).

Five large vessels (over 50 m length) including four charter and one New Zealand flagged vessel dominate the fishery, and in 2003 accounted for 31% of the landed bluefin (by weight), while half of the total annual catch was landed by the just fourteen vessels (Figure 7).

Two large longliners on their first year of charter in the New Zealand EEZ, targeted albacore off the east coast and reported a few southern bluefin in their catch (Figure 7).

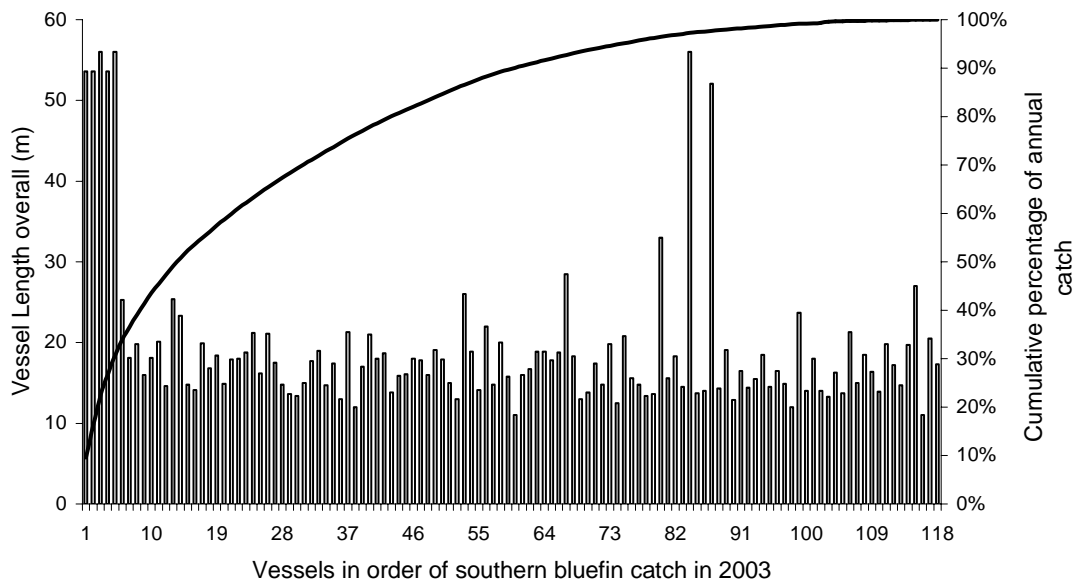


Figure 7: Description of the fleet (overall length of each vessel) that landed southern bluefin tuna in 2003, in order of bluefin catch (by weight), with the cumulative percentage of the total annual catch also presented. All are longliners. Not included are the six large trawlers that caught bluefin as a bycatch of non-tuna fisheries.

ACKNOWLEDGMENTS

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REFERENCES

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Murray, T. and K. Richardson. 2001. Trends in the New Zealand southern bluefin tuna fishery. CCSBT-SC/0108/SBT Fisheries – New Zealand, 13 p.

Appendix 1. New Zealand southern bluefin tuna catches by calendar year and fishing year (1 October to 30 September).

Calendar year	t.	Fishing year	t.
1980	130		
1981	173		
1982	305		
1983	132		
1984	93		
1985	94		
1986	82	1986/87	60
1987	59	1987/88	94
1988	94	1988/89	437
1989	437	1989/90	529
1990	529	1990/91	165
1991	164	1991/92	279
1992	279	1992/93	216
1993	217	1993/94	277
1994	277	1994/95	435
1995	436	1995/96	140
1996	139	1996/97	333
1997	334	1997/98	331
1998	337	1998/99	458
1999	461	1999/00	381
2000	380	2000/01	362
2001	358	2001/02	452
2002	463	2002/03	388
2003	389	2003/04	397
2004	397		