AUSTRALIA'S 2001–02
SOUTHERN BLUEFIN TUNA FISHING SEASON

by

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Contents

1. Introduction

This report summarises catches and fishing activities in the 2001–02 quota year[1] of the Australian Southern Bluefin Tuna (*Thunnus maccoyii*; SBT) Fishery. It updates preliminary information on the 2000–01 quota year presented by Hender *et al.* (2002). It also provides a summary of the history of the Australian SBT fishery. Caton *et al.* (1995) provides a more detailed historical description of the fishery.

History

Troll catches of SBT were reported as early as the 1920s off the east coast of Australia but significant commercial fishing for SBT commenced in the early 1950s with the establishment of a pole-and-live-bait fishery off New South Wales, South Australia and later (1970), Western Australia. Purse seine gear soon overtook pole as the predominant method and catches peaked at 21 500 t in 1982. The bulk of this early Australian catch of SBT was canned. Following quota reductions in 1983/84, the Western Australian pole fishery for very small juveniles closed down and the south-eastern fishery began to target larger juveniles to supply the Japanese sashimi market. Surface catches were further reduced between 1989 and 1995 when about half of the Australian total allowable catch was taken by Australia–Japan joint venture longliners in the Australian Fishing Zone (AFZ). The joint venture ceased in late 1995. From 1992 to 1998 domestic longliners operating off Tasmania and New South Wales also took around 5-10% of the total Australian catch.

Following declaration of the Australian Fishing Zone (AFZ) in 1979, Japanese longliners fished under a range of bilateral conditions, real time monitoring program and joint-venture arrangements until 1997 when Japanese longliners' were excluded from all AFZ fishing operations following failure to reach agreement on global TAC within the CCSBT. Caton and Ward (1996) provide copies of annual subsidiary agreements for the operations of bilateral-licensed longliners in the AFZ from 1979–80 to 1994–95.

In 1990–91 about 20 t of SBT tuna were transferred to fattening cages in Port Lincoln, South Australia to enhance their value. These 'farming' operations increased from 3% of the Australian SBT total allowable catch (TAC) in 1991–92 to 99% in 2000–01.

Recent Seasons

The Australian domestic SBT catches for the 2001 and 2002 calendar years were 4853 t and 5374 t, respectively. The 2001 calendar year catch is larger than the previously agreed national allocation to Australia of 5265 t because it represents the aggregation of catches from periods in two quota years. The 2000–01 quota year catch was 5248 t while the catch for the 2001–02 quota year was 5262 t.

[1] Various time periods, such as 'calendar years', 'fishing seasons' and 'quota years', can be used when describing Australia's SBT fishery. Unless otherwise indicated, we have used quota years in this report, but note that fishing seasons of the various fishery components often span quota years. The commencement and end dates of Australian quota years have varied; they are given in Appendix 1 for each quota year.

Quota	Western Australia			South Australia				New South Wales			Tasmania			Large longliners			Australia total				Total
Year*	Albany Pole	Esperance Pole	**Total**	Pole & purse seine	Farm Cages	Long-line	**Total**	Pole & purse seine	Long-Line	**Total**	Troll	Long-Line	**Total**	Aust. charter	Joint-venture	**total**	Domestic Surface	Domestic long-line	Total long-line	RTMP	**All Gears**
1988–89	204	221	425	4872	0	0	4872	0	1	1	2	0	2	0	684	684	5299	1	685	0	5984
1989–90	133	97	230	4199	0	0	4199	0	6	6	14	0	14	0	400	400	4443	6	406	0	4849
1990–91	175	45	220	2588	0	0	2588	0	15	15	57	0	57	255	881	1136	2865	15	1151	#300	4316
1991–92	17	0	17	1629	138	14	1781	34	90	124	36	20	56	59	2057	2116	1854	124	2240	800	4894
1992–93	0	0	0	716	722	68	1506	16	238	254	23	44	67	0	2735	2735	1477	350	3085	650	5212
1993–94	0	0	0	621	1294	55	1970	0	286	286	7	105	112	0	2299	2299	1922	446	2745	270	4937
1994–95	0	0	0	908	1954	2	2864	0	157	157	4	109	113	0	1295	1295	2866	268	1563	650	5080
1995–96	0	0	0	1447	3362	0	4809	28	89	117	0	262	262	0	0	0	4837	351	351	0	5188
1996–97	0	0	0	2000	2498	0	4497	7	229	236	2	242	244	0	0	0	4507	472	472	0	4978
1997-98	0	0	^0	916	3488	^0	4403	~0	475	475	!0	219	219	0	0	0	4433	664	664	0	5097
1998-99	0	0	^0	28	4991	^0	5018	~0	97	97	!0	116	116	0	0	0	5016	216	216	0	5232
1999–00	0	0	^0	0	5130	13	5143	0	114	114	0	!0	!0	0	0	0	5130	127	127	0	5257
2000–01	0	0	^0	0	5162	6	5168	0	32	32	0	!0	!0	0	0	0	5162	38	38	0	5247
2001-02	0	0	7	0	5234	0	5234	0	≈22	≈22	0	!0	!0	0	0	0	5234	29	29	0	5262

* Dates: 1 October to 30 September for 1988–89 to 1990–91; 1 October 1991 to 31 October 1992 for 1991–92; 1 November to 31 October for 1992–93 and 1993–94; 1 November 1994 to 15 December 1995 for 1994–95; 16 December 1995 to 15 December 1996 for 1995–96; and 16 December 1996 to 30 November 1997 for 1996–97; 1 December to 30 November for 1997–98; 1998-99; 1999–00, 2000–01 and 2001-02.

Note that a further 700t of Australian quota was 'frozen' (not allocated) in 1990–91.

^ 1997-98 and 1998-99 WA and SA non-farm catches are included in SA pole and purse seine catch and in 1999–00 and 2000–01 WA longliner is included in SA longliner catch due to confidentiality guidelines.

~ 1997-98 to 1998-99 NSW pole and purse seine catches are included in NSW longline catch due to confidentiality guidelines.

! 1997-98 and 1998-99 Tas troll catches are included in Tas longline and in 1999–00, 2000–01 and 2001-02 Tas longline is included in NSW longline due to confidentiality guidelines.

≈ 2001-02 NSW longline catch also includes QLD longline catch due to confidentiality guidelines.

Table 1: Australian Catch by Gear and State for Quota Years 1988-89 to 2001-02

Figure 1: Australian SBT Catch in 2001

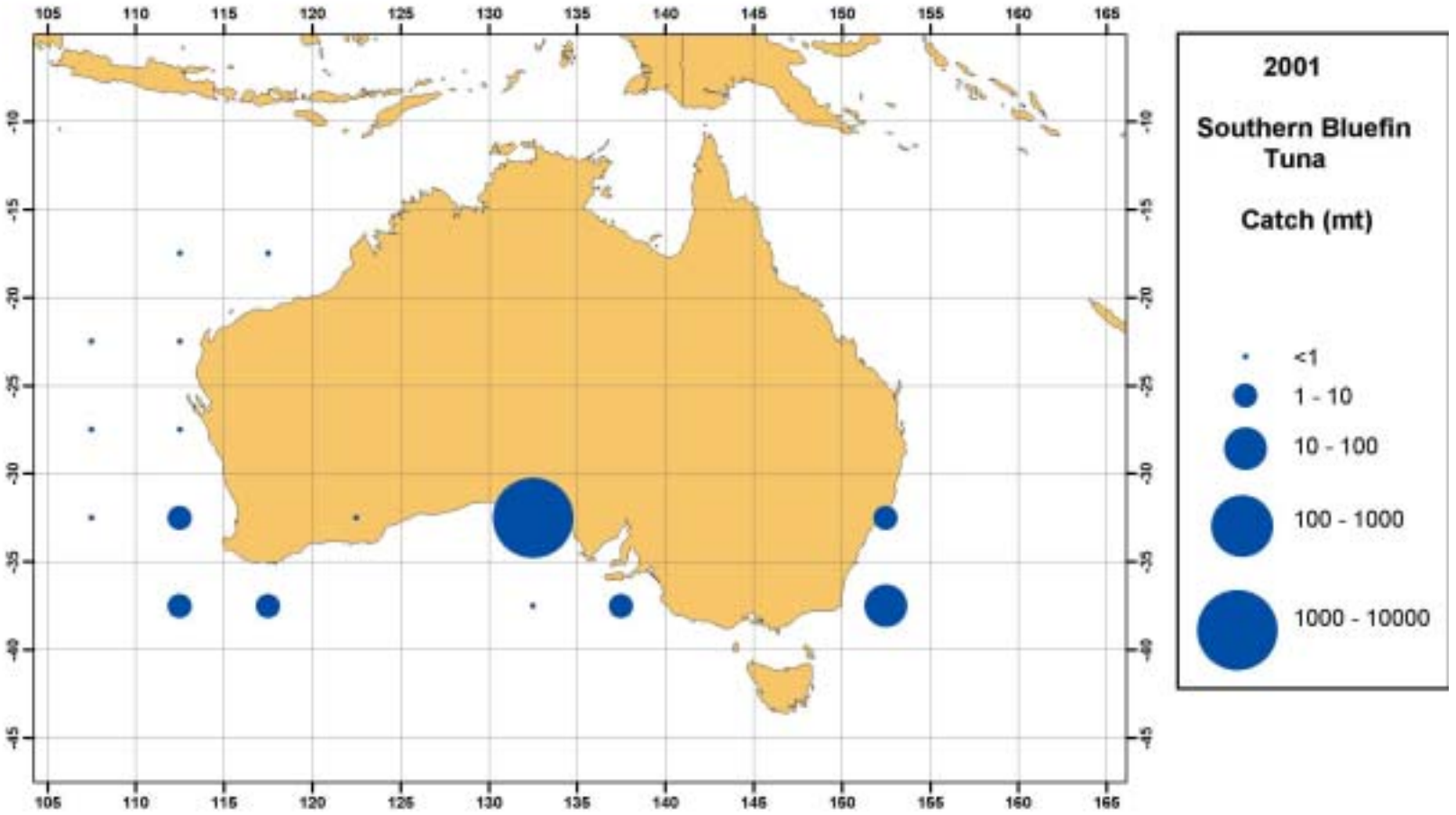
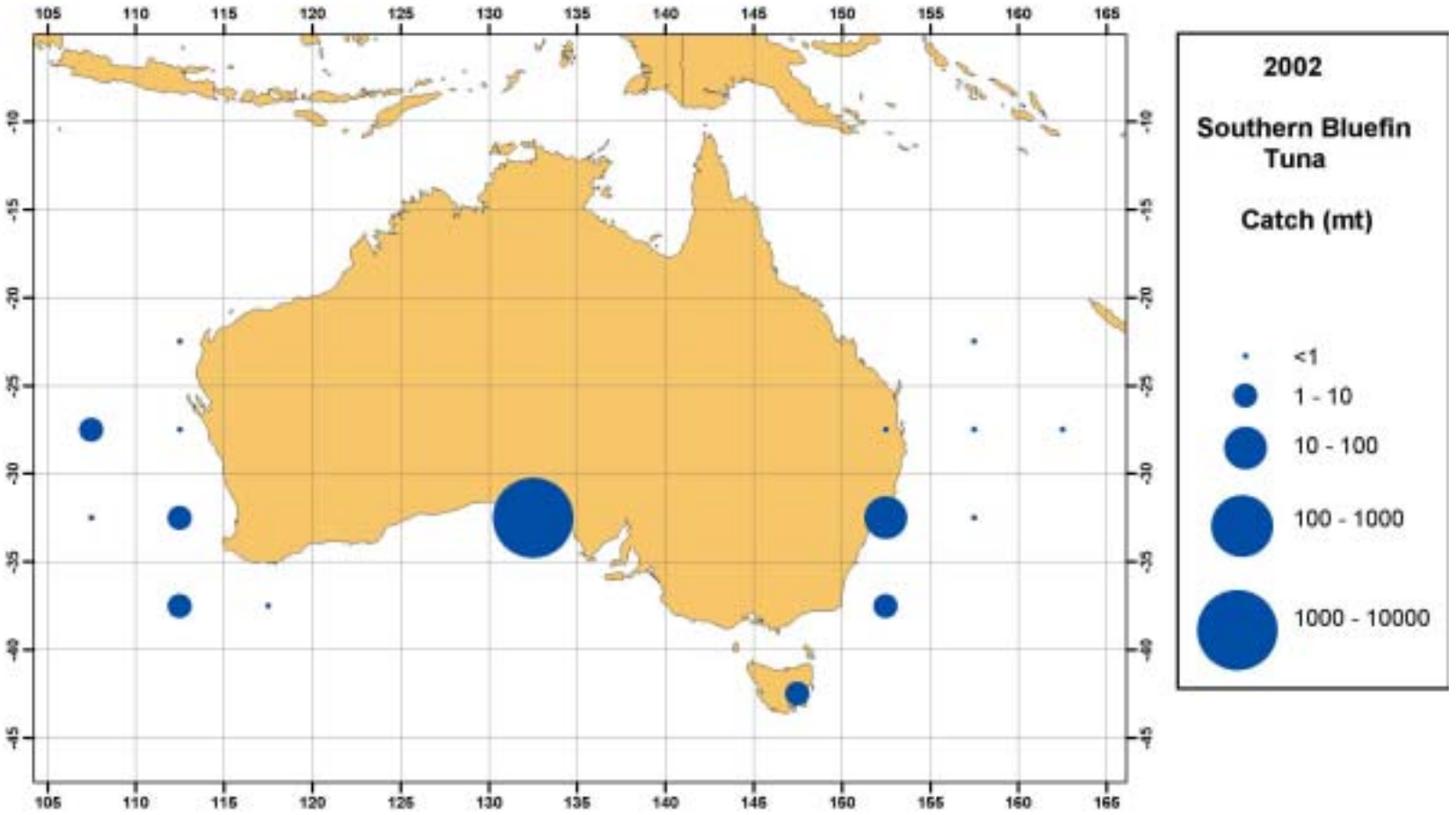


Figure 2: Australian SBT Catch in 2002



2. Catch and effort

In 2001–02, 99.5% of the Australian catch of SBT was taken by purse seine with the remainder taken by longline. Australian catch by gear and State for the quota years 1988-89 to 2001-02 is shown in Table 1. The Australian catch of SBT in calendar years 2001 and 2002 is mapped on Figures 1 & 2 respectively.

3. Nominal CPUE

Catch-per-unit-effort indices are not readily applicable for the Australian SBT fishery. The farm operations use purse seines to catch SBT, with assistance by former pole-and-line vessels as bait boats and the support of spotter planes. This makes it impossible to calculate a reasonable measure of nominal effort.

Australian longliners generally target more than one species in the season and the targeted effort (number of hooks targeting SBT) is not distinguishable from logbooks. For information the nominal SBT CPUE for all Australian longline effort is provided at Appendix I.

All other methods used to land SBT in Australian waters typically constitute a minor part of the catch in recent years and in 2001-02, no SBT were landed by either troll or pole and line vessels.

4. Size composition

In the South Australian surface fishery there has been reduced competition for SBT among fishers following the introduction of individual transferable quotas. Since the late 1980s and 1990s the fishery has avoided the very small (<80cm) SBT, which were previously taken in bulk for canning (Caton *et al.* 1995). This resulted in an increase in the average length of SBT landed for fresh-chilled export. As the farm component of the fishery increased in the 1990's the average length has decreased. This is primarily due to selective targeting on schools to catch the best size for the farm fish, rather than an indication of decreased availability of large SBT (Table 2).

The size trends in the Tasmanian fishery reflect the change in orientation of the fishery from trolling to longlining operations since 1993. In the later years, the catch was dominated by longlining operations that tend to target the larger fish.

Since the late 1980s the average length of SBT landed in NSW has varied considerably because of the varying contribution of longline and sporadic surface catches to the overall catch levels. However, longline caught SBT off NSW have, in general, been considerably larger than SBT previously taken in this fishery.

In recent years it is debatable whether an analysis of average lengths taken in the longline fishery is meaningful. This is due to the small numbers of fish now caught in the WA, NSW and TAS components of the Australian SBT fishery and to the confounding factor of the change in fish length resulting from changes in fishing operations, not in sizes of available fish (Figures 3 & 4).

The percentage representation by length in the winter catches of Japanese longliners off eastern Tasmania from 1988 to 1997 shows substantial changes (Figure 5). Initially there were two groups, in essence representing a group of pre-adults (<130 cm) and older, adult SBT (>150 cm). Progressive increase in representation of younger ages was evident until 1992, and there was also a steady increase in the average length of the SBT comprising the larger mode. The 'trough' between the

modes is consistent with intensive removals of small SBT in the early 1980s by Australia's surface fishery. The increasing representation of small SBT in the eastern Tasmania longline fishery after 1988 had been consistent with the escapement of smaller SBT as a result of the 1988 and 1989 quota reductions in Australia's surface fishery. The reversal of this trend from 1993 is apparent as reduced presence first of SBT <105 cm in 1994, then of SBT <120 cm in 1995, and subsequently of SBT < 135 cm in 1996. This needs careful attention because one explanation could be reduced overall abundance of 3+ year-old SBT in 1994, 3+ and 4+ SBT in 1995 and 3+, 4+ and 5+ SBT in 1996. The reduced representation of those sizes was also noted in the reduced abundance of small SBT (<100 cm) in the Tasmania troll fishery in 1994 and 1995, and the failure of the troll fishery (which has depended upon small SBT) in 1996 and 1997.

In 1997, the troll fishery results were poor and, for the fourth successive year, the observer data from Japanese longliners for the Tasmania winter season showed a scarcity of SBT less than 105 cm. However, the 1997 data showed an increased representation of 105 cm SBT compared with their representation in 1996. In the absence of Japanese and joint-venture longline operations in the AFZ in 1998, no subsequent comparison is possible.

While the successive reduction in small SBT representation did not persist in 1997, the previous decreases may signal several weak year classes in the early 1990s. The changed representation of 105 cm SBT does not appear to have been associated with any change in fishing or reporting practices. Since about 1994, the Japan Tuna Federation apparently instructed all Japanese longliners to return SBT less than 25 kg to the sea, reportedly to protect small SBT.

Table 2. Average fork length (cm) of SBT landed in each Australian state, 1989 to 2002.

Calendar Year	*Western Australia	*South Australia	Tasmania	NSW	Joint-Venture
1989	65.4	88.8	_	_	_
1990	65.6	89.3	96.0	112.8	_
1991	67.2	95.5	94.9	154.8	114.5
1992	66.1	97.0	93.4	109.2	108.0
1993	65.2	101.1	99.7	117.8	116.5
1994	_	97.4	125.5	121.3	124.8
1995	_	103.2	127.9	125.0	125.0
1996	_	102.7	132.7	139.7	_
1997	_	97.7	133.2	134.6	_
1998	_	94.9	134.5	136.1	_
1999	_	97.6	134.2	138.5	_
2000	_	97.0	_	154.3	_
2001	154.3	97.6	_	149.7	_
2002	_	98.6	_	157.9	_

* Lengths are reported by calendar year, except for Western Australia and South Australia, which are by financial year (e.g. 1999 represents the financial year 1998-99) to cover the summer season

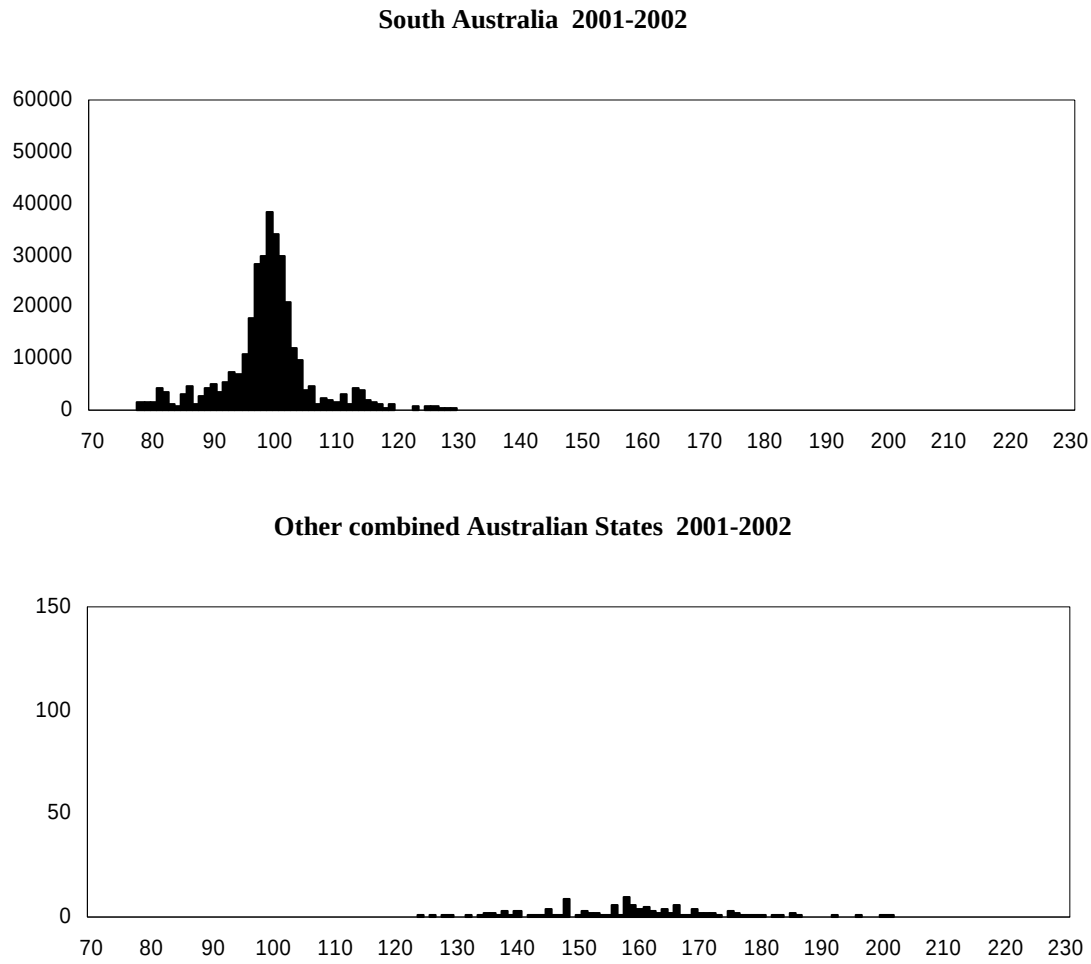
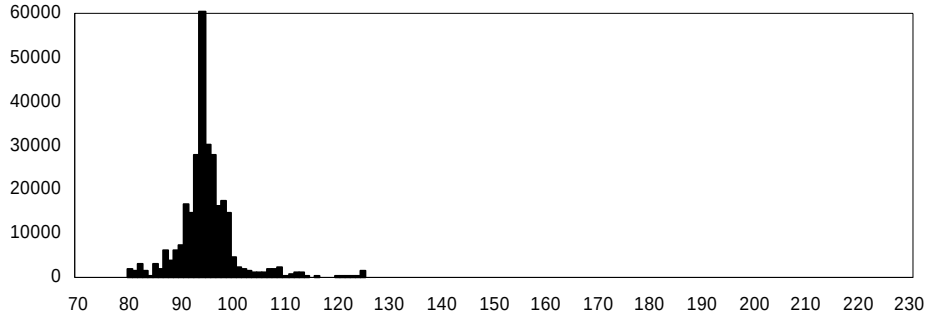
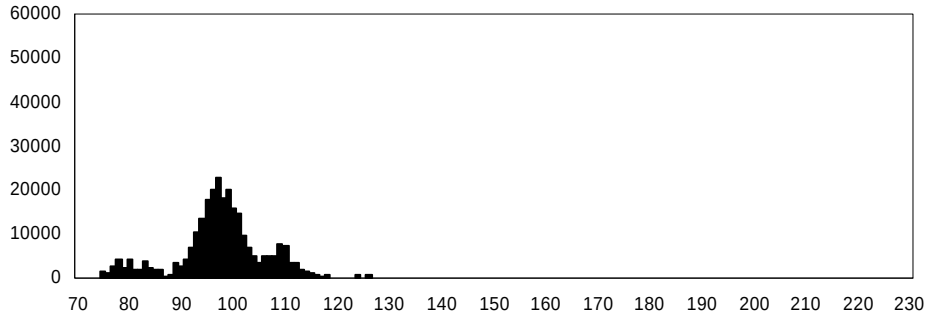


Figure 3: Length frequency histograms for SBT in Australian waters adjusted to total catch, 2001-02 quota year. Note: different frequency scale for SA.

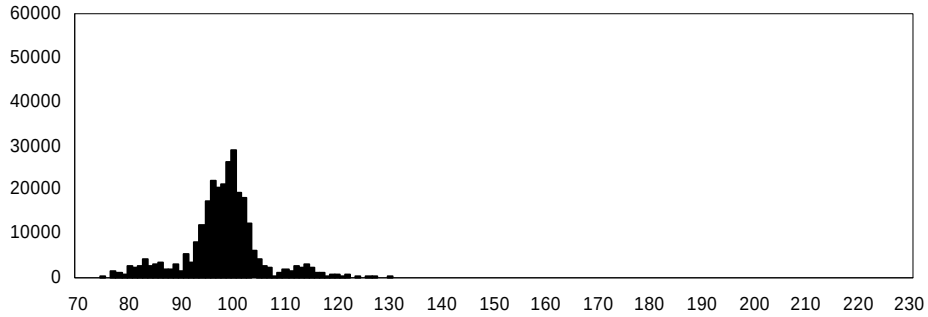
South Australia 1989-1999



South Australia 1999-2000



South Australia 2000-2001



South Australia 2001-2002

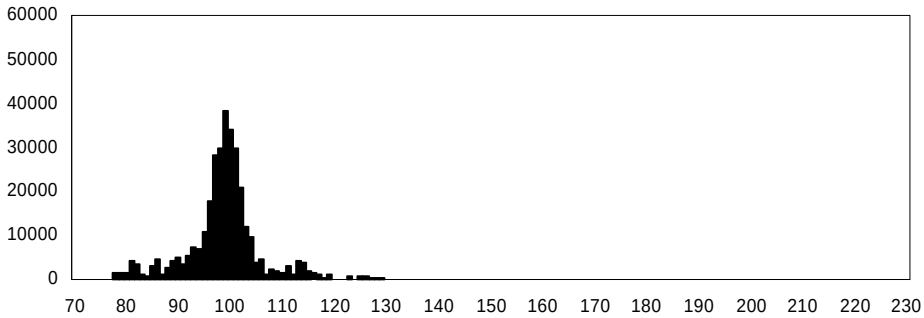
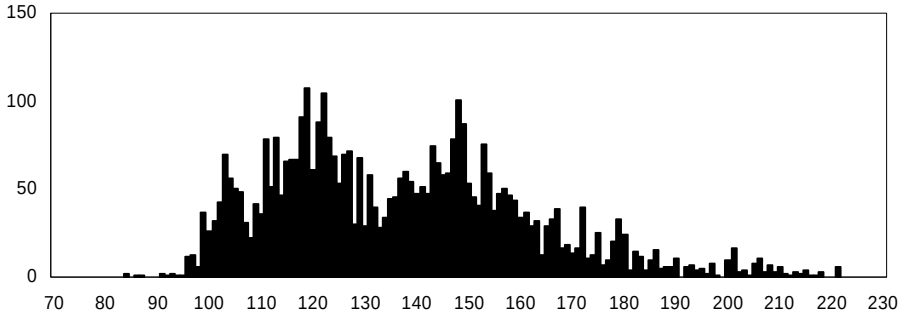
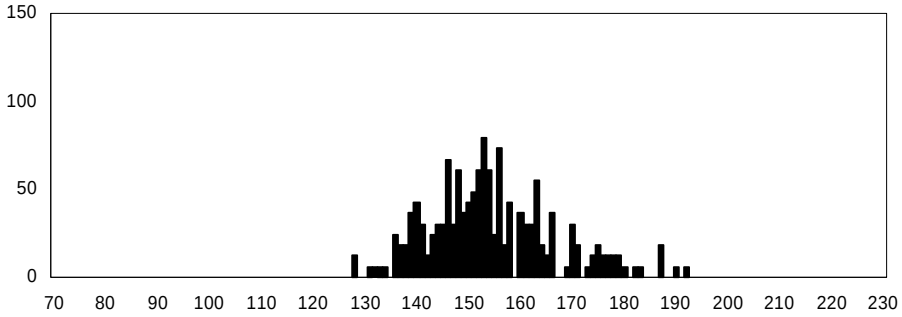


Figure 4: Length frequency histograms for SBT in Australian waters adjusted to total catch, 1999-98 to 2001–02 quota years. Note: different frequency scale for SA.

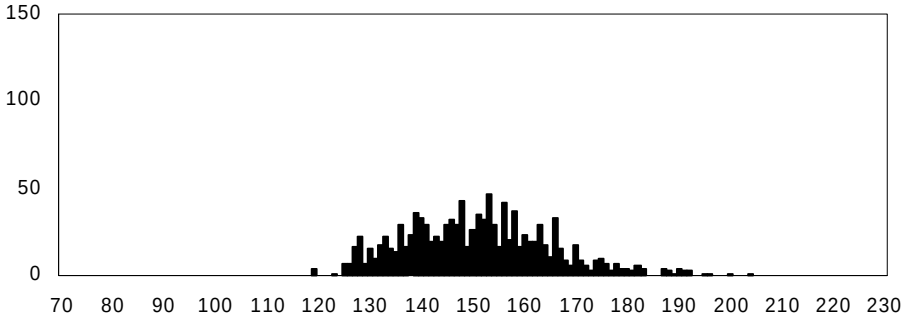
Other combined Australian States 1989-1999



Other combined Australian States 1999-2000



Other combined Australian States 2000-2001



Other combined Australian States 2001-2002

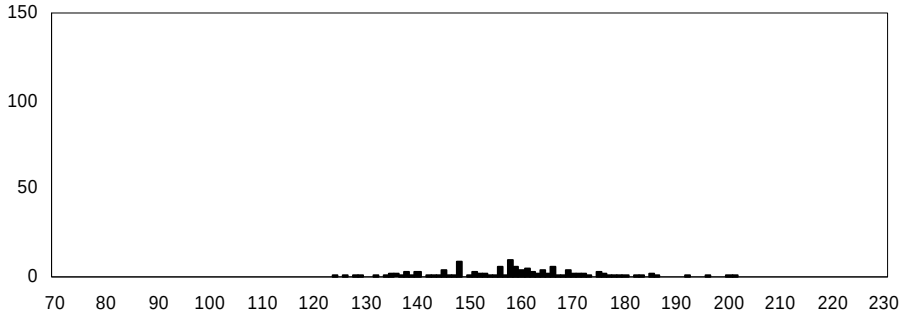


Figure 4 continued: Length frequency histograms for SBT in Australian waters adjusted to total catch, 1999-98 to 2001–02 quota years. Note: different frequency scale for SA.

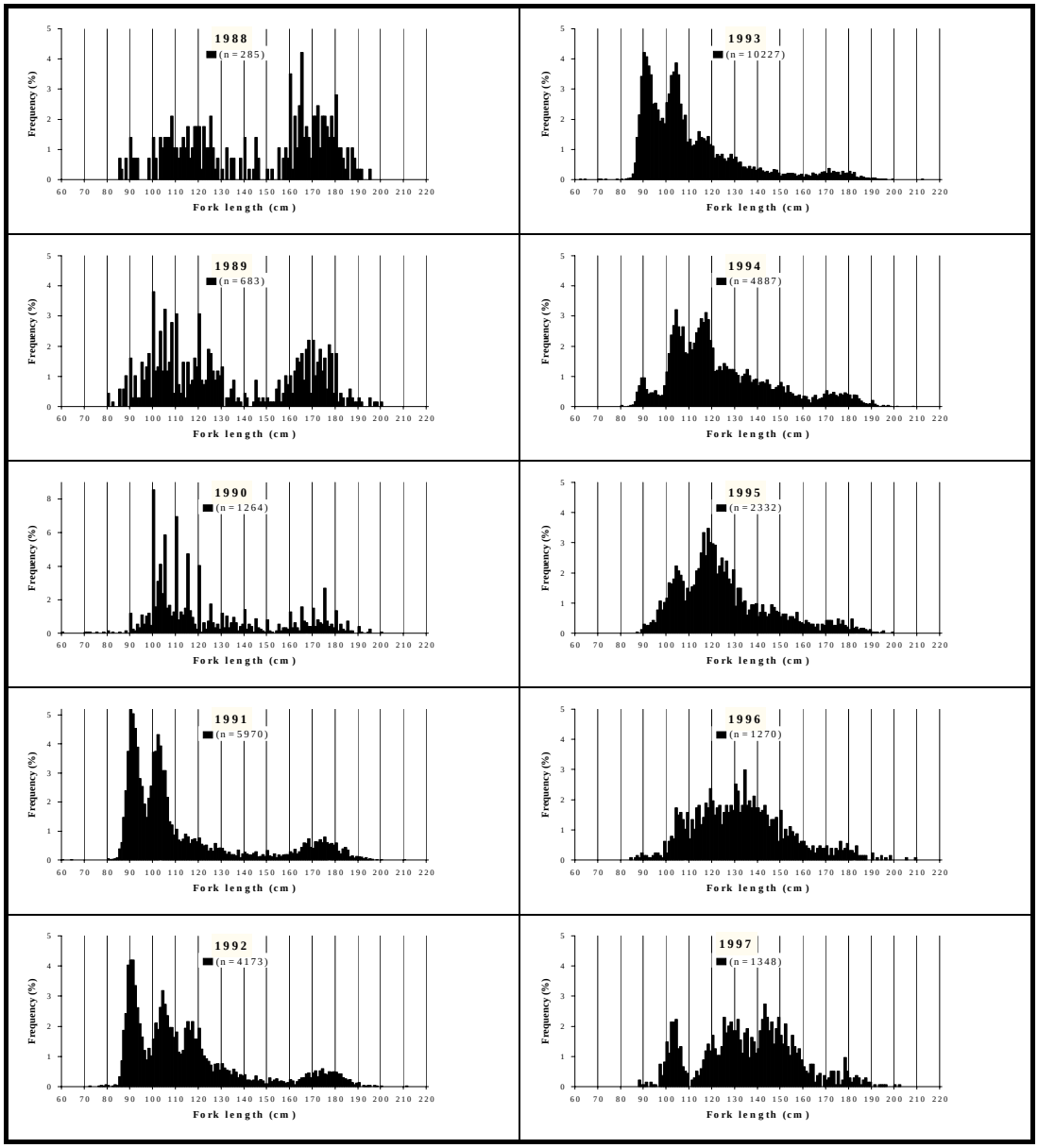


Figure 5. Length frequency histograms for SBT measured by Australian observers on Japanese longliners fishing in the Tasmania region, 1988–97. The data include small SBT tagged and released by observers.

5. Fleet size and distribution

In 2001–02, a total of 56 commercial fishing vessels landed SBT in Australian waters.

South Australia

The one- to five-year-old SBT, which school from late spring to autumn in surface waters of the eastern Great Australian Bight, South Australia, were fished by seven purse seiners during the 2001–02 quota year, but various live bait, pontoon-towing and feeding vessels were also involved. Fishing commenced in late December 2001 and finished in March 2002. No longline vessels reported taking SBT from these waters during 2001–02.

Western Australia

Thirteen longliners caught SBT seasonally off the WA coastline in 2001–02.

New South Wales

During 2001–02, 17 domestic longliners participated at some time in the area of the fishery for older juveniles and adults in deeper waters off NSW in winter. Longline fishing off NSW that landed SBT commenced in May 2001 and finished in November 2001.

Tasmania

Only two longline vessels operated during the 2001–02 quota year because of the non-availability of quota. For confidentiality reasons all catches are incorporated in the NSW longline catch.

Queensland

Two longline vessels operated during the 2001–02 quota year. For confidentiality reasons all catches are incorporated in the NSW longline catch.

6. Other relevant information

CSIRO Marine Research commenced a SBT tagging program in the 1960s to study recruitment, mortality, growth and migration patterns. Between 1990 and 1997 there have been 67 893 conventional tags placed on tuna within Australian waters (Table 3) and 7 751 tags have been returned (11.5% recovery rate). Tags have been recovered by Australian and Japanese vessels in Australian waters, New Zealand and joint-venture longliners in New Zealand waters and further afield from Japanese longliners on the high seas and Taiwanese longliners landing their catches at Mauritius. While the number of these tags being returned is decreasing each year, the period at liberty before recapture is always increasing, consequently, providing progressively more valuable information on growth rates and long term movements of SBT (Stanley 2000). The recruitment monitoring program decided to suspend the release of new tags after 1997, however conventional tagging activity resumed in January 2001. There were 2726 new tags released in WA from January-March 2001. CCSBT began coordination of a tagging program that includes tagging of juvenile SBT in Australian waters in 2002.

Table 3. The number of SBT tagged and released by the CSIRO Marine Research Conventional Tagging Program, 1990–91 to 2000-01.

Season	Western Australia (Albany)	Western Australia (Esperance)	South Australia	Tasmania	Total
1990-91	3306	-	4352	86	7744
1991-92	3050	-	4998	88	8136
1992-93	1182	3759	5873	360	11174
1993-94	2946	5733	7629	196	16504
1994-95	1744	8416	7648	84	17892
1995-96	-	-	4218	109	4327
1996-97	-	-	2087	29	2116
2000-01	2726				2726
Total	14954	17908	36805	952	70619

The CSIRO also conducts an archival tagging project. It began in 1993 with the development of archival tags suitable for small and medium sized tunas. Between 1993 and 2001 there have been 514 archival tags released in Tasmanian and South Australian waters with an 18.3% recovery rate (94 tags returned), including the 27 tags released in February 2000. There were 5 tags released in Western Australia in early 2001. These tags help in migration, movement and behavioural research (Gunn and 0'Reilly 2000).

In January 2001, the CSIRO commenced an acoustic monitoring program to provide information about the movement and migration pathways of juvenile (age 1-2) SBT in southern Australia. There were 32 acoustic tags released in 2001.

The aerial survey program has been conducted over the South Australian west coast waters since 1991 and is improving the understanding of surface abundance of juvenile SBT. The fieldwork component of the aerial survey project was suspended in 2000–01 to permit the completion of analytical work (Polacheck 2000).

Since 1994 the Japan Marine Resources Research Centre (JAMARC) has carried out acoustic surveys in the Albany–Bremer Bay region of Western Australia in an attempt

to develop abundance estimates for 1-year-old SBT (Nishida et al. 1999). Various experiments have been and continue to be conducted to help improve the survey techniques and increase knowledge on biological factors (Anon. 2000, Kemps *et al.* 1999 and Miyashita *et al.* 1999a,b).

7. References

Anonymous (2000) Acoustic survey workshop report. Working Paper RMWS/00/7 Twelfth Workshop on SBT Recruitment Monitoring, October 2000, Hobart, Australia.

Caton, A.E. & and Ward, P. J. (1996). Arrangements on fisheries between the governments of Australia and Japan on tuna longlining. Annex to Ward P.J. (Ed.) (1996) Japanese longlining in eastern Australian waters 1962–1990. Bureau of Resource Sciences, Canberra.

Foster, J.L., Robins, C.M., Caton, A.E. and Williams, K.F. (2001). Australia's 1999-00 and 2000-01 southern bluefin tuna fishing seasons. Working Paper CCSBT-SC/01, Sixth Meeting of the Scientific Committee of the Commission for the Conservation of Southern Bluefin Tuna, August 2001, Tokyo, Japan.

Caton, A.E., Ward, P. J. ,Colgan, M. K., Williams, K. F.,Ramirez, C.and Skousen, T. (1995) The Australian 1989–90 to 1994–95 southern bluefin tuna seasons. Working Paper SBFWS/95/1, First meeting of the Scientific Committee of the Commission for the Conservation of Southern Bluefin Tuna, 10–19 July 1995, Shimizu, Japan.

Gunn, J. and O'Reilly, J. (2000) 1999–00 Archival tag project report. Working Paper RMWS/00/5, Twelfth Workshop on SBT Recruitment Monitoring, October 2000, Hobart, Australia.

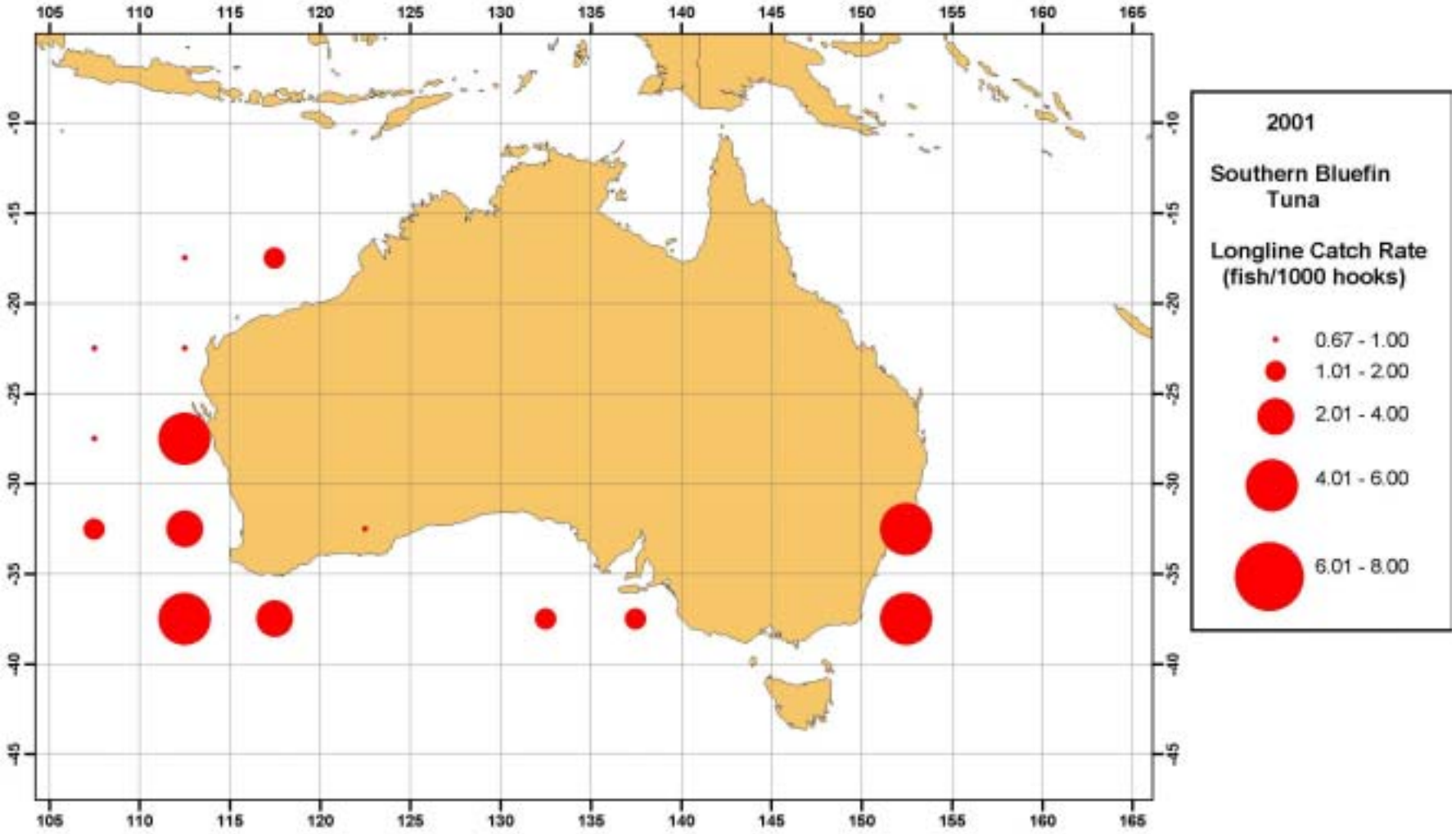
Hender, J., Findlay J.D. and Bromhead D. (2002). Australia's 2001-02 southern bluefin tuna fishing season. Working Paper CCSBT-SC/??, Sixth Meeting of the Scientific Committee of the Commission for the Conservation of Southern Bluefin Tuna, August 2002, Canberra, Australia.

Kemps, H. A., Totterdell, J. A., Nishide, T. and Gill, H. S. (1999) Preliminary analysis on the diet and feeding ecology of juvenile southern bluefin tuna in relation to the southern coastal waters of Western Australia. . Working Paper RMWS/99/18, Eleventh Workshop on SBT Recruitment Monitoring, September 1999, Caloundra, Queensland.

Miyashita, K., Sawada, K, and Nishida, T. (1999a) In situ measurement of live juvenile southern bluefin tuna. Working Paper RMWS/99/15, Eleventh Workshop on SBT Recruitment Monitoring, September 1999, Caloundra, Queensland.

Miyashita, K, Sawada, K, and Nishide, T. (1999b) Acoustic estimation of the school density of juvenile southern bluefin tuna using a split-beam quantitative echo sounder system in Western Australia – Evaluation of sonar specialist's estimation. Working Paper RMWS/99/16, Eleventh Workshop on SBT Recruitment Monitoring, September 1999, Caloundra, Queensland.

Appendix I: Nominal CPUE for all Australian longliners in 2001 and 2002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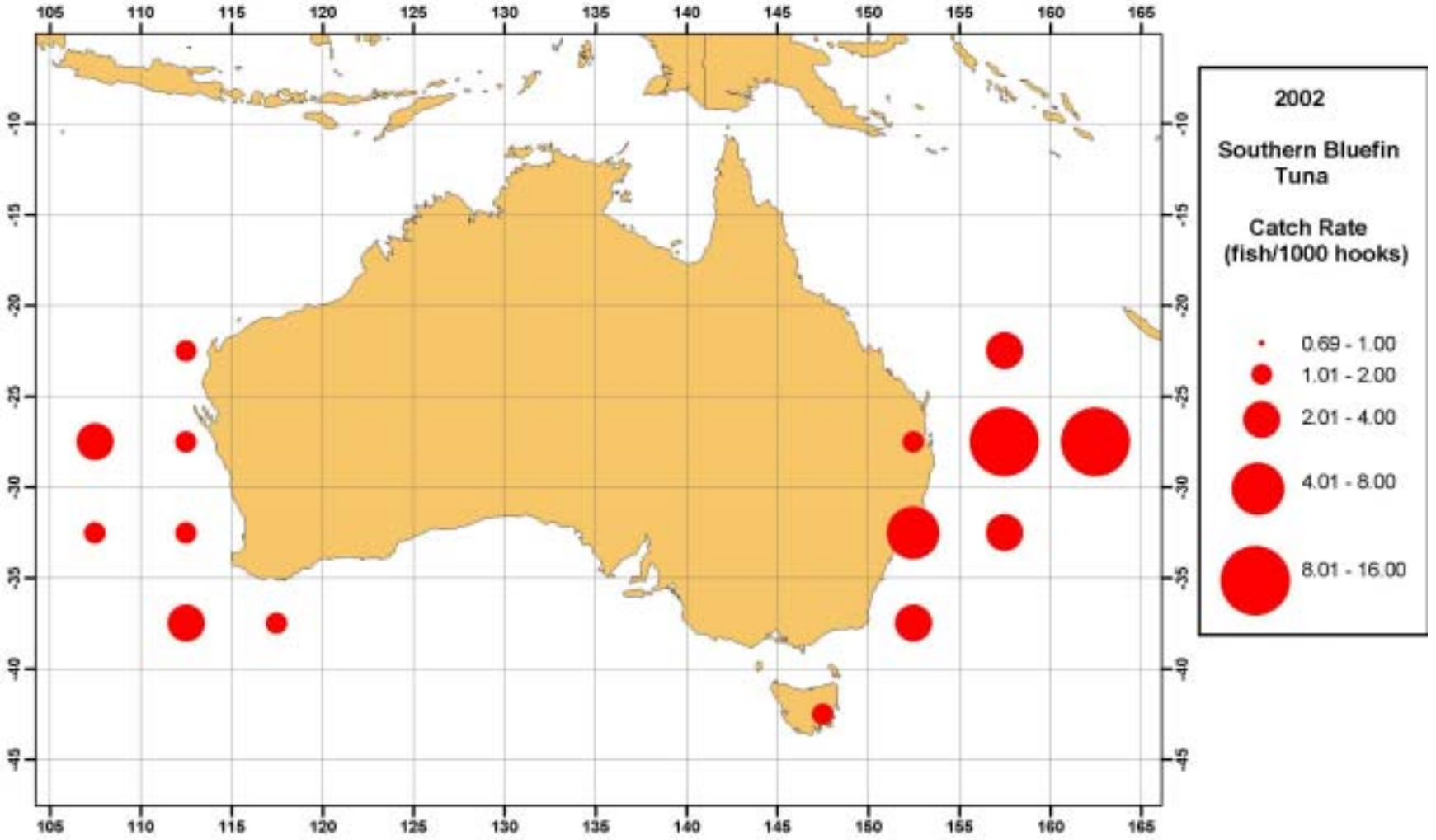
-40
-45
2001
Southern Bluefin Tuna
Longline Catch Rate (fish/1000 hooks)
0.67 - 1.00
1.01 - 2.00
2.01 - 4.00
4.01 - 6.00
6.01 - 8.00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2002
Southern Bluefin Tuna
Catch Rate (fish/1000 hooks)
0.69 - 1.00
1.01 - 2.00
2.01 - 4.00
4.01 - 8.00
8.01 - 16.00