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Update on SBT catch monitoring and biological sampling in Indonesia

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The SBT sampling program in Indonesia would not be possible without the significant cooperation of the scientist team and enumerators involved in measuring SBT and collecting tissue and otolith samples in Indonesia over many years. The cooperation of the longline tuna industry (coordinated through Asosiasi Tuna Longline Indonesia-ATLI) and the individual processing companies in providing access and facilities to carry out the sampling is much appreciated. We also appreciate the support and corporation of the Research Centre for Biota Systems, National Research and Innovation Agency (BRIN) and the Directorate General of Capture Fisheries (DGCF-MMAF) for coordinating and undertaking sampling of adult SBT in Indonesia. This work was funded by the Commission for the Conservation of Southern Bluefin Tuna and CSIRO Environment.

Abstract

Monitoring the size and age structure of SBT in the Indonesian longline fishery began in the early 1990s and is a key component of CCSBT assessments of spawning stock status and provides critical data for close-kin mark-recapture (CKMR) analyses. In 2021/22, the monitoring program was disrupted due to a combination of COVID-19 impacts and institutional restructuring within Indonesia, and in 2023, the CCSBT supported a collaborative capacity-building project to restore monitoring activities. Sampling remained low through 2023/24 but increased substantially in the most recent sampling season (2025/26). During this season, 5,342 SBT were measured, muscle tissue was collected from 5,306 fish for CKMR, and otoliths were collected from 3,051 fish for age estimation, highlighting the successful rebuilding of monitoring capacity. The size distribution in 2025/26 was similar to that observed in the most recent well-sampled year (2020/21), with a mean fork length (FL) of 162 cm. Muscle tissue and otoliths collected since 2022/23 remain in Indonesia pending completion of a Material Transfer Agreement to facilitate their transfer to Hobart for analysis, which is expected to contribute to the 2027 CCSBT data exchange.

Introduction

Southern bluefin tuna (SBT) spawn between Indonesia and northwest Australia from September to April. Monitoring the size and age composition of SBT caught as bycatch in the Indonesian longline fishery is critical for stock assessments and close-kin mark recapture (CKMR) analyses used by the CCSBT to monitor changes in the spawning population. A collaborative monitoring program between Indonesia's Ministry of Marine Affairs and Fisheries and CSIRO began in 1993 to monitor the size and age distribution of the catch of SBT. Most monitoring occurs at the Port of Benoa, where otoliths are collected from ‘reject’ quality SBT (graded as non-export quality) (Farley et al. 2007). Since 2013, the CCSBT Scientific Research Plan has identified continued sampling and ageing of SBT otoliths and collection of tissue samples for CKMR as high priorities.

Following disruptions to the Indonesian monitoring program in 2021/22 and 2022/23, a collaborative capacity-building project was initiated to restore biological sampling and catch monitoring (Farley et al., 2025). Training workshops, revised sampling protocols and enhanced coordination between Indonesian agencies and CSIRO resulted in a partial recovery in tissue and otolith sampling during the 2024/25 spawning season. This report provides an update on the catch monitoring during 2025-26.

Length monitoring and biological sampling: 2025-26

Between September 2025 and May 2026, a total of 5,342 SBT were measured at the Port of Benoa, with muscle tissue and otoliths collected from 5,306 and 3,051 individuals, respectively. This represented a substantial increase compared with previous years and highlights the success of the collaborative project to restore and strengthen SBT monitoring capacity in Indonesia (Farley et al., 2025). The measured fish ranged in size from 101 to 214 cm FL (Table 1), and the length-frequency distribution by spawning season is shown in Figure 1. The length data presented here were included in the 2026 CCSBT data exchange. Otoliths collected during the 2022/23 to 2025/26 seasons remain in Indonesia, pending transfer to Australia for age estimation, which is expected to be completed in time for inclusion in the 2027 CCSBT data exchange.

Changes in the size distribution of the catch

As reported previously, the mean length of SBT landed at Benoa has declined substantially from around 180 cm FL in the mid-1990s to ~170 cm in the early 2010s (Figure 2). A further decline occurred between 2012 and 2014, when mean length dropped to ~160 cm FL, coinciding with the emergence of a distinct mode of smaller fish in the catch (Figure 1, Figure 3). This cohort progressed through the fishery until 2016/17, during which mean lengths remained relatively stable at 160-163 cm FL. Since 2018, the length-frequency distributions have again been dominated by a single mode, with mean length remaining relatively stable between 159 and 162 cm FL, including 162.0 cm FL in the most recent season 2025/26.

Table 1. Number of length measurements, otoliths sampled and age estimates for SBT by spawning season.

Spawning season	Fork length (cm)			Otoliths	
	N	*Mean*	*Range*	*N*	*Age estimates*[1]
1993/94	676	188.1	161-207	0	0
1994/95	1610	180.7	147-221	549	486
1995/96	1107	178.9	149-216	225	50
1996/97	1615	179.6	146-218	602	475
1997/98	1577	176.4	143-214	519	485
1998/99	936	179.9	145-210	660	474
1999/00	786	177.4	150-216	533	498
2000/01	762	174.2	140-210	720	481
2001/02	821	169.5	147-223	715	489
2002/03	1385	166.8	134-229	1502	488
2003/04	1279	168.5	145-215	1283	494
2004/05	1580	168.4	89-205	1523	493
2005/06	1182	168.5	122-201	1180	486
2006/07	1586	167.5	134-202	1586	491
2007/08	1693	169.5	145-203	1709	485
2008/09	1704	171.0	143-219	1697	479
2009/10	1583	168.5	141-204	1538	488
2010/11	1015	170.4	142-198	1009	481
2011/12	565	169.4	136-212	543	NA
2012/13	1381	162.1	131-211	1373	474
2013/14	1641	158.2	117-201	1637	473
2014/15	1609	160.7	110-201	1346	482
2015/16	2000	161.0	117-201	2000	477
2016/17	1500	163.3	134-203	1499	472
2017/18	1500	159.8	134-209	1500	486
2018/19	1500	162.0	134-205	1500	474
2019/20	1500	160.6	134-199	1500	484
2020/21	1500	161.6	133-208	1500	484
2021/22	0	NA	NA	0	0
2022/23	148			148	0
2023/24	236	159.9	128-192	21	0
2024/25	1148	162.1	128-203	865	0
2025/26	5342	162.0	101-214	3051	0
Total	44467			36033	12129

[1] A random sub-sample of 500 are selected for ageing, apart from the 2011/12 season where an ALK based on data from the previous two seasons was used.

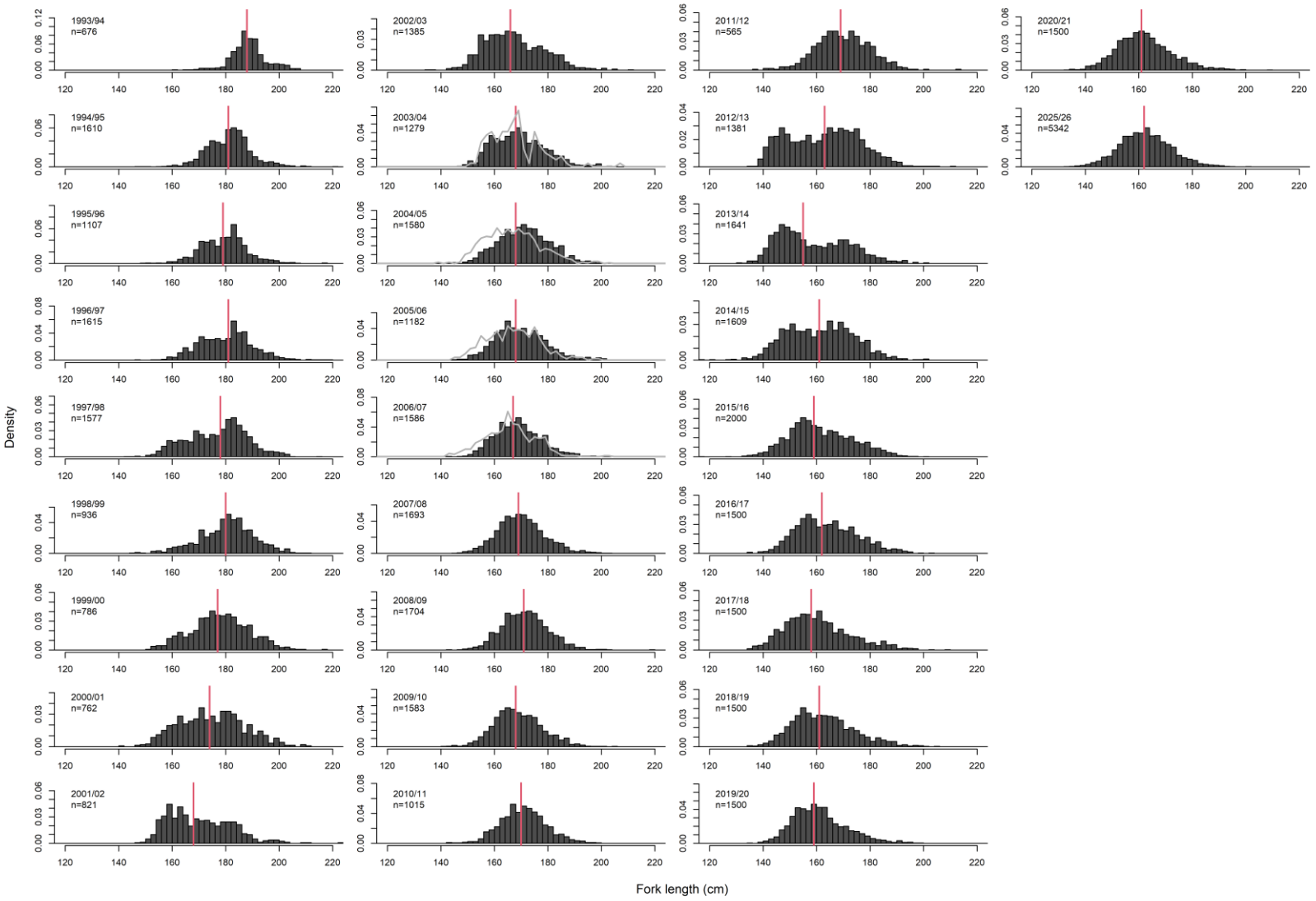


Figure 1. Length frequency (2 cm intervals) of SBT caught by the Indonesian longline fishery (bars) by spawning season. The red bar shows the median size class. For comparison, the length distribution of SBT thought to be caught south of the spawning ground (Processor A) is shown for the 2003/04 (n=121), 2004/05 (n=685), 2005/06 (n=311) and 2006/07 (n=452) seasons (grey line) (Farley et al. 2007)

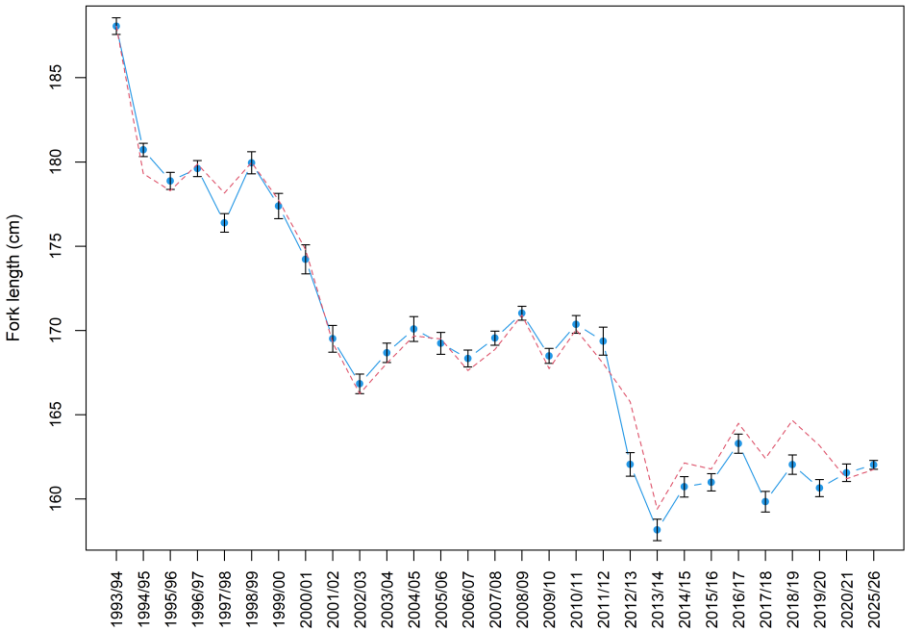


Figure 2. Mean length (+/- 95% CI) of SBT landed by the Indonesian longline fishery by spawning season. Data from Processor A in 2003/04 to 2006/07 are excluded. Dashed line is the mean length of SBT caught in December to May only.

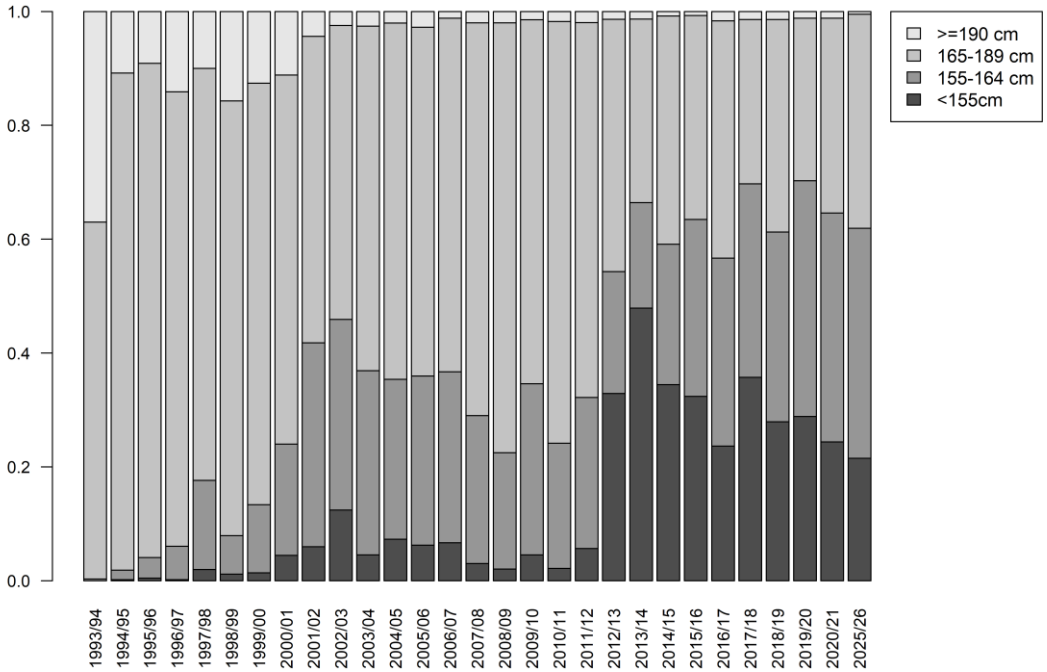


Figure 3. Proportion of SBT caught by the Indonesian longline fishery by size class. Data from Processor A in 2003/04 to 2006/07 are excluded.

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