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Report of the age-0 southern bluefin tuna distribution off the west coast of Western Australia in 2026

2026 年の西オーストラリア州西沿岸におけるミナミマグロ 0 歳魚分布調査の結果報告

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要約

ミナミマグロについて仔魚から 1 歳魚までの分布と回遊はほとんど知られていない。西オーストラリア州沿岸で小型 0 歳魚の分布を調べる調査プロジェクトを 2019 年に開始し、第 5 回目調査をこれまでより南に位置するアブロルハス諸島近海で実施した。10 日間で 30-46 ㎝の 91 個体の SBT を採取した。SBT には二つの産卵ピークに相当する魚が見られた。25 個体にはアーカイバルタグを装着して放流した。

Summary

Little is known about the distribution and migration of southern bluefin tuna (SBT) from larvae to age 1. A research project to investigate the distribution of small age-0 fish off the coast of Western Australia was launched in 2019, and the fifth survey was conducted in the waters near the Houtman Abrolhos Islands, a location further south than previous survey sites. Over a 10-day period, 91 SBT measuring 30 - 46 cmFL were collected. The size of fish corresponded to two distinct spawning peaks. Twenty-five individuals were implemented with archival tags and released.

1. Introduction

It has been revealed from the collection of larvae and the catch of adult fish with developed ovaries that the spawning grounds of southern bluefin tuna (*Thunnus maccoyii*; SBT) are located in the waters between south of Java and northwest of Australia (10S-20S, 100E-125E) (Ueyanagi 1969, Warashina and Hisada 1970, Farley and Davis 1998). It is believed that the spawning season of SBT, which runs from September to April of the following year, has two peaks, one in October and the other in January and February, based on data from Japanese commercial longline CPUE in the spawning area in the 1950s and 1960s, body length composition of age-1 fish off the southwest coast of Australia, and monitoring of adult fish landings in Indonesia since the 1990s, (Mimura and Warashina 1962, Hynd 1965, Shingu 1970, Farley and Davis 1998). The two sub-cohort structure of SBT has also been confirmed by length frequency analysis of SBT between age 0 and 2 caught in the trolling surveys conducted off the south coast of Western Australia (Itoh et al. 2012). It is known that the fish, which has grown to about 45 cm (1 year old), is distributed on the west coast of Western Australia (Hynd 1965). However, little is known about the distribution and migration of fish between larvae and age-1. It is important to know the distribution and migration of fish in the life stage during this period, and the influence of the environment on it, because it would make available to understand the annual fluctuation of recruitment of SBT stock.

In the 1980s and 1990s, the Japanese Fisheries Agency carried out several research surveys using the research vessel Shoyo-maru on the west coast of Western Australia, and collected SBT by trolling. As a result, the distribution of age-1 fish was confirmed mainly off Perth (32S), and a total of 11 small age-0 fish of 25 cm or less were collected. However, no survey was conducted after that, and information on the distribution of small age-0 fish was not added.

In December 2019, we started a new research project to investigate the distribution of small age-0 fish (< 25 cm in fork length; FL) off the northwest coast of Western Australia, and have been successful in collecting small SBT with a minimum of 23.0cm FL by trolling gear, including the second survey in December 2022 (Itoh and Tsuda 2020, Itoh 2023). Among the SBT caught in the trolling survey in southern Western Australia, there were few fish born in October, which was the target of the December survey (Itoh et al. 2012), and because strong winds make it difficult to conduct surveys in December, the survey period was moved from March to May to target fish born in January and February. However, we did not have any SBT collection in the third and fourth surveys, which were held in March 2024 and May 2025, respectively (Itoh 2024b, 2025). We conducted the fifth survey in May 2026. The research was conducted in a more southern area than before, targeting both fish born during the early spawning season and fish that likely migrated

south early. The results of the survey are presented in this document.

2. Materials and methods

An Australian vessel, Aussie Warrior (19.9m long, 5.75m wide, 40 ton), was chartered (Fig. 1). The study area was around the Abrolhos Islands, 60 km off the west of Geraldton in Western Australia (Fig. 2).

The vessels engaged in the survey from 8:00 to 16:00 and returned to a calm bay every day. GPS position data were recorded every second in GPS logger devices. The vessel operated trolling at a speed of 7-8 knots. Seven trolling lines consists of four types of lines, were trolled at maximum. Each line had one hook with a plastic lure. Individual fish caught of any species were measured by their length. Some SBT were killed for biological samples, including stomach for contents analysis and muscle tissue for stable isotope analysis. Other SBT were released, followed by their fork length (FL) being measured. SBT in good condition were implemented archival tag (LAT2810L from Lotek Inc.) and released. To determine the proportion of fish—attracted to the vessel or the fishing gear—that are actually hooked and caught, underwater footage was recorded during trolling operations using a system equipped with an action camera.

3. Results

The survey was carried out over ten days between May 14 and May 23. Strong winds prevented the vessel from departing for one day.

A total of 202 fish were caught, including 91 SBT, 5 yellowfin tuna *Thunnus albacares*, 2 longtail tuna *T. tonggol*, 50 skipjack *Katsuwonus pelamis*, 11 other species, and 43 unidentified fish because the hooks came off far from the vessel (Table 1). Twenty-five SBT were released with an archival tag implemented. Stomachs and muscles were collected from 90 individuals, including SBT. Analysis of stomach contents revealed that fish accounted for 62% of the total weight of the food. Towing camera surveys were conducted 27 times, yielding 31 hours of underwater footage.

SBT ranged from 30 cm to 46 cm in fork length. There were three individuals measuring 30–33 cm (estimated to have been born in February 2026) and 88 individuals measuring 37 cm or larger (estimated to have been born in October 2025).

A total of 51 SBT specimens were killed, with a combined weight of 68.7 kg.

4. Discussion

In this survey, we were able to collect fish born at two different spawning peaks. Regarding SBT around 40 cmFL, estimated to have been spawned in October, one fish measuring approximately 40 cm was caught in the 2019 survey in Shark Bay, which is located north of the survey area this year, so it is thought that it is already distributed on the continental shelf from Shark Bay to the Abrolhas Islands. Combining Shoyo-maru survey data (1990), acoustic and trolling survey data (since 1996), and historical catch data in the literature from the Australian coast (Hynd 1965), it appears that its distribution continues as far as Rottnest Island off the coast of Perth, and then from Albany to Esperance on the southern coast of WA on the continental shelf. However, direct data regarding whether they are distributed uniformly or patchily (concentrated in high-density areas), or whether they migrate within this range, has been lacking until now. We have attached archival tags to 25 individuals; should they be recaptured, we anticipate obtaining direct data on their movements.

Regarding SBT around 30 cmFL class, estimated to have spawned in February, we managed to collect three specimens of fish. Compared to the 40 cm class, these were caught further west and near the continental shelfedge, suggesting they may have only recently migrated in from offshore. Off the west coast of Western Australia, the Leeuwin Current—a slow-moving warm current—flows southward, with its core located near the continental shelfedge (Furue 2019). While the mechanism by which small (30 cm class) SBT migrate from their spawning grounds to the continental shelf off Australia remains unclear, surveys in 2019 and 2022 collected 23–25 cm SBT beyond the shelfedge (Itoh and Tsuda 2020; Itoh 2023), and trolling surveys frequently caught 30 cm class SBT in the shelfedge area (Itoh 2024a). Based on this, we hypothesize that these fish move within the warm waters expanded by the Leeuwin Current—distributing primarily along the shelfedge—and migrate southward along the WA west coast before heading east along the WA south coast. Under this hypothesis, the migration of small SBT toward the coast would be strongly influenced by the strength of the Leeuwin Current. In 2025, the Leeuwin Current was strong, causing a high-temperature zone to extend far south off the WA west coast, whereas in 2026, the current was not as strong. Consequently, the southward migration of 30 cm class fish (spawned in February) to the Abrolhos Islands may have been delayed compared to 2025. The Leeuwin Current is also known to strengthen during La Niña years; therefore, how SBT distribution and migration patterns shift in response to oceanographic dynamics linked to ENSO events will be a key focus for future study.

Having successfully detected two size groups of fish, it would be worthwhile to conduct further surveys in this area.

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Figure 1. Aussie Warrior, used for the 2026 survey of the age-0 SBT distribution research.

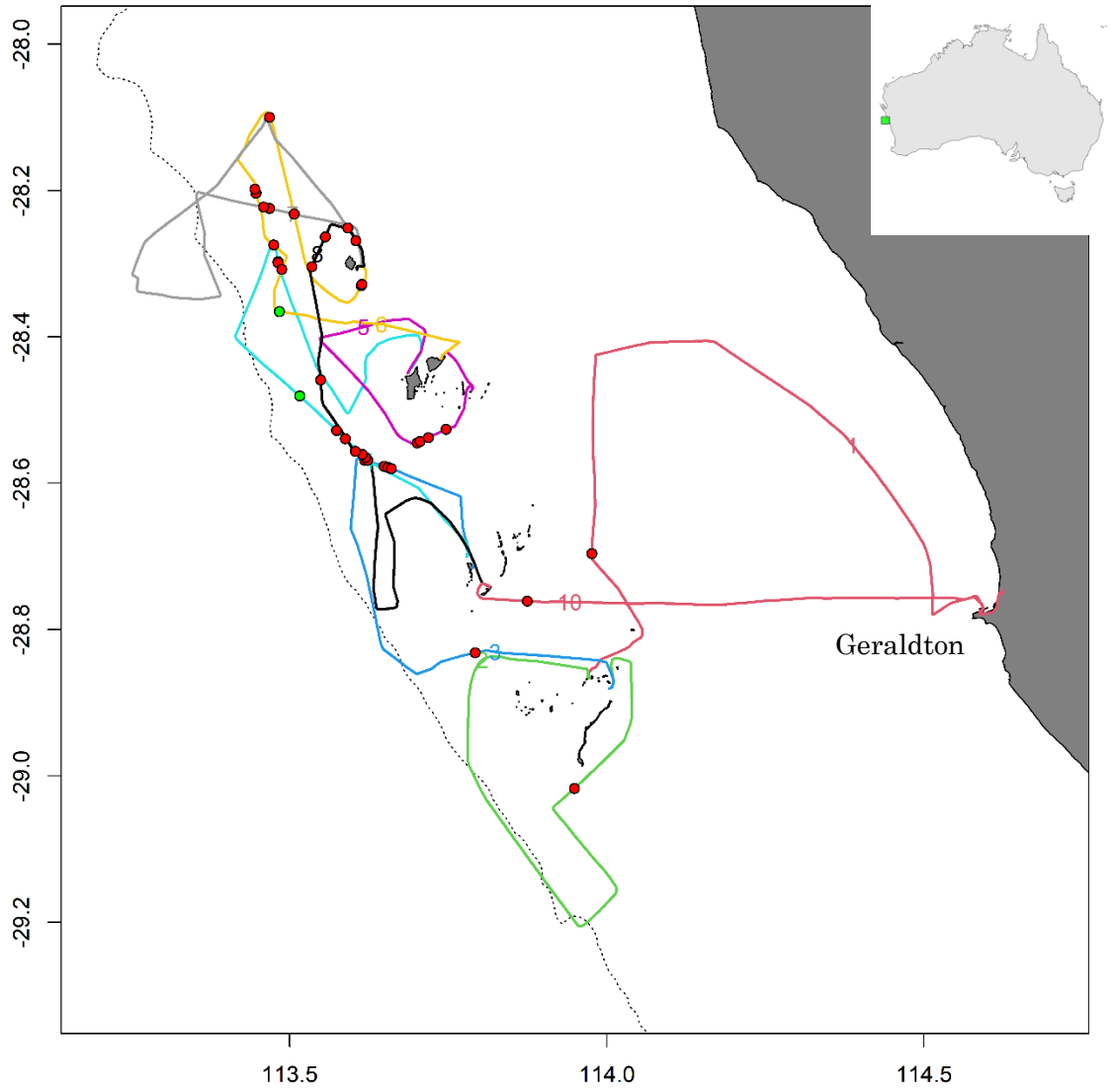


Figure 2 Survey tracks and southern bluefin tuna capture locations.

Dotted lines indicate the 200m isobath. Cruise tracks from different days are shown in different colors. Numbers indicate positions at 09:00. Cruise tracks include periods when trolling was not being conducted. Circles represent SBT capture locations: green indicates a fork length of less than 35 cm, and red indicates 35 cm or greater.

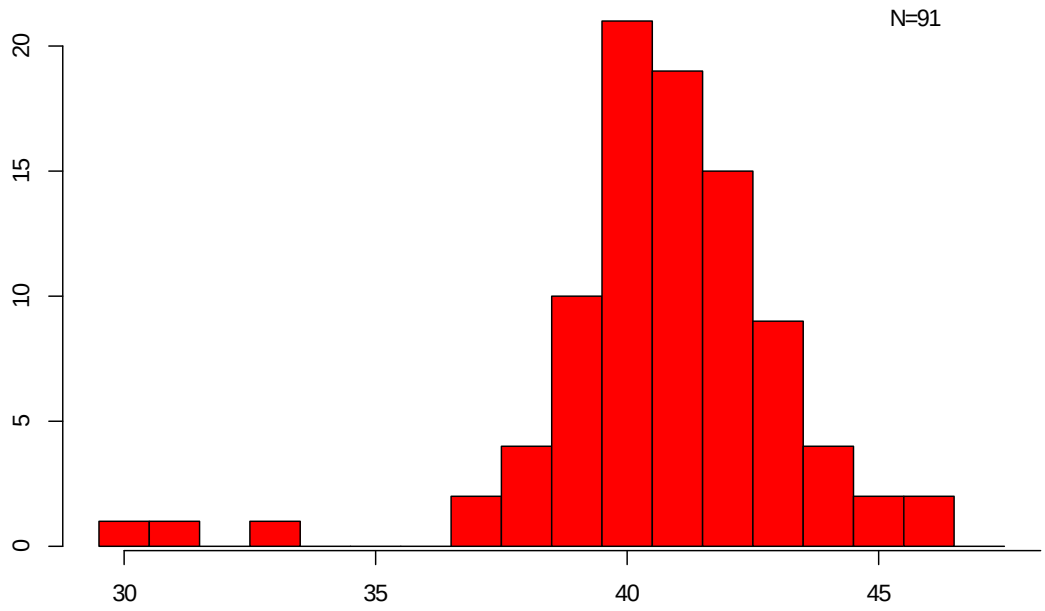


Figure 3　Fork length frequency of southern bluefin tuna captured.

Table 1. List of fish caught in the age-0 SBT distribution survey in 2025.

Japanese name	English name	Scientific name	N
SBT	Southern Bluefin Tuna	*Thunnus maccoyii*	91
カツオ	Skipjack	*Katsuwonus pelamis*	50
キハダ	Yellowfin tuna	*Thunnus albacares*	5
コシナガ	Longtail tuna	*Thunnus tonggol*	2
ヒラソウダ	Frigate mackerel	*Auxis thazard*	1
シイラ	Dolphinefish	*Coryphaena hippurus*	2
ヨコシマサワラ	Narrow-barred spanish mackerel	*Scomberomorus commerson*	1
ニジョウサバ	Shark mackerel	*Grammatorcynus bicarinatus*	4
クイーンズランドスクールマッケレル	Queensland school mackerel	*Scomberomorus queenslandicus*	1
ダツ	Barred longtom	*Ablennes hians*	1
テイラー	Tailor	*Pomatomus saltator*	1
sub_total	sub_total		159
不明（バレ）	unidentified (hook came off before identification)		43
Total	Total		202