

Draft for Workshop of Recruitment Monitoring Program in 2006

Report on the piston-line trolling survey in 2005/2006

ピストンライン曳縄調査 2005/2006 の結果報告

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## Summary

In January 2006, a research survey that provides recruitment level of age one southern bluefin tuna with low cost was conducted as feasibility. In the survey, a chartered Australian vessel goes and back on a same straight line (piston-line) using trolling. In eight days for piston-line survey, 19 SBT schools were found on the piston-line in 42.9 hours. The trolling index is calculated as 44.3 schools / 100 hours. SBT mortality by this survey was 525 kg.

## 要約

2006年1月に、ミナミマグロ1歳魚の加入レベルを低コストで提供する新たな調査を試行として実施した。この調査では、豪州船を用船し、単一ライン（ピストンライン）上を曳縄をしながら往復する。8日間のピストンライン調査で、ミナミマグロ19群が42.9時間に発見されたことから、曳縄指数は44.3群/100時間であった。調査で死亡したミナミマグロは合計525kgであった。

## 1. Objectives

In order to know the recruitment level of southern bluefin tuna *Thunnus maccoyii* (SBT) as early as possible in their life stage, the Recruitment Monitoring Program has been carried out since 1988. In recent years, the Recruitment Monitoring Program, including the acoustic survey for age one SBT, the aerial survey mainly for age three SBT and other relevant researches, are conducted under the research framework of collaboration between Japanese and Australian scientists.

The acoustic survey has been conducted since 1996 by transect method on designed zigzag lines. A Japanese vessel (Taikai-maru No 2) that equipped high performance scanning sonar was transported to Australia. While this survey provides quantitative results, it has been a great concern that it requires a large budget. Therefore, a type of

survey that can be done with small budget even providing information in less accuracy but useful has been desired.

Last year, we conducted a survey that a chartered Australian vessel go-and-back on a single straight line and find SBT schools with side-scan sonar. However, because few schools were detected, we could not evaluate the effectiveness of the method. This year, we again conducted a feasibility survey that a chartered Australian vessel go-and-back on a single straight line, but find SBT schools with trolling catch.

## 2. Research method

An Australian vessel, St Gerard M, was chartered (Fig.1). The vessel departed Esperance on 22 January 2006, and stayed off Bremer Bay from 23 to 30 January for research. The vessel left off Bremer Bay and arrived Esperance on 31 January, and then the research survey was finished.

The research area was off the south coast of Western Australia between Esperance to Bremer Bay (Fig. 2). The piston-line lies between two points; one is at 34°31.1'S-119°26.5'E and the other was at 34°47.4'S-119°41.4'E. These are slightly different from those used in 2005 (34°29.0'S-119°24.0'E, 34°48.0'S-119°41.0'E) in order to prevent influencing to the listening stations of sonic tagging for SBT. In addition to the piston-line, adjacent areas east or west of the piston-line were also surveyed so that evaluate whether the piston-line is a peculiar area in regard to SBT distribution (Fig. 3). Furthermore, on the ways from and to Esperance, the areas so called "hot spots" where SBT often aggregated due to its specific topography in the coastal area were also surveyed.

The vessel operated trolling at speed of 7 knots. Eight lines at maximum were trolled.

The index derived from the survey is based on the number of SBT school, not the number of SBT individuals caught. Therefore, when catch was succeeded and reach 10 individuals presumably from single school, trolling was suspended and the vessel went forward around 0.5 mile without trolling the lines so that left from the school, in order to minimize mortality by the survey.

Individuals caught of any species were measured length and weight and stomachs were taken. Otoliths and muscle tissue were also collected from SBT individuals.

## 3. Result

Usually, the vessel conducted research survey from 5:00 to 18:00 and anchored in calm bay at night. While there are a few days in rough sea, most of the days were in calm sea

and we could the survey in the successive 10 days. Except the 1<sup>st</sup> and 10<sup>th</sup> day when the vessel cruised between Esperance and Bremer Bay with conducting troll at several hot spots, eight days were used for surveys on the piston-line and adjacent areas (Fig. 3, Fig. 4). On the 6<sup>th</sup> day, only a third of the piston-line was surveyed due to rough sea condition and exchange of field researcher. On the 9<sup>th</sup> day, two third of the piston-line was surveyed due to rough sea condition.

During the whole period, total of 288 fish individuals were caught, including 211 SBT, 12 albacore *Thunnus alalunga*, 28 skipjack *Katsuwonus pelamis*, 24 bonito *Sarda orientaris*, 8 barracuda *Thyrsites atun*, 3 australian salmon *Arripis truttaceus* and 2 yellowtail kingfish *Seriola lalandi*. Total weight of SBT mortality by this survey was 525 kg.

Locations of SBT caught are shown in Fig. 3 and Fig. 4. SBT were caught not only on the piston-line but also in the adjacent areas on the continental shelf. Relatively many SBT schools were found on shelf edge in spite of short survey durations were allocated. On days of calm sea surface, several SBT schools of jumping were sighted by eye.

98.6 % of SBT caught were age one with around 50 cm FL, followed by two individuals of age two and one individuals of age three (Fig. 5).

#### 4. Calculation of the trolling index

The trolling index that defined as the number of school of age one SBT in 100 search hour was calculated. Because 19 SBT schools were found on the piston-line in 42.9 hours, the trolling index is 44.3 schools / 100 hours. If including the adjacent areas east or west to the piston-line, 32 schools in 64.3 hours provide 49.8 schools / 100 hours.

#### Acknowledgement

Members who accomplish the survey, Tonk and Harry of St Gerard, Frank Totterdell and John Totterdell of SBT guide, and Yukito Narisawa of CCSBT Secretariat, are greatly appreciated. Staffs in Fisheries Agency of Japan, CCSBT Secretariat and NRIFSF are acknowledged.



Fig. 1 St Gerard M, used for the research

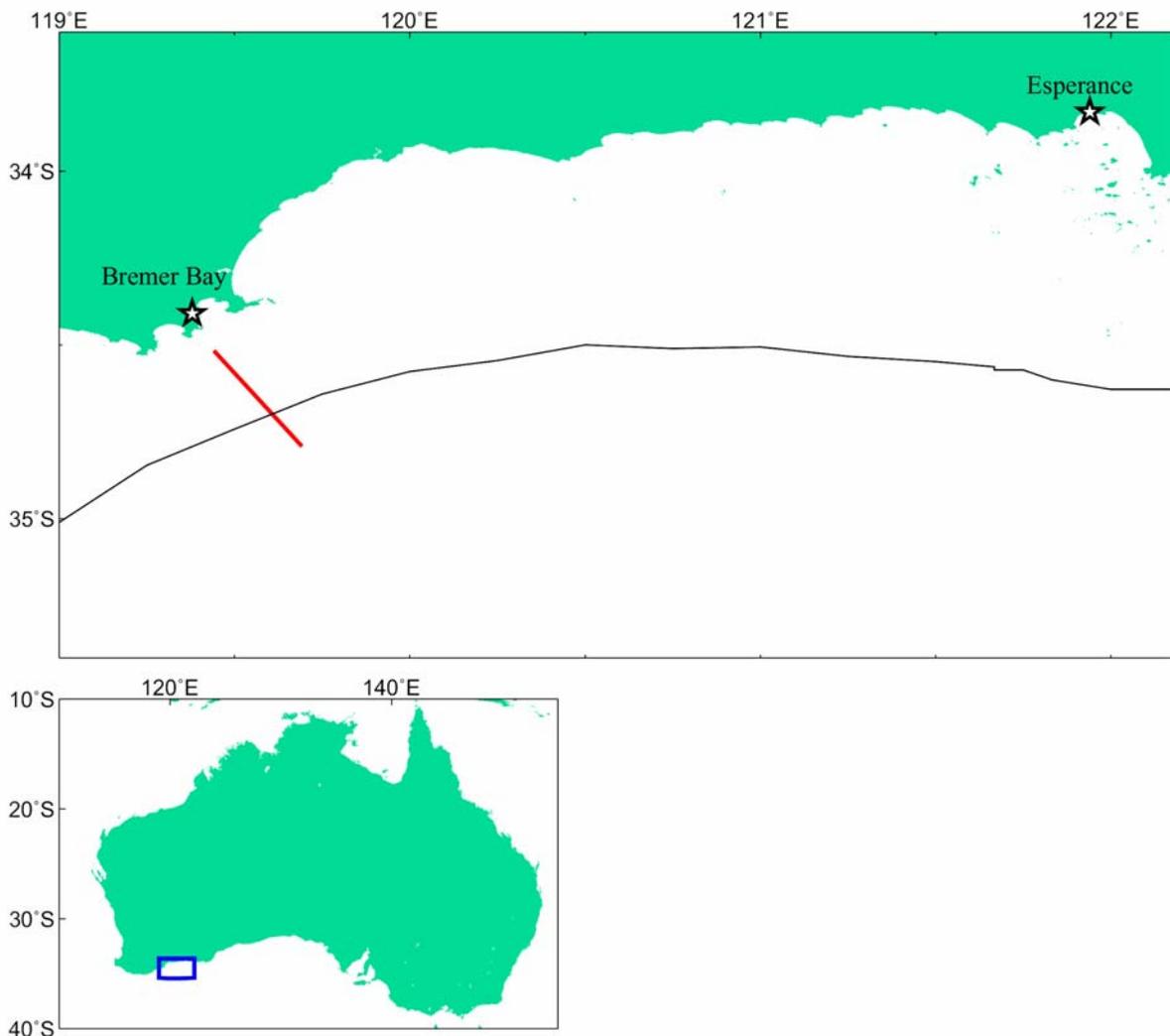


Fig. 2 Map of area researched

On the upper panel, a straight line is the piston-line and a narrow line is 200m isobath. A square in the lower panel is the area of the upper panel.

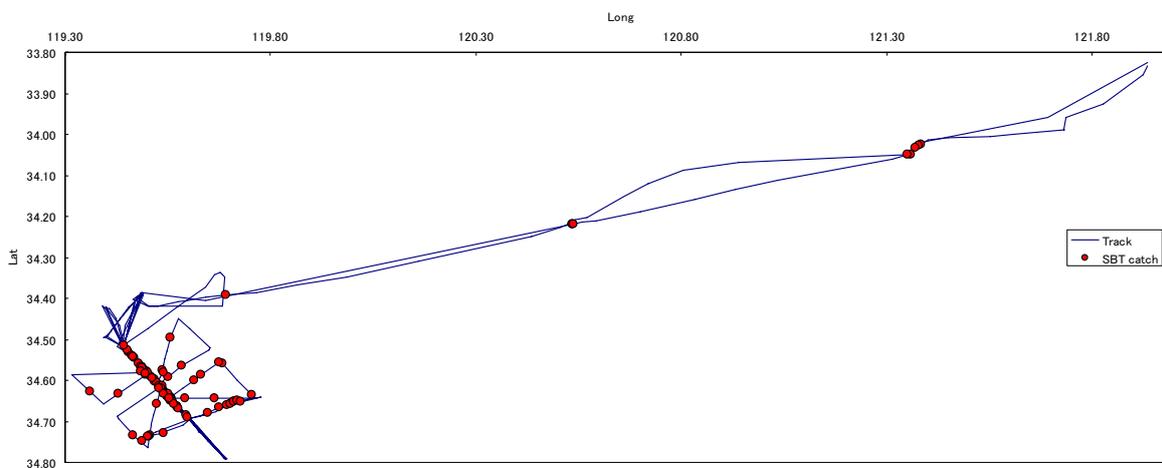


Fig. 3 Trajectory of the research survey vessel

Circles denote locations where southern bluefin tuna were caught.

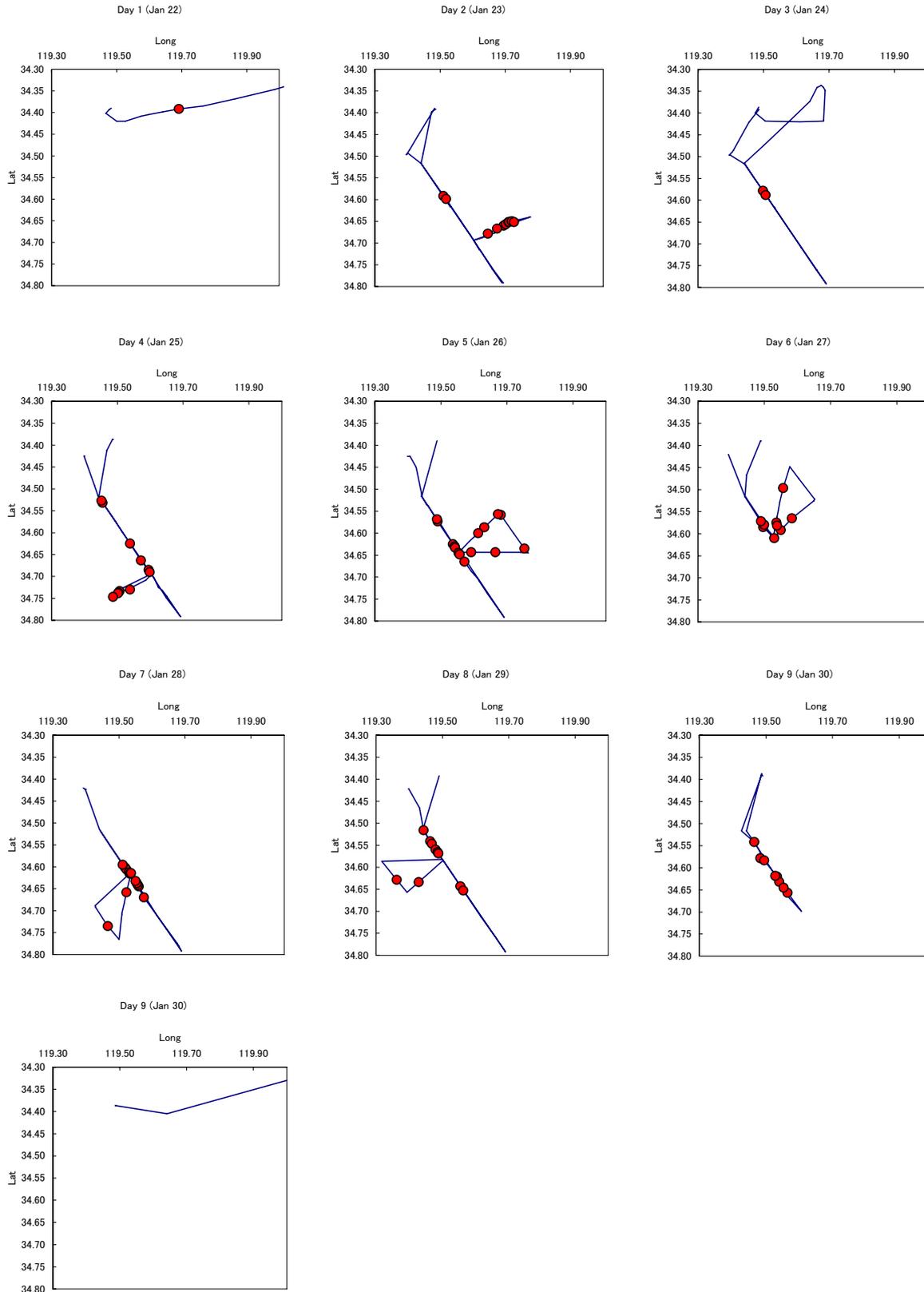


Fig. 4 Trajectory of the research survey vessel by day  
 Circles denote locations where southern bluefin tuna were caught. Trajectories include that of trolling was not conducted.

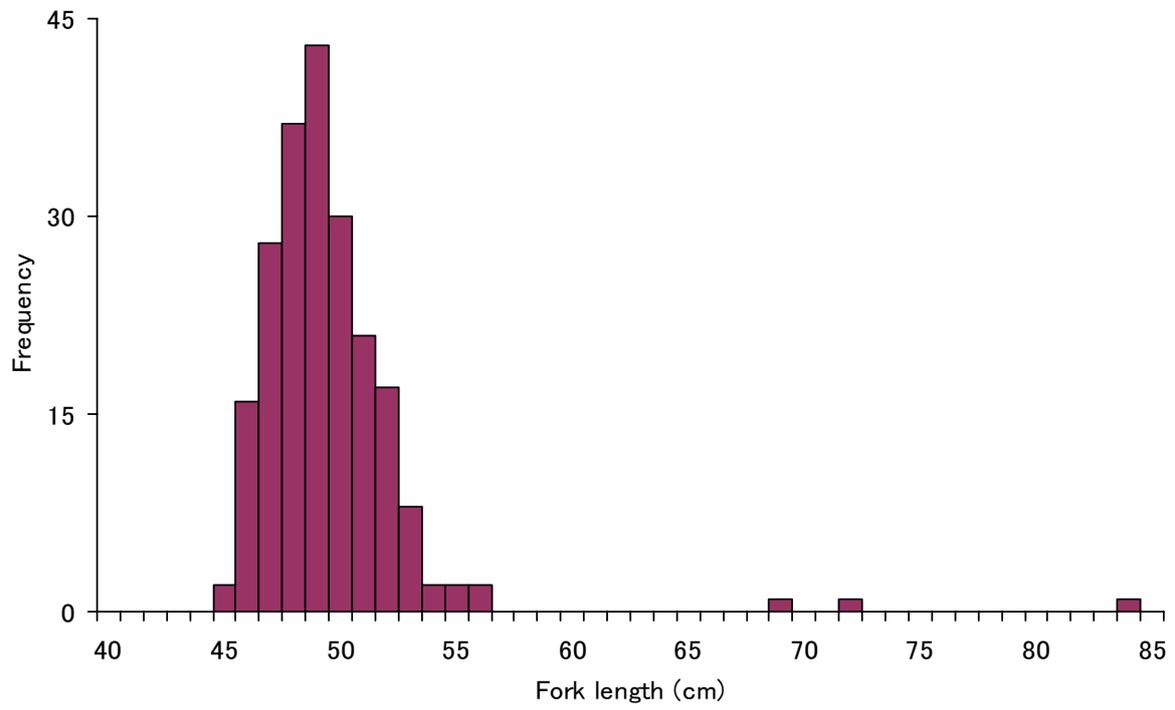


Fig. 5 Fork length frequency distribution of southern bluefin tuna caught.