



Preliminary analysis of catch at size for  
Pacific bluefin tuna, *Thunnus orientalis*, landed by  
Other fishery (Fleet 10)<sup>1</sup>

**Masayuki Abe, Izumi Yamazaki and Minoru Kanaiwa**

National Research Institute of Far Seas Fisheries  
5-7-1 Orido, Shimizu, Shizuoka, 424-8633, Japan

**Jan.-Feb. 2012**

---

<sup>1</sup> A working document submitted to the Pacific Bluefin Working Group for the Fourth Meeting of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC), 31 January – 7 February 2012, La Jolla, Shizuoka, Japan. Document not to be cited without permission of authors.

## Introduction

In Tsugaru Strait and its adjacent areas (hereafter called Tsugaru area), a variety of small scale fisheries catch Pacific bluefin tuna (PBF) during the seasons between the late summer and the early winter. Troll, hand line and longline fisheries as well as set net fishery account for majority of the catch in these areas. Especially, handline and small scaled longline fisheries are major fishery there. These fisheries operated in Tsugaru Strait targets large PBF between summer to winter (Yamada *et al.* 2007). The PBF caught in Tsugaru area yield high-economic value.

In the current stock assessment of the PBF using the Stock Synthesis 3 (SS3), the troll and longline fisheries in Tsugaru areas are categorized into “*other fisheries fleet (Fleet 10)*” (Abe *et al.* 2007), and the Set net fishery in Tsugaru Strait is categorized into “*set net fisheries fleet (Fleet 6)*”. In current SS3 model, length distribution for Fleet10 was created from aggregating individual length measurement data. However, length measurement data and amount of catch collected in Tsugaru area have not been analyzed in details. Therefore, this document summarized present available size data sampled from fisheries operated in Tsugaru area and reviewed quantity and quality of the data in detail s .

## Materials and Methods

The Research program on Japanese Bluefin tuna (RJB) has been conducted by National Research Institute of Far Seas for the purpose of collecting the information of landing data, size data and biological samples of the PBF caught by Japanese coastal and offshore fisheries. A total of 22 prefectural fisheries experimental stations have collected catch data in weight and number of fish by month (even by day since 2007), gear, market size category and processed status of fish (whole fish or processed) at the local markets based on the sales slips. The size and amount of catch have been collected through this project since 1992 as feasibility study and from 1994 in full scale survey. As size data, either or both of fork length and weight of individual fish are recorded and collected.

Location of the main landing ports in Tsugaru area is shown in Fig.

1. In these ports, fork lengths of a part of PBF landings were measured to the closest 1 cm intervals through the RJB program. In addition, individual weights obtained from sales slips were recorded. There are three types of size data obtained in Tsugaru area: individual length data; individual weight data; individual length and weight data. Coverage rate of fish of which weight was recorded attained 100% in many years owing to utilization of the sales slips (Table 1 and 2). The sale slips included individual weight with unit of 0.1 kg, 0.5 kg or 1 kg. Consequently, weight frequency distributions were created with weight class of 1 kg interval.

## Results and Discussion

Weight and length frequency by year were shown in Fig. 2. In the length frequencies, there were a large number of PBF of the length classes larger than 50cm, In contrast, obvious mode of in weight frequencies appeared at the weight class smaller than 8 kg corresponding to 50cm in FL. There was inconsistency in positions and presence/absence of modes between the length and the weight frequency distributions. Such inconsistency seems to be caused by measuring more of the larger fish since it is easier. Length data did not have so high coverage rate for the total landing in number, whereas weight of PBF landed were recorded well in most of ports in Tsugaru area. Consequently, the weight frequency distributions are considered to be more reliable than the length frequency distributions and do not need to be raised to total catch because of high coverage rates. We highly recommend that the weight frequency distributions are used as the size data for Fleet 10 at the next stock assessment.

## Reference

- Abe, M., and Yamazaki, I. Catch and distribution of Pacific bluefin tuna, *Thunnus orientalis*, around the Tsugaru Strait. ISC/08/PBF-2/17
- Takahashi, M., and Yamada, H. Reviews of Japanese fisheries and catch estimation on Pacific Bluefin tuna. ISC/06/PBF-WG/02
- Watanabe, K., Takahashi, M., Yamada, H. 2006. An investigation of length-weight relationship for Pacific Bluefin tuna. 6th ISC PBF-WG

Document #06.

Yamada, H. 2007. Reviews of Japanese Fisheries and Catch Statistics on the Pacific Bluefin Tuna. ISC/07/PBF-1/01

Table 1. Number of fish weighed and measured and those coverage rates for annual catch in number.

year	Weight					Length					Both								
	fukaura	fukushimayoshoka	furubira	iwasaki	matsumae	mimaya	ooma	shiramaki	toi	fukaura	matsumae	mimaya	ooma	toi	fukaura	matsumae	mimaya	ooma	toi
1994	1231			38	73	262	73			73					73				
1995	154			4	184	379	214			184					184				113
1996	322			8	222	206	704			218					218				411
1997	1187			4		3	1104			79					79				203
1998	498				79		808												281
1999	1166	25		16	417	5	1807		562										281
2000	1062	509		54	427	1006	567		1298										
2001	1735	176		38	1090	1679	961		1386										
2002	2113	1083	12	799	1024		2212		1031										
2003	1856	2755		851	4430	1171	677	3	654	180					899				143
2004	680	1848		685	6002	2007	2522		1485	83	123	1931	816	83	123	1931	816		816
2005	3013	3178		4069	8208	1555	2189		1474	214	230	1519	454	214	230	1519	454		454
2006	2201	1282		3143	3739	1713	1913		907	118	32	1689	487	118	32	1689	487		487
2007	951	1915			10244	51	2521		1924	292				292					158
2008	409	1437			14834	1838	1880		132	69	5341	1791	926	69	5341	1791	926		133
2009	538	1401	18		12149	1339	1301		412					2339					79
2010	10	800			7360	1176	1460		750	10	1129	1160	1439	10	1129	1160	1439		183

Table 2. Coverage of number caught by other fishery(%).

year	Weight					Length					Both								
	fukaura	fukushimayoshoka	furubira	iwasaki	matsumae	mimaya	ooma	shiramaki	toi	fukaura	matsumae	mimaya	ooma	toi	fukaura	matsumae	mimaya	ooma	toi
1994	100			100	4		100			11					4				
1995	61			100	4		100			18					4				53
1996	100			100	3	100	100			10					3				
1997	100			100		100	100												37
1998	100				3		100			15					3				25
1999	100	35			88	100	100		100										16
2000	46	100		100	100	100	100		100										
2001	100	64		100	100	100	100		100										
2002	100	100	100	100	101	0	100		100										
2003	99	100		100	101	100	100	100	100	10					10				21
2004	110	100		100	100	100	100		100	13	7	96	32	13		2			32
2005	100	100		98	100	100	100		100	7	7	98	21	7	7	3			21
2006	100	100		100	100	100	100		38	5	2	99	25	5	1				25
2007	100	100		100	100	3	100		100	31	100	2	54	16	31	100			54
2008	100	100		100	100	100	100		43	17	56	97	49	43	17	56			49
2009	47	100	100		100	100	100		100	0	24	98	94	24	0	24			94
2010	36	100			100	100	46		100	36	18	99	46	32	36	18			46

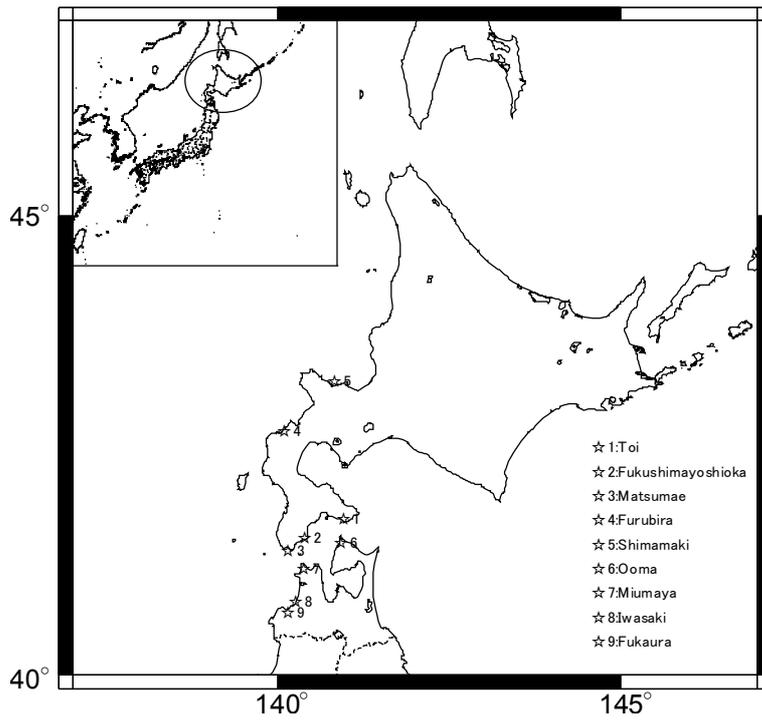


Fig. 1. Operation sea area around the Tsugaru Strait by RJB.

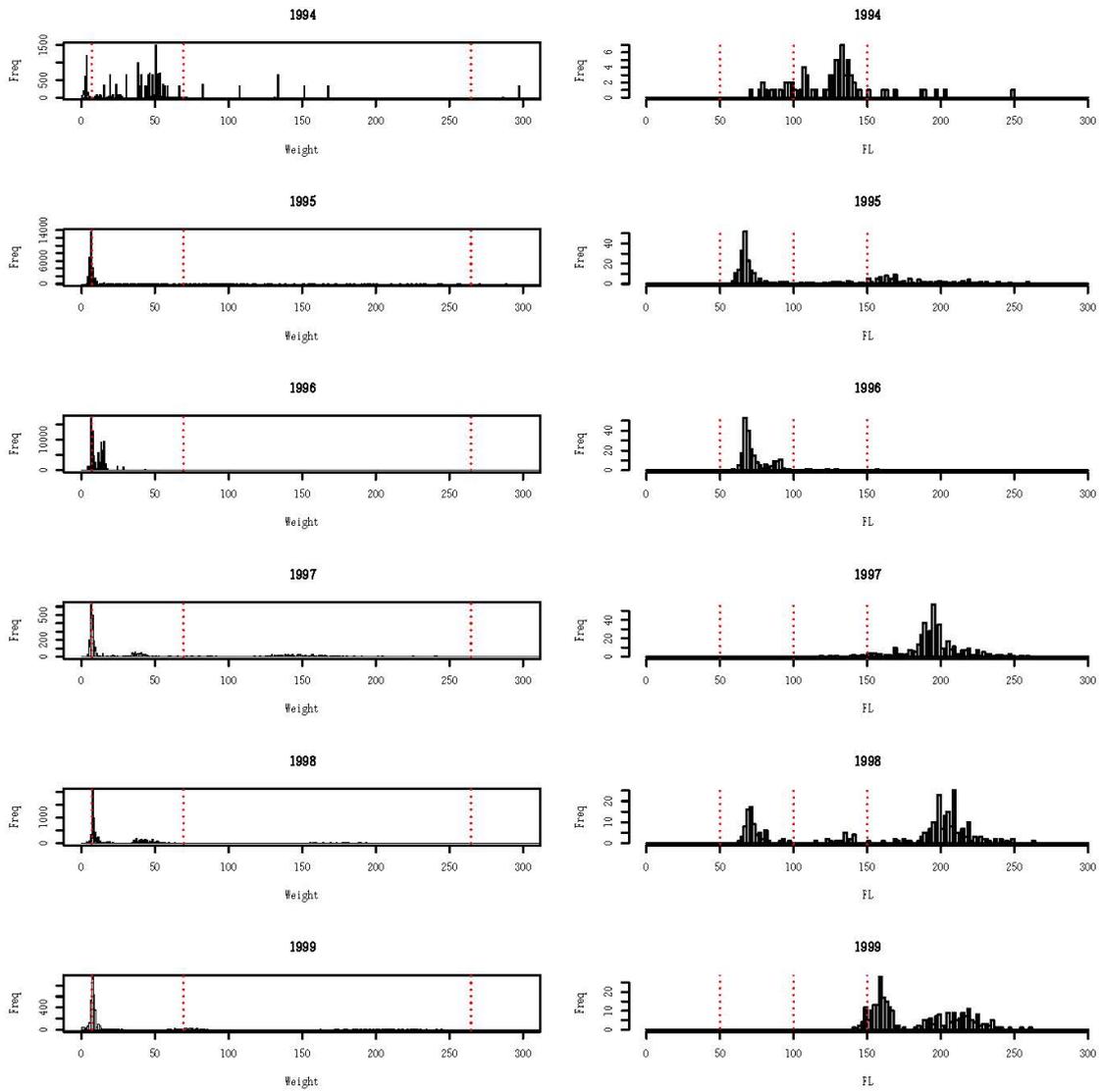


Fig. 2. Yearly weight and length frequency distribution of Pacific Bluefin tuna landed at Tsugaru area. Dotted vertical lines indicate the weight corresponding to 50,100 and 150cmFL.

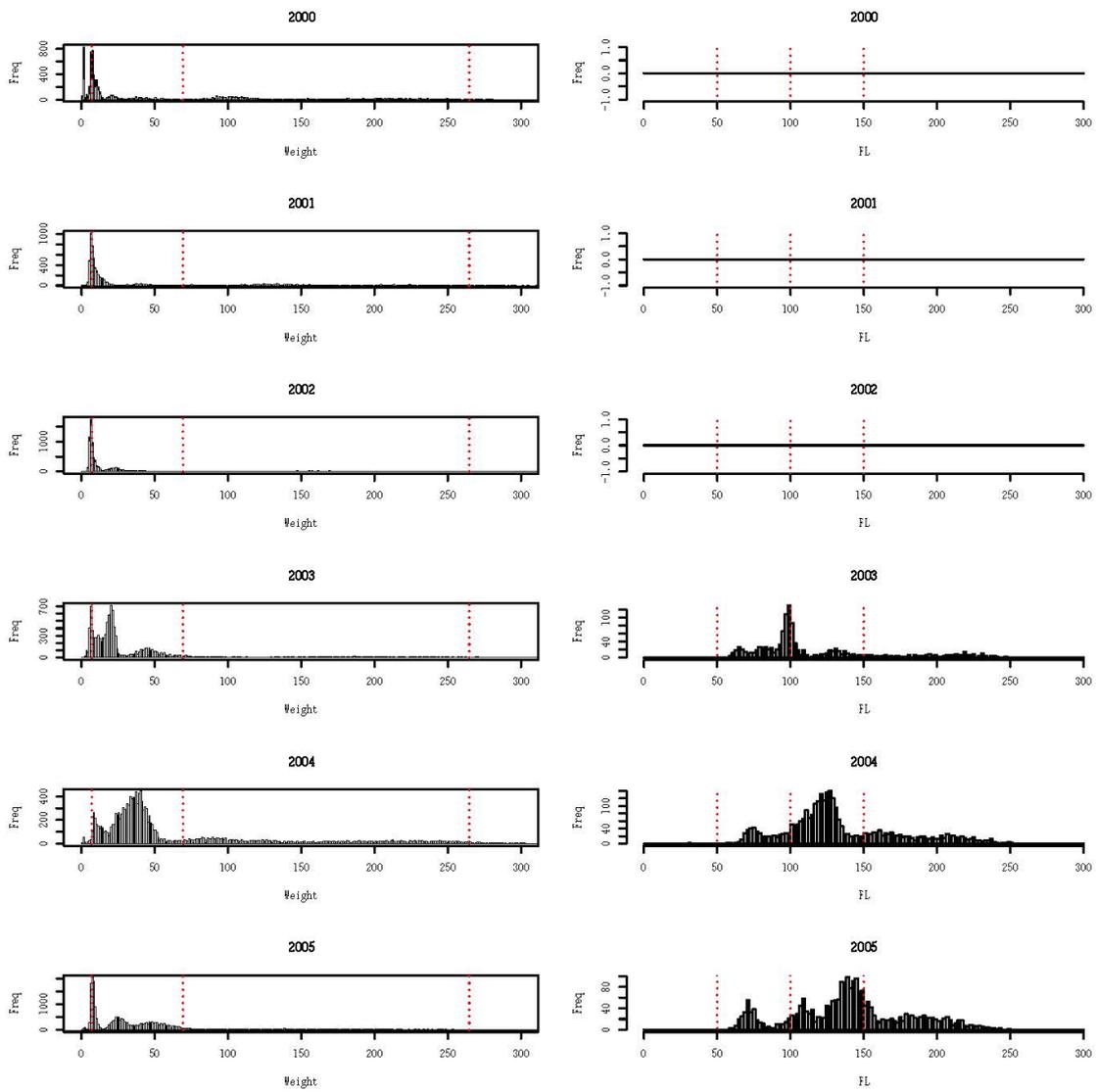


Fig. 2. *Continued.*

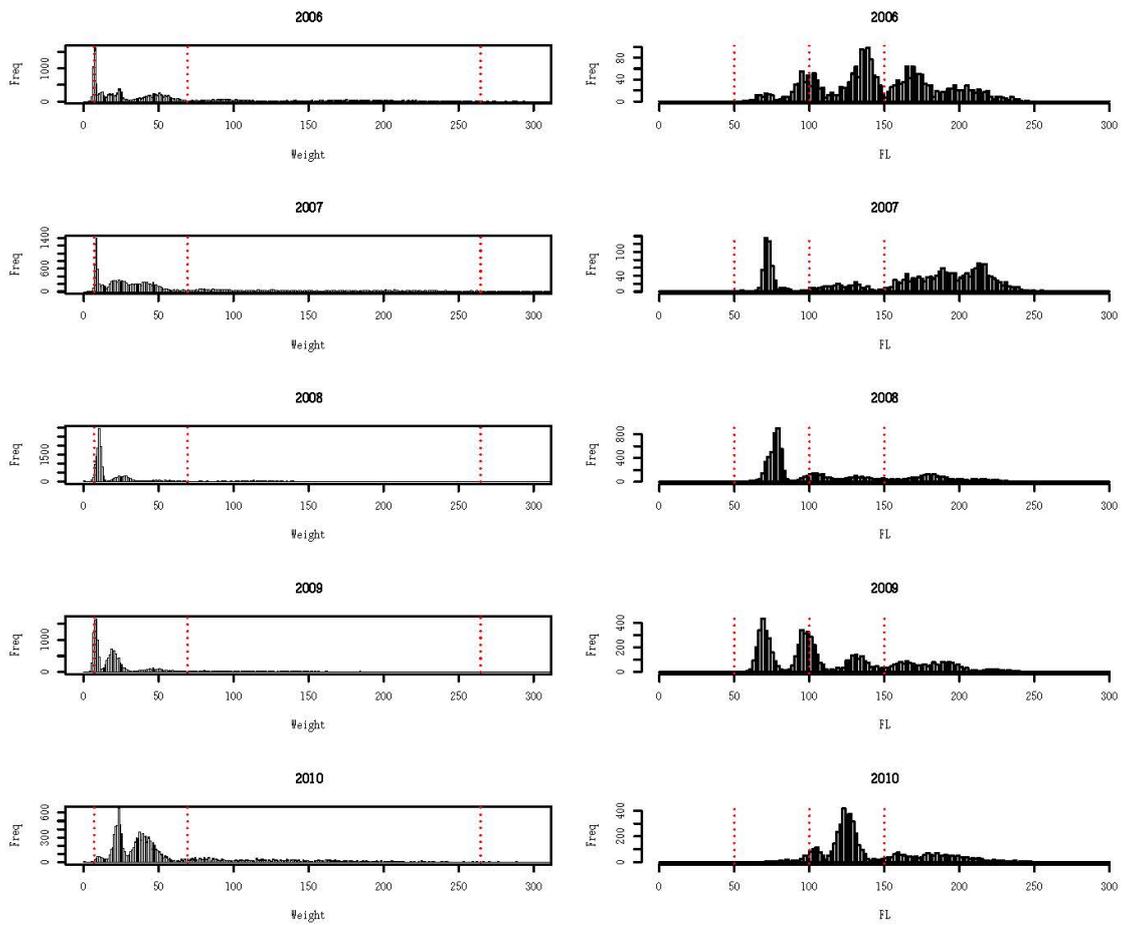


Fig. 2. *Continued.*