



Input data for stock assessment model, Stock Synthesis 3, on Pacific bluefin tuna, *Thunnus orientalis*

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Summary

This paper presents summary of the input data for the Stock Synthesis 3 model (SS3) for the stock assessment of Pacific bluefin tuna (PBF). The main contents are as follow: quarterly catch and length data of PBF up to 2010; fishing year which starts on July 1st and ends on June 30th; the number of fleets was increased to thirteen fleets from ten fleets; length composition data weighted by respective catch quantity; 11 CPUE time series were included into the input data; 6 time series are for the base case and 5 are for only sensitivity analysis.

Introduction

In January-February 2012, ISC Pacific bluefin tuna Working Group Workshop meeting was held in order to prepare input data for 2012 stock assessment. At that meeting, there were discussions on the following issues: updating input data including quarterly catch data, size data such as length-frequency data of PBF catch and catch-per-unit-effort used as abundance indices; setting of base case model for stock assessment; listing of the future projection scenarios; and consideration the biological reference points. This document provides the catalog of input data used the Stock Synthesis 3 model (SS3) in the coming stock assessment to be conducted in May 2012.

Definition of fishing year

In the stock assessment for PBF since 2008, fishing year which starts on July 1st and ends on June 30th of the following year has been used instead of calendar year. The starting month (July) corresponds to the time when smallest age-0 PBF be caught by Japanese coastal fisheries after hatching.

Fleet definition

At the last meeting (January-February, 2012), after examination of the actual state of fisheries (fishing season and main size of fish caught), it was decoded that 10 fleets used in the previous stock assessment be increased to 13 fleets (Table 1). Definitions of all fisheries for PBF are shown in Table 2. In the current (new) fishery definitions, Japanese tuna purse seine and set net fisheries were split into two and three fisheries, respectively, although each of them was a single fishery in the previous analyses. Tuna purse seine fishery was split into the following two fleets due to differences in length-frequency distributions of catches between them (Kanaiwa 2012,

Abe 2012): the one operated in the Sea of Japan; and another operated in the Pacific coastal water of Japan. Japanese set net fishery was split into three fleets in consideration of differences in fishing season, body size and regions of PBF catch (Kai 2012): the one operated in northern part of Japan; the second operated in the western part of Japan; and the third operated in other area of Japan.

Quarterly catch data

Updates of quarterly catch data by country and by fleet up to 2010 were done by corresponding countries of Japan, Korea, Mexico, Taiwan and U.S. The quarterly catch data in weight is shown in Table 3. Quarterly catch data for Eastern Pacific Ocean (EPO) fisheries were provided by both IATTC and the countries concerned (U.S. and Mexico). There are slight discrepancies in past values between these sources and catch data from U.S. and Mexico were used, because annual total catch of the data above two countries was closer to annual catch previously reported to the ISC plenary than that from IATTC.

Some of the data revisions were made only very shortly before the coming stock assessments. Most of the working papers had been prepared using the updated data except these last minute revisions. See appendix for more information on the last minute revisions.

Size frequency data

In the data preparation meeting held in January-February 2012, many working papers about construction of catch at size were presented. These working papers proposed to weight length frequency data proportionally to the respective quantities of catches; for Japanese longline (FL1) (Mizuno 2012), small pelagic fish purse seine (FL2) (Oshima 2012), purse seine of Sea of Japan (FL3) (Kanaiwa 2012), purse seine of Pacific Ocean (FL4) (Abe 2012), Japanese troll (FL5) (Fukuda 2012), setnet (FL7, FL8, FL9) (Kai 2012) and the others (FL13) (Abe 2012).

In 2012 stock assessment, two types of size data were used as input to SS3, i.e. length frequency data and weight frequency data (Fig. 1). Length frequency data were used for all fleets with exceptions for FL7 and FL13. These length frequency data were allocated into 65 length bins; overall length range being 16-290cm, with 2cm-interval length bins for fish size of 16-58cm, 4cm bins for fish size of 58-110cm and 6cm length bins for fish size of 110-290cm. This bin definition was the same as that used in the previous stock assessment.

Weight frequency data were used as size data for FL7 and FL3 in order to increase the accuracy of size data since more weight data than length data are available for those fisheries. Current version of SS3 accepts weight composition data as size composition. They were allocated

into 40 bins defined based on the growth curve equation of Pacific bluefin tuna; in general narrower interval bins are used for light weighted fish, while wider bins are used for heavier fish (Fujioka 2012).

Sample size¹ data were shown in Table 4. For input data of SS3, maximum sample size was set to 200 fish and minimum was set to 100 a priori except for FL3 and FL11. So a sample of over 200 fish were set to 200, from 100 to 200 were set to intact values and a sample of less than 100 fish was not used. While for FL3 sample size was set to the half of their estimated effective sample size (Kanaiwa 2012) and for FL11 sample size was set to the half of the number of well measured which is in general believed to be a good approximation of their effective sample size.

CPUE data

We developed 11 CPUE time series according to their defined fisheries, landing port and fishing period (Table5). Among them, 6 time series are selected for the base case (FL14, FL15, FL16, FL18, FL19 and FL22), and other 4 series (FL20, FL21, FL23 and FL24) are to be used only for sensitivity analysis.

CPUE estimates and their coefficients of variance (CV) were shown in Tables 6, Table7, Fig. 2 and Fig. 3. CPUE data were standardized before being input to SS3 except for FL17. Only CPUE for FL17 was nominal. The method of inputting CV data to SS3 was the same as adopted at the previous stock assessments; larger than 0.2 values were set to intact value, less than 0.2 values were set to 0.2, if CV was not provided, CV was set to 0.2.

References

- Abe, M., Kanaiwa, M., Oshima, K and Takeuchi, Y.. 2012. Estimation of catch at size of Pacific bluefin tuna, *Thunnus orientalis*, caught by Japanese tuna purse seine operated in Pacific ocean. ISC/12-1/PBFWG/03
- Abe, M., Yamazaki, I. and Kanaiwa, M. 2012. Preliminary analysis of catch at size for Pacific bluefin tuna, *Thunnus orientalis*, landed by Other fishery (Fleet 10). ISC/12-1/PBFWG/06
- Fujioka, K., Ichinokawa, M., Oshima, K. and Takeuchi, Y.. 2012. Re-estimation of standardized CPUE of Pacific bluefin tuna caught by Japanese offshore longline fisheries operated during 1952-1974. ISC/12-1/PBFWG/10
- Fukuda, H. and Oshima, K.. 2012. Estimation of Catch at size of young Pacific bluefin tuna caught by Japanese troll fisheries. ISC/12-1/PBFWG/04

¹ Hear, a sample refers to a group of fish assigned to a stratum (time/ area/ fishery). Therefore sample size means total number of fish in each stratum.

- Kai, M. and Takeuchi, Y.. 2012. Update and re-examination of the estimation of catch at size of Pacific Bluefin tuna *Thunnus orientalis* caught by Japanese set-net fishery.
ISC/12-1/PBFWG1/05
- Kanaiwa, M., Tsuruoka, I., Shibano, A., Shimura, T., Uji, R., Ishihara, Y. and Takeuchi, Y.. 2012. Update of estimated catch at size by Purse Seiner in Japanese sea. ISC/12-1/PBFWG/07
- Mizuno, A., Ichinokawa, M., Oshima, K. and Takeuchi, Y.. 2012. Estimation of length compositions on pacific bluefin tuna caught by Japanese longline fishery.
ISC/12-1/PBFWG/01
- Oshima, K., Kai, M., Iwata, S and Takeuchi, Y.. 2012. Reconsideration of estimation of catch at size for young Pacific bluefin tuna caught by Japanese small pelagic fish purse seine fisheries. ISC/12-1/PBFWG/02

Table 1. Fishery fleet in SS3 model and SS2 model.

NEW (SS3)		OLD (SS2)	
Fleet No.	Fishing category	Fleet No.	Fishing category
FL1	Japanese Longline	FL1	Japanese Longline
FL2	Small pelagic fish purse seine	FL2	Small pelagic fish purse seine
FL3	Tuna Purse seine on Sea of Japan	FL3	Tuna Purse seine
FL4	Tuna Purse seine on Pacific Ocean		
FL5	Japanese Troll	FL4	Japanese Troll
FL6	Japanese Pole-and-Line	FL5	Japanese Pole-and-Line
FL7	Northern part of Japanese Setnet	FL6	Japanese Setnet
FL8	Western part of Japanese Setnet		
FL9	Other areas Setnet		
FL10	Taiwanese Longline	FL7	Taiwanese Longline
FL11	Eastern Pacific Ocean Commercial fishery	FL8	Eastern Pacific Ocean Commercial fishery
FL12	Eastern Pacific Ocean Sports fishery	FL9	Eastern Pacific Ocean Sports fishery
FL13	Others	FL10	Others

Table 2. Fishing method category in Stock synthesis 3.

Area	Country	Fishing methods	Category	Fleet No.	Temporal coverage of annual catch data	Temporal coverage of q catch data	Temporal coverage of size data	Reference paper	Autor
Western Pacific States	Japan	Distant &offshore Longline	Japanese Longline		1952-	1952-1968, 1994-2009		ISC/12-1/PBFWG/01	Mizuno, A.
		Coastal Longline		FL1	1969-	1994-			
		Small pelagic fish purse seine	Small pelagic fish purse seine	FL2	1988-	1994-	2001-	ISC/12-1/PBFWG/02	Oshima, K.
		Tuna purse seine	Tuna Purse seine on Sea of Japan	FL3	1981-		1987-	ISC/12-1/PBFWG/07	Kanaiwa, M.
			Tuna Purse seine on Pacific Ocean	FL4	1952-	1952-	1974-	ISC/12-1/PBFWG/03	Abe, M.
		Troll	Japanese Troll	FL5	1952-	1981-	1984-	ISC/12-1/PBFWG/04	Fukuda, H.
		Pole-and-Line	Pole-and-Line	FL6	1952-	1994-	1994-		
		Drift net			1952-		1993-		
		Set net	Northern part of Japanese Setnet	FL7	1952-	1952-	1993-	ISC/12-1/PBFWG/05	Kai, M.
			Western part of Japanese Setnet	FL8	1952-		1994-		
			Other areas	FL9	1952-	1952-	1993-		
		Angling	Other	FL13	1952-		1994-	ISC/12-1/PBFWG/06	Abe, M.
		Trawl	Other	FL13	1952-				
		Other Longline	Other	FL13	1952-		1994-		
		Unclassified	Set net	FL7-9	1952-			ISC/12-1/PBFWG/05	Kai, M.
Korea		Purse seine	Small pelagic fish purse seine	FL2	1982-	2002-		ISC/12-1/PBFWG/19	Yoo, J.
		Trawl	Small pelagic fish purse seine	FL2	2000-				
Chinese-Taipei		Longline	Taiwanese Longline	FL10	1965-		1992-		
		Purse seine	Tuna purse seine	FL4	1983-1993				
		Distant drift net	Pole-and-Line	FL6	1982-1992				
		Others	Pole-and-Line	FL6	1974-2002				
Eastern Pacific States	United States	Purse seine	Eastern Pacific Ocean Commercial fishery	FL11	1952-			ISC/12-1/PBFWG/18	Alexandre, A.
		Others	Eastern Pacific Ocean Commercial fishery	FL11	1952-				
		Sport	Eastern Pacific Ocean Sport fishery	FL12	1952-				
Mexico		Purse seine	Eastern Pacif Ocean Commercial fishery	FL11	1952-				
		Others	Eastern Pacif Ocean Commercial fishery	FL11	1952-				
		Others	Eastern Pacif Ocean Commercial fishery	FL11	1952-				
out of ISC members	NZ		Taiwanese Longline	FL10	1991-				
	Others		Taiwanese Longline	FL10	2002-				

Table 3. Pacific Bluefine Tuna Catch Table for the Stock Assessment.

Fishing Year	Fishing Quarter	Catch Biomass												
		FL1 Japanese Longline	FL2 Small pelagic fish purse seine	FL3 Tuna Purse seine on Sea of Japan	FL4 Tuna Purse seine on Pacific Ocean	FL5 Japanese Troll	FL6 Japanese Pole-and-Line	FL7 Northern part of Japanese Setnet	FL8 Western part of Japanese Setnet	FL9 Other areas Setnet	FL10 Taiwanese Longline	FL11 Eastern Pacific Ocean Commercial fishery	FL12 Eastern Pacific Ocean Sports fishery	FL13 Others
1952	Q1	1072.8 ^t	0.0 ^t	0.0 ^t	4935.9 ^t	23.3 ^t	712.7 ^t	236.0 ^t	266.0 ^t	148.4 ^t	0.0 ^t	1950.6 ^t	0.1 ^t	0.0 ^t
1952	Q2	132.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	498.1 ^t	504.5 ^t	170.2 ^t	231.8 ^t	175.1 ^t	0.0 ^t	24.1 ^t	0.0 ^t	171.5 ^t
1952	Q3	144.5 ^t	0.0 ^t	0.0 ^t	0.0 ^t	282.4 ^t	796.1 ^t	0.2 ^t	0.0 ^t	501.9 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1952	Q4	1897.5 ^t	0.0 ^t	0.0 ^t	1990.0 ^t	39.3 ^t	906.9 ^t	17.3 ^t	0.0 ^t	554.7 ^t	0.0 ^t	0.1 ^t	0.0 ^t	0.0 ^t
1953	Q1	763.9 ^t	0.0 ^t	0.0 ^t	3579.6 ^t	51.4 ^t	649.6 ^t	254.6 ^t	71.8 ^t	293.1 ^t	0.0 ^t	3843.5 ^t	2.9 ^t	0.0 ^t
1953	Q2	241.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1098.4 ^t	705.5 ^t	185.8 ^t	113.2 ^t	342.3 ^t	0.0 ^t	589.7 ^t	0.9 ^t	131.2 ^t
1953	Q3	263.2 ^t	0.0 ^t	0.0 ^t	0.0 ^t	317.9 ^t	609.2 ^t	1.9 ^t	0.0 ^t	430.3 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1953	Q4	1577.7 ^t	0.0 ^t	0.0 ^t	1917.1 ^t	44.2 ^t	815.3 ^t	106.5 ^t	0.0 ^t	1426.5 ^t	0.0 ^t	2289.1 ^t	0.0 ^t	0.0 ^t
1954	Q1	1096.0 ^t	0.0 ^t	0.0 ^t	3448.4 ^t	57.9 ^t	744.2 ^t	860.5 ^t	106.4 ^t	1002.4 ^t	0.0 ^t	6844.8 ^t	0.6 ^t	0.0 ^t
1954	Q2	177.8 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1236.2 ^t	923.4 ^t	612.9 ^t	309.2 ^t	722.6 ^t	0.0 ^t	403.1 ^t	0.0 ^t	218.5 ^t
1954	Q3	176.6 ^t	0.0 ^t	0.0 ^t	0.0 ^t	289.1 ^t	568.6 ^t	0.7 ^t	0.0 ^t	567.2 ^t	0.0 ^t	483.0 ^t	0.0 ^t	0.0 ^t
1954	Q4	1309.7 ^t	0.0 ^t	0.0 ^t	5008.0 ^t	40.2 ^t	761.0 ^t	42.6 ^t	0.0 ^t	724.5 ^t	0.0 ^t	3130.5 ^t	0.9 ^t	0.0 ^t
1955	Q1	1171.6 ^t	0.0 ^t	0.0 ^t	9008.1 ^t	52.7 ^t	664.8 ^t	363.9 ^t	109.9 ^t	397.1 ^t	0.0 ^t	2466.5 ^t	4.0 ^t	0.0 ^t
1955	Q2	311.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1124.5 ^t	861.9 ^t	259.9 ^t	372.5 ^t	417.3 ^t	0.0 ^t	92.9 ^t	0.0 ^t	100.9 ^t
1955	Q3	123.7 ^t	0.0 ^t	0.0 ^t	0.0 ^t	338.3 ^t	812.5 ^t	0.7 ^t	0.0 ^t	895.9 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1955	Q4	1103.7 ^t	0.0 ^t	0.0 ^t	7496.0 ^t	47.1 ^t	1087.4 ^t	37.8 ^t	0.0 ^t	1072.2 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1956	Q1	1521.3 ^t	0.0 ^t	0.0 ^t	13483.3 ^t	61.6 ^t	952.5 ^t	261.5 ^t	203.0 ^t	390.7 ^t	0.0 ^t	4753.0 ^t	29.6 ^t	0.0 ^t
1956	Q2	160.8 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1315.9 ^t	1231.5 ^t	184.9 ^t	62.4 ^t	500.0 ^t	0.0 ^t	974.0 ^t	1.9 ^t	192.3 ^t
1956	Q3	163.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	459.0 ^t	359.2 ^t	2.5 ^t	0.0 ^t	493.1 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1956	Q4	904.6 ^t	0.0 ^t	0.0 ^t	6036.0 ^t	63.9 ^t	480.7 ^t	97.8 ^t	0.0 ^t	837.3 ^t	0.0 ^t	140.8 ^t	0.0 ^t	0.0 ^t
1957	Q1	566.3 ^t	0.0 ^t	0.0 ^t	12111.4 ^t	83.6 ^t	424.5 ^t	73.6 ^t	199.4 ^t	305.5 ^t	0.0 ^t	8778.5 ^t	6.3 ^t	0.0 ^t
1957	Q2	98.1 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1785.1 ^t	544.5 ^t	25.0 ^t	353.4 ^t	434.4 ^t	0.0 ^t	295.6 ^t	0.0 ^t	194.3 ^t
1957	Q3	135.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	287.3 ^t	467.8 ^t	0.3 ^t	0.0 ^t	284.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1957	Q4	384.0 ^t	0.0 ^t	0.0 ^t	3936.5 ^t	40.0 ^t	626.0 ^t	13.7 ^t	0.0 ^t	381.4 ^t	0.0 ^t	2634.5 ^t	0.0 ^t	0.0 ^t
1958	Q1	113.0 ^t	0.0 ^t	0.0 ^t	4649.6 ^t	52.3 ^t	541.4 ^t	10.3 ^t	102.0 ^t	80.8 ^t	0.0 ^t	11187.5 ^t	0.7 ^t	0.0 ^t
1958	Q2	211.1 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1117.3 ^t	709.0 ^t	3.5 ^t	208.6 ^t	102.8 ^t	0.0 ^t	112.0 ^t	0.2 ^t	183.2 ^t
1958	Q3	371.2 ^t	0.0 ^t	0.0 ^t	0.0 ^t	141.3 ^t	117.2 ^t	1.0 ^t	0.0 ^t	364.2 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1958	Q4	1572.7 ^t	0.0 ^t	0.0 ^t	4430.5 ^t	19.7 ^t	156.9 ^t	38.9 ^t	0.0 ^t	501.8 ^t	0.0 ^t	1277.9 ^t	0.0 ^t	0.0 ^t
1959	Q1	841.1 ^t	0.0 ^t	0.0 ^t	5565.2 ^t	25.7 ^t	134.9 ^t	29.3 ^t	113.5 ^t	110.0 ^t	0.0 ^t	2487.2 ^t	1.3 ^t	0.0 ^t
1959	Q2	916.2 ^t	0.0 ^t	0.0 ^t	0.0 ^t	549.5 ^t	177.7 ^t	9.9 ^t	257.8 ^t	148.3 ^t	0.0 ^t	0.0 ^t	0.0 ^t	153.4 ^t
1959	Q3	641.5 ^t	0.0 ^t	0.0 ^t	0.0 ^t	361.7 ^t	120.1 ^t	0.3 ^t	0.0 ^t	457.4 ^t	0.0 ^t	102.8 ^t	0.0 ^t	0.0 ^t
1959	Q4	4028.7 ^t	0.0 ^t	0.0 ^t	3475.3 ^t	50.3 ^t	160.7 ^t	15.4 ^t	0.0 ^t	561.7 ^t	0.0 ^t	1492.0 ^t	0.0 ^t	0.0 ^t
1960	Q1	705.6 ^t	0.0 ^t	0.0 ^t	7065.5 ^t	65.9 ^t	204.3 ^t	112.6 ^t	138.4 ^t	163.1 ^t	0.0 ^t	2911.9 ^t	0.1 ^t	0.0 ^t
1960	Q2	728.7 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1406.9 ^t	182.0 ^t	79.8 ^t	343.8 ^t	159.8 ^t	0.0 ^t	40.3 ^t	0.0 ^t	302.2 ^t
1960	Q3	781.3 ^t	0.0 ^t	0.0 ^t	0.0 ^t	612.8 ^t	132.5 ^t	0.4 ^t	0.0 ^t	682.7 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1960	Q4	3940.0 ^t	0.0 ^t	0.0 ^t	3585.6 ^t	85.3 ^t	200.0 ^t	31.9 ^t	0.0 ^t	560.9 ^t	0.0 ^t	2376.1 ^t	0.0 ^t	0.0 ^t
1961	Q1	1471.8 ^t	0.0 ^t	0.0 ^t	5768.3 ^t	111.6 ^t	170.1 ^t	12.2 ^t	229.3 ^t	200.8 ^t	0.0 ^t	6754.9 ^t	2.2 ^t	0.0 ^t
1961	Q2	596.6 ^t	0.0 ^t	0.0 ^t	0.0 ^t	2383.4 ^t	200.8 ^t	4.1 ^t	481.8 ^t	219.3 ^t	0.0 ^t	216.5 ^t	0.1 ^t	580.0 ^t
1961	Q3	799.8 ^t	0.0 ^t	0.0 ^t	0.0 ^t	323.0 ^t	149.4 ^t	0.8 ^t	0.0 ^t	566.0 ^t	0.0 ^t	108.1 ^t	0.0 ^t	0.0 ^t
1961	Q4	4331.2 ^t	0.0 ^t	0.0 ^t	3980.5 ^t	44.9 ^t	200.0 ^t	31.9 ^t	0.0 ^t	560.9 ^t	0.0 ^t	2376.1 ^t	0.0 ^t	0.0 ^t
1962	Q1	592.8 ^t	0.0 ^t	0.0 ^t	6676.8 ^t	58.8 ^t	176.4 ^t	71.0 ^t	618.6 ^t	125.5 ^t	0.0 ^t	8578.2 ^t	2.2 ^t	0.0 ^t
1962	Q2	458.7 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1256.1 ^t	226.5 ^t	43.4 ^t	393.3 ^t	134.0 ^t	0.0 ^t	0.7 ^t	0.2 ^t	287.6 ^t
1962	Q3	541.4 ^t	0.0 ^t	0.0 ^t	0.0 ^t	487.8 ^t	251.4 ^t	1.6 ^t	0.0 ^t	528.2 ^t	0.0 ^t	72.4 ^t	0.0 ^t	0.0 ^t
1962	Q4	5129.9 ^t	0.0 ^t	0.0 ^t	3485.0 ^t	67.9 ^t	336.4 ^t	72.8 ^t	0.0 ^t	702.3 ^t	0.0 ^t	2428.1 ^t	0.0 ^t	0.0 ^t
1963	Q1	599.5 ^t	0.0 ^t	0.0 ^t	6301.2 ^t	88.9 ^t	304.9 ^t	240.0 ^t	181.5 ^t	224.0 ^t	0.0 ^t	9718.1 ^t	0.5 ^t	0.0 ^t
1963	Q2	255.4 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1897.1 ^t	381.0 ^t	157.6 ^t	399.0 ^t	290.0 ^t	0.0 ^t	53.4 ^t	0.3 ^t	276.3 ^t
1963	Q3	312.6 ^t	0.0 ^t	0.0 ^t	0.0 ^t	534.2 ^t	207.5 ^t	0.7 ^t	0.0 ^t	408.2 ^t	0.0 ^t	16.5 ^t	0.0 ^t	0.0 ^t
1963	Q4	2321.0 ^t	0.0 ^t	0.0 ^t	3174.9 ^t	74.3 ^t	277.7 ^t	30.1 ^t	0.0 ^t	380.0 ^t	0.0 ^t	1768.3 ^t	0.0 ^t	0.0 ^t
1964	Q1	359.7 ^t	0.0 ^t	0.0 ^t	5798.2 ^t	97.3 ^t	246.0 ^t	48.7 ^t	135.8 ^t	62.4 ^t	0.0 ^t	7419.8 ^t	0.6 ^t	0.0 ^t
1964	Q2	260.2 ^t	0.0 ^t	0.0 ^t	0.0 ^t	2077.8 ^t	314.5 ^t	27.2 ^t	306.4 ^t	75.1 ^t	0.0 ^t	12.5 ^t	0.0 ^t	365.7 ^t
1964	Q3	322.2 ^t	0.0 ^t	0.0 ^t	0.0 ^t	376.7 ^t	229.2 ^t	0.8 ^t	0.					

Table 3. Continued.

Fishing Year	Fishing Quarter	Catch Biomass												
		FL1 Japanese Longline	FL2 Small pelagic fish purse seine	FL3 Tuna Purse seine on Sea	FL4 Tuna Purse seine on Pacific Ocean	FL5 Japanese Troll	FL6 Japanese Pole-and-Line	FL7 Northern part of Japanese Setnet	FL8 Western part of Japanese Setnet	FL9 Other areas Setnet	FL10 Taiwanese Longline	FL11 Eastern Pacific Ocean Commercial fishery	FL12 Eastern Pacific Ocean Sports fishery	FL13 Others
1970	Q1	22.9 ^t	0.0 ^t	0.0 ^t	1632.8 ^t	41.9 ^t	210.2 ^t	190.1 ^t	100.7 ^t	181.7 ^t	0.0 ^t	2534.0 ^t	0.7 ^t	0.0 ^t
1970	Q2	35.1 ^t	0.0 ^t	0.0 ^t	0.0 ^t	894.3 ^t	194.2 ^t	99.3 ^t	163.7 ^t	234.7 ^t	0.0 ^t	1.5 ^t	0.8 ^t	161.1 ^t
1970	Q3	181.3 ^t	0.0 ^t	0.0 ^t	0.0 ^t	286.4 ^t	233.7 ^t	4.1 ^t	0.0 ^t	159.0 ^t	0.0 ^t	31.4 ^t	0.0 ^t	0.0 ^t
1970	Q4	504.8 ^t	0.0 ^t	0.0 ^t	2834.7 ^t	39.8 ^t	269.3 ^t	170.8 ^t	0.0 ^t	257.7 ^t	1.0 ^t	4039.2 ^t	0.0 ^t	0.0 ^t
1971	Q1	18.5 ^t	0.0 ^t	0.0 ^t	886.5 ^t	52.2 ^t	229.7 ^t	339.5 ^t	67.4 ^t	108.2 ^t	0.0 ^t	3349.1 ^t	0.5 ^t	0.0 ^t
1971	Q2	43.3 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1113.8 ^t	240.2 ^t	202.4 ^t	113.1 ^t	132.1 ^t	0.0 ^t	939.3 ^t	0.2 ^t	212.4 ^t
1971	Q3	46.5 ^t	0.0 ^t	0.0 ^t	0.0 ^t	161.7 ^t	297.0 ^t	2.7 ^t	0.0 ^t	195.4 ^t	0.0 ^t	3.4 ^t	0.0 ^t	0.0 ^t
1971	Q4	445.5 ^t	0.0 ^t	0.0 ^t	2048.7 ^t	22.5 ^t	77.8 ^t	110.9 ^t	0.0 ^t	203.4 ^t	14.0 ^t	2879.2 ^t	0.0 ^t	0.0 ^t
1972	Q1	15.3 ^t	0.0 ^t	0.0 ^t	2163.4 ^t	29.4 ^t	449.0 ^t	163.8 ^t	63.7 ^t	54.5 ^t	0.0 ^t	8861.1 ^t	1.4 ^t	0.0 ^t
1972	Q2	31.4 ^t	0.0 ^t	0.0 ^t	0.0 ^t	628.8 ^t	158.5 ^t	88.9 ^t	155.2 ^t	68.8 ^t	0.0 ^t	1603.4 ^t	0.0 ^t	123.8 ^t
1972	Q3	56.5 ^t	0.0 ^t	0.0 ^t	0.0 ^t	404.5 ^t	72.6 ^t	1.5 ^t	0.0 ^t	480.2 ^t	0.0 ^t	10.5 ^t	0.0 ^t	0.0 ^t
1972	Q4	798.5 ^t	0.0 ^t	0.0 ^t	463.7 ^t	56.3 ^t	69.5 ^t	0.0 ^t	487.5 ^t	33.0 ^t	2043.2 ^t	1.8 ^t	0.0 ^t	0.0 ^t
1973	Q1	21.0 ^t	0.0 ^t	0.0 ^t	1802.7 ^t	73.7 ^t	419.1 ^t	276.8 ^t	235.6 ^t	110.5 ^t	0.0 ^t	8690.3 ^t	3.6 ^t	0.0 ^t
1973	Q2	25.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1573.3 ^t	183.1 ^t	381.2 ^t	121.9 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	285.8 ^t
1973	Q3	15.1 ^t	0.0 ^t	0.0 ^t	0.0 ^t	317.9 ^t	450.2 ^t	3.5 ^t	0.0 ^t	1307.7 ^t	0.0 ^t	0.3 ^t	0.0 ^t	0.0 ^t
1973	Q4	977.3 ^t	0.0 ^t	0.0 ^t	416.0 ^t	44.2 ^t	245.7 ^t	155.4 ^t	0.0 ^t	1386.4 ^t	47.0 ^t	1227.4 ^t	0.0 ^t	0.0 ^t
1974	Q1	52.4 ^t	0.0 ^t	0.0 ^t	3690.4 ^t	57.9 ^t	482.5 ^t	545.7 ^t	387.8 ^t	261.1 ^t	0.0 ^t	4237.9 ^t	5.7 ^t	0.0 ^t
1974	Q2	24.3 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1236.4 ^t	363.3 ^t	361.5 ^t	1063.5 ^t	346.9 ^t	0.0 ^t	151.4 ^t	0.0 ^t	368.3 ^t
1974	Q3	28.9 ^t	0.0 ^t	0.0 ^t	0.0 ^t	197.8 ^t	805.6 ^t	1.3 ^t	0.0 ^t	286.6 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1974	Q4	890.0 ^t	0.0 ^t	0.0 ^t	3414.7 ^t	27.5 ^t	131.6 ^t	72.7 ^t	0.0 ^t	349.4 ^t	61.0 ^t	3065.3 ^t	0.0 ^t	0.0 ^t
1975	Q1	121.3 ^t	0.0 ^t	0.1 ^t	1076.8 ^t	36.0 ^t	1095.5 ^t	604.7 ^t	186.2 ^t	123.1 ^t	0.0 ^t	5747.6 ^t	3.1 ^t	0.0 ^t
1975	Q2	61.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	769.4 ^t	49.6 ^t	431.4 ^t	212.7 ^t	165.1 ^t	0.0 ^t	769.2 ^t	0.3 ^t	131.9 ^t
1975	Q3	36.6 ^t	0.0 ^t	0.0 ^t	0.0 ^t	159.2 ^t	80.1 ^t	5.4 ^t	0.0 ^t	230.8 ^t	0.0 ^t	615.6 ^t	0.0 ^t	0.0 ^t
1975	Q4	297.5 ^t	0.0 ^t	0.0 ^t	1122.0 ^t	22.1 ^t	270.7 ^t	240.0 ^t	0.0 ^t	430.3 ^t	17.0 ^t	2282.5 ^t	0.0 ^t	0.0 ^t
1976	Q1	53.7 ^t	0.0 ^t	0.0 ^t	1026.4 ^t	29.0 ^t	1300.3 ^t	818.0 ^t	111.3 ^t	189.6 ^t	0.0 ^t	7250.1 ^t	1.6 ^t	0.0 ^t
1976	Q2	15.4 ^t	0.0 ^t	0.0 ^t	0.0 ^t	619.2 ^t	518.3 ^t	539.6 ^t	186.6 ^t	244.6 ^t	0.0 ^t	496.8 ^t	0.4 ^t	151.9 ^t
1976	Q3	69.1 ^t	0.0 ^t	0.0 ^t	0.0 ^t	415.7 ^t	169.0 ^t	2.3 ^t	0.0 ^t	320.2 ^t	0.0 ^t	1.6 ^t	0.0 ^t	0.0 ^t
1976	Q4	243.7 ^t	0.0 ^t	0.0 ^t	4062.7 ^t	57.8 ^t	1337.6 ^t	107.7 ^t	0.0 ^t	410.9 ^t	131.0 ^t	2014.5 ^t	0.2 ^t	0.0 ^t
1977	Q1	36.5 ^t	0.0 ^t	0.0 ^t	1047.2 ^t	75.7 ^t	1258.4 ^t	485.5 ^t	127.3 ^t	94.7 ^t	0.0 ^t	3093.5 ^t	1.6 ^t	0.0 ^t
1977	Q2	11.5 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1616.6 ^t	376.9 ^t	330.8 ^t	267.4 ^t	110.6 ^t	0.0 ^t	348.4 ^t	0.1 ^t	168.1 ^t
1977	Q3	57.5 ^t	0.0 ^t	0.0 ^t	0.0 ^t	866.9 ^t	51.0 ^t	2.3 ^t	0.0 ^t	376.8 ^t	0.0 ^t	86.4 ^t	0.0 ^t	0.0 ^t
1977	Q4	242.5 ^t	0.0 ^t	0.0 ^t	10346.2 ^t	120.6 ^t	426.1 ^t	106.5 ^t	0.0 ^t	527.2 ^t	66.0 ^t	704.3 ^t	0.0 ^t	0.0 ^t
1978	Q1	339.1 ^t	0.0 ^t	2.8 ^t	78.2 ^t	157.9 ^t	2328.9 ^t	441.1 ^t	136.3 ^t	146.6 ^t	0.0 ^t	4402.9 ^t	0.5 ^t	0.0 ^t
1978	Q2	16.4 ^t	0.0 ^t	0.0 ^t	0.0 ^t	3371.6 ^t	380.4 ^t	298.1 ^t	310.1 ^t	202.0 ^t	0.0 ^t	20.5 ^t	0.0 ^t	246.4 ^t
1978	Q3	54.7 ^t	0.0 ^t	0.0 ^t	0.0 ^t	509.6 ^t	454.1 ^t	2.2 ^t	0.0 ^t	733.3 ^t	0.0 ^t	10.6 ^t	0.0 ^t	0.0 ^t
1978	Q4	580.2 ^t	0.0 ^t	0.0 ^t	11144.8 ^t	70.9 ^t	210.6 ^t	114.9 ^t	0.0 ^t	378.7 ^t	114.0 ^t	1434.8 ^t	0.0 ^t	0.0 ^t
1979	Q1	103.9 ^t	0.0 ^t	0.0 ^t	2736.3 ^t	92.8 ^t	1720.2 ^t	768.0 ^t	301.0 ^t	225.9 ^t	0.0 ^t	3539.4 ^t	0.0 ^t	0.0 ^t
1979	Q2	23.9 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1981.9 ^t	406.0 ^t	540.4 ^t	622.2 ^t	239.2 ^t	0.0 ^t	227.0 ^t	0.0 ^t	888.2 ^t
1979	Q3	42.9 ^t	0.0 ^t	0.0 ^t	0.0 ^t	293.8 ^t	572.0 ^t	3.0 ^t	0.0 ^t	362.7 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1979	Q4	749.0 ^t	0.0 ^t	0.0 ^t	6167.6 ^t	40.9 ^t	195.4 ^t	139.8 ^t	0.0 ^t	378.7 ^t	114.0 ^t	1434.8 ^t	0.0 ^t	0.0 ^t
1980	Q1	19.8 ^t	0.0 ^t	0.0 ^t	5159.4 ^t	53.5 ^t	1640.5 ^t	573.8 ^t	246.5 ^t	75.8 ^t	0.0 ^t	1439.0 ^t	0.7 ^t	0.0 ^t
1980	Q2	40.6 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1142.6 ^t	467.6 ^t	387.4 ^t	276.8 ^t	76.3 ^t	0.0 ^t	59.1 ^t	0.0 ^t	473.9 ^t
1980	Q3	184.5 ^t	0.0 ^t	0.0 ^t	0.0 ^t	283.1 ^t	84.9 ^t	1.0 ^t	0.0 ^t	406.11 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1980	Q4	336.2 ^t	0.0 ^t	0.0 ^t	6344.0 ^t	0.0 ^t	115.4 ^t	53.8 ^t	0.0 ^t	404.0 ^t	179.0 ^t	355.7 ^t	0.1 ^t	0.0 ^t
1981	Q1	55.9 ^t	0.0 ^t	129.7 ^t	17780.7 ^t	67.7 ^t	2381.5 ^t	352.4 ^t	192.8 ^t	78.3 ^t	0.0 ^t	742.3 ^t	0.5 ^t	0.0 ^t
1981	Q2	40.9 ^t	0.0 ^t	0.0 ^t	0.0 ^t	1426.1 ^t	301.9 ^t	247.8 ^t	302.8 ^t	90.4 ^t	0.0 ^t	1.1 ^t	0.0 ^t	523.0 ^t
1981	Q3	63.1 ^t	7.6 ^t	0.0 ^t	0.0 ^t	435.4 ^t	336.2 ^t	1.5 ^t	0.0 ^t	276.6 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t
1981	Q4	582.9 ^t	11.7 ^t	0.0 ^t	5410.4 ^t	53.2 ^t	671.2 ^t	68.5 ^t	0.0 ^t	340.9 ^t	207.0 ^t	59.6 ^t	0.1 ^t	0.0 ^t
1982	Q1	8.1 ^t	2.7 ^t	570.2 ^t	2262.3 ^t	21.1 ^t	896.7 ^t	113.6 ^t	90.0 ^t	53.0 ^t	0.0 ^t	630.5 ^t	0.8 ^t	0.0 ^t
1982	Q2	15.0 ^t	2.3 ^t	0.0 ^t	0.0 ^t	1925.3 ^t	130.9 ^t	73.8 ^t	138.3 ^t	71.2 ^t	0.0 ^t	124.7 ^t	1.1 ^t	309.5 ^t
1982	Q3	41.0 ^t	1.0 ^t	0.0 ^t	0.0 ^t	287.1 ^t	32.9 ^t	3.2 ^t	0.0 ^t	380.3 ^t	0.0 ^t	7		

Table 3. Continued.

Fishing Year	Fishing Quarter	Catch Biomass												
		FL1 Japanese Longline	FL2 Small pelagic fish purse seine	FL3 Tuna Purse seine on Sea of Japan	FL4 Tuna Purse seine on Pacific Ocean	FL5 Japanese Troll	FL6 Japanese Pole-and-Line	FL7 Northern part of Japanese Setnet	FL8 Western part of Japanese Setnet	FL9 Other areas Setnet	FL10 Taiwanese Longline	FL11 Eastern Pacific Ocean Commercial fishery	FL12 Eastern Pacific Ocean Sports fishery	FL13 Others
1990 Q1	24.2 ^t	59.2 ^t	149.0 ^t	2474.2 ^t	2.9 ^t	830.2 ^t	90.0 ^t	30.4 ^t	33.3 ^t	0.0 ^t	1311.4 ^t	3.5 ^t	0.0 ^t	
1990 Q2	10.2 ^t	140.5 ^t	0.0 ^t	0.0 ^t	989.7 ^t	47.1 ^t	59.7 ^t	126.3 ^t	52.4 ^t	0.0 ^t	194.2 ^t	0.2 ^t	198.5 ^t	
1990 Q3	16.0 ^t	164.1 ^t	0.0 ^t	0.0 ^t	635.5 ^t	30.0 ^t	1.1 ^t	0.0 ^t	420.7 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	
1990 Q4	193.4 ^t	125.8 ^t	0.0 ^t	645.6 ^t	160.7 ^t	78.5 ^t	49.1 ^t	0.0 ^t	287.8 ^t	342.0 ^t	85.8 ^t	0.0 ^t	0.0 ^t	
1991 Q1	14.2 ^t	236.1 ^t	224.2 ^t	3465.9 ^t	81.8 ^t	429.3 ^t	146.1 ^t	97.1 ^t	26.2 ^t	1.5 ^t	334.1 ^t	4.9 ^t	0.0 ^t	
1991 Q2	14.4 ^t	521.2 ^t	0.0 ^t	0.0 ^t	1190.6 ^t	105.2 ^t	94.5 ^t	340.1 ^t	22.7 ^t	0.0 ^t	5.1 ^t	0.4 ^t	414.4 ^t	
1991 Q3	36.4 ^t	464.3 ^t	0.0 ^t	0.0 ^t	273.6 ^t	18.0 ^t	1.6 ^t	0.0 ^t	182.8 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	
1991 Q4	462.2 ^t	2169.4 ^t	0.0 ^t	1677.0 ^t	0.0 ^t	35.2 ^t	67.6 ^t	0.0 ^t	331.9 ^t	464.0 ^t	11.3 ^t	0.1 ^t	0.0 ^t	
1992 Q1	10.2 ^t	313.7 ^t	469.0 ^t	2182.5 ^t	0.0 ^t	944.3 ^t	116.1 ^t	77.9 ^t	95.0 ^t	0.3 ^t	1649.8 ^t	8.3 ^t	0.0 ^t	
1992 Q2	20.4 ^t	247.6 ^t	0.0 ^t	0.0 ^t	641.7 ^t	64.6 ^t	66.3 ^t	134.9 ^t	134.4 ^t	0.0 ^t	327.8 ^t	0.2 ^t	193.3 ^t	
1992 Q3	15.0 ^t	591.6 ^t	0.0 ^t	0.0 ^t	144.5 ^t	12.2 ^t	0.7 ^t	0.0 ^t	102.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	
1992 Q4	707.5 ^t	766.4 ^t	0.0 ^t	1243.1 ^t	34.1 ^t	38.4 ^t	26.6 ^t	0.0 ^t	280.0 ^t	471.0 ^t	45.1 ^t	0.0 ^t	0.0 ^t	
1993 Q1	62.4 ^t	107.2 ^t	82.7 ^t	3880.7 ^t	47.5 ^t	204.2 ^t	32.0 ^t	50.4 ^t	110.3 ^t	5.6 ^t	525.1 ^t	10.4 ^t	0.0 ^t	
1993 Q2	37.3 ^t	19.3 ^t	0.0 ^t	0.0 ^t	319.8 ^t	35.9 ^t	15.8 ^t	66.9 ^t	163.4 ^t	0.0 ^t	112.7 ^t	0.1 ^t	206.5 ^t	
1993 Q3	42.4 ^t	37.0 ^t	0.0 ^t	0.0 ^t	67.1 ^t	0.2 ^t	1.1 ^t	0.0 ^t	70.0 ^t	0.0 ^t	1.8 ^t	0.0 ^t	0.0 ^t	
1993 Q4	1084.5 ^t	580.8 ^t	0.0 ^t	2676.8 ^t	15.2 ^t	16.6 ^t	15.7 ^t	0.0 ^t	481.1 ^t	559.0 ^t	4.1 ^t	0.1 ^t	0.0 ^t	
1994 Q1	77.3 ^t	24.1 ^t	694.4 ^t	3973.3 ^t	458.0 ^t	206.3 ^t	35.6 ^t	144.9 ^t	23.0 ^t	1.9 ^t	966.5 ^t	2.1 ^t	0.0 ^t	
1994 Q2	22.3 ^t	194.1 ^t	0.0 ^t	0.0 ^t	3570.2 ^t	65.4 ^t	30.6 ^t	256.2 ^t	100.2 ^t	0.0 ^t	57.6 ^t	0.0 ^t	271.8 ^t	
1994 Q3	11.2 ^t	607.5 ^t	0.0 ^t	0.0 ^t	2475.5 ^t	9.1 ^t	0.2 ^t	0.0 ^t	131.9 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	
1994 Q4	616.3 ^t	563.1 ^t	0.0 ^t	2039.6 ^t	733.2 ^t	135.5 ^t	23.3 ^t	0.0 ^t	255.5 ^t	335.0 ^t	0.1 ^t	0.0 ^t	0.0 ^t	
1995 Q1	35.0 ^t	4223.2 ^t	496.1 ^t	2798.2 ^t	439.8 ^t	143.1 ^t	212.5 ^t	87.6 ^t	155.3 ^t	1.8 ^t	715.8 ^t	16.0 ^t	0.0 ^t	
1995 Q2	25.2 ^t	9002.3 ^t	0.0 ^t	0.0 ^t	1130.0 ^t	94.1 ^t	204.8 ^t	289.8 ^t	498.3 ^t	0.0 ^t	0.0 ^t	0.0 ^t	476.3 ^t	
1995 Q3	30.9 ^t	1380.4 ^t	0.0 ^t	0.0 ^t	136.0 ^t	4.7 ^t	0.0 ^t	84.3 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	
1995 Q4	827.1 ^t	178.3 ^t	0.0 ^t	3123.5 ^t	57.2 ^t	0.7 ^t	15.5 ^t	0.0 ^t	253.3 ^t	956.0 ^t	757.1 ^t	1.6 ^t	0.0 ^t	
1996 Q1	25.3 ^t	471.5 ^t	450.0 ^t	1966.7 ^t	256.2 ^t	90.0 ^t	141.9 ^t	62.5 ^t	66.3 ^t	4.2 ^t	7651.7 ^t	1.1 ^t	0.0 ^t	
1996 Q2	26.4 ^t	175.9 ^t	0.0 ^t	0.0 ^t	3190.8 ^t	66.0 ^t	109.7 ^t	307.4 ^t	108.3 ^t	0.0 ^t	0.3 ^t	0.0 ^t	503.3 ^t	
1996 Q3	26.8 ^t	852.9 ^t	0.0 ^t	0.0 ^t	846.0 ^t	0.9 ^t	0.0 ^t	114.1 ^t	0.0 ^t	0.0 ^t	0.6 ^t	0.0 ^t	0.0 ^t	
1996 Q4	1214.9 ^t	1509.7 ^t	0.0 ^t	1401.7 ^t	550.1 ^t	3.6 ^t	6.3 ^t	0.0 ^t	199.3 ^t	1814.0 ^t	61.0 ^t	3.0 ^t	0.0 ^t	
1997 Q1	27.0 ^t	3214.9 ^t	707.9 ^t	4027.2 ^t	224.3 ^t	113.1 ^t	20.0 ^t	125.4 ^t	40.1 ^t	14.3 ^t	2637.9 ^t	5.4 ^t	0.0 ^t	
1997 Q2	43.8 ^t	2491.4 ^t	0.0 ^t	0.0 ^t	1119.6 ^t	25.4 ^t	52.8 ^t	143.7 ^t	101.9 ^t	0.0 ^t	40.5 ^t	0.0 ^t	702.0 ^t	
1997 Q3	17.7 ^t	605.4 ^t	0.0 ^t	0.0 ^t	605.2 ^t	1.6 ^t	0.6 ^t	0.0 ^t	158.3 ^t	0.0 ^t	4.4 ^t	0.0 ^t	0.0 ^t	
1997 Q4	1149.9 ^t	589.3 ^t	0.0 ^t	13.1 ^t	515.0 ^t	2.4 ^t	15.3 ^t	0.0 ^t	130.7 ^t	1910.0 ^t	8.3 ^t	0.7 ^t	0.0 ^t	
1998 Q1	53.1 ^t	887.4 ^t	325.5 ^t	2376.2 ^t	131.2 ^t	108.0 ^t	29.1 ^t	33.5 ^t	80.2 ^t	20.4 ^t	2016.5 ^t	19.0 ^t	0.0 ^t	
1998 Q2	45.7 ^t	1081.6 ^t	0.0 ^t	0.0 ^t	1613.2 ^t	63.5 ^t	67.9 ^t	273.0 ^t	85.7 ^t	0.0 ^t	23.8 ^t	0.7 ^t	608.7 ^t	
1998 Q3	33.3 ^t	748.8 ^t	0.0 ^t	0.0 ^t	797.8 ^t	10.2 ^t	0.6 ^t	0.0 ^t	278.8 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	
1998 Q4	1075.8 ^t	1082.9 ^t	0.0 ^t	5592.1 ^t	360.0 ^t	2.4 ^t	32.4 ^t	0.0 ^t	264.8 ^t	3089.0 ^t	2280.4 ^t	0.6 ^t	0.0 ^t	
1999 Q1	25.2 ^t	2280.4 ^t	578.6 ^t	5448.2 ^t	128.5 ^t	64.5 ^t	15.8 ^t	75.7 ^t	31.9 ^t	21.2 ^t	442.3 ^t	35.2 ^t	0.0 ^t	
1999 Q2	40.6 ^t	697.7 ^t	0.0 ^t	0.0 ^t	2100.6 ^t	16.7 ^t	46.1 ^t	251.8 ^t	98.9 ^t	0.0 ^t	49.2 ^t	1.0 ^t	481.6 ^t	
1999 Q3	39.3 ^t	751.3 ^t	0.0 ^t	0.0 ^t	1455.7 ^t	0.7 ^t	0.1 ^t	0.0 ^t	167.5 ^t	0.0 ^t	0.0 ^t	0.1 ^t	0.0 ^t	
1999 Q4	893.0 ^t	2508.2 ^t	0.0 ^t	3403.4 ^t	769.7 ^t	82.8 ^t	4.9 ^t	0.0 ^t	164.1 ^t	2780.0 ^t	668.5 ^t	8.0 ^t	0.0 ^t	
2000 Q1	15.2 ^t	3599.7 ^t	746.9 ^t	4042.3 ^t	116.0 ^t	65.5 ^t	86.6 ^t	26.9 ^t	127.5 ^t	20.9 ^t	3203.5 ^t	12.6 ^t	0.0 ^t	
2000 Q2	12.2 ^t	2602.7 ^t	0.0 ^t	0.0 ^t	2799.5 ^t	5.6 ^t	72.4 ^t	272.6 ^t	202.2 ^t	0.0 ^t	0.0 ^t	0.0 ^t	637.8 ^t	
2000 Q3	8.4 ^t	926.6 ^t	0.0 ^t	0.0 ^t	934.2 ^t	0.0 ^t	0.5 ^t	0.0 ^t	358.0 ^t	0.0 ^t	0.0 ^t	0.1 ^t	0.0 ^t	
2000 Q4	748.9 ^t	3193.2 ^t	0.0 ^t	981.4 ^t	464.3 ^t	4.4 ^t	45.0 ^t	0.0 ^t	189.4 ^t	1839.0 ^t	382.0 ^t	0.7 ^t	0.0 ^t	
2001 Q1	12.9 ^t	890.8 ^t	239.0 ^t	1918.3 ^t	83.3 ^t	167.2 ^t	174.3 ^t	25.8 ^t	47.2 ^t	49.8 ^t	821.0 ^t	19.8 ^t	0.0 ^t	
2001 Q2	26.1 ^t	345.8 ^t	0.0 ^t	0.0 ^t	1847.1 ^t	112.3 ^t	232.2 ^t	168.2 ^t	125.1 ^t	0.0 ^t	0.0 ^t	1.4 ^t	682.5 ^t	
2001 Q3	43.5 ^t	70.2 ^t	0.0 ^t	0.0 ^t	988.4 ^t	16.5 ^t	0.0 ^t	0.0 ^t	112.9 ^t	0.0 ^t	0.0 ^t	0.1 ^t	0.0 ^t	
2001 Q4	752.8 ^t	2165.5 ^t	0.0 ^t	556.3 ^t	697.2 ^t	50.5 ^t	6.3 ^t	0.0 ^t	114.9 ^t	1523.0 ^t	274.6 ^t	1.3 ^t	0.0 ^t	
2002 Q1	24.7 ^t	1042.2 ^t	598.8 ^t	2766.9 ^t	36.5 ^t	223.5 ^t	234.7 ^t	55.5 ^t	96.8 ^t	65.6 ^t	1497.4 ^t	30.5 ^t	0.0 ^t	
2002 Q2	33.7 ^t	1925.5 ^t	0.0 ^t	0.0 ^t	205.9 ^t	24.0 ^t	250.9 ^t	130.1 ^t	97.8 ^t	0.0 ^t	0.0 ^t	1.5 ^t	409.1 ^t	
2002 Q3	41.8 ^t	130.2 ^t	0.0 ^t	0.0 ^t	519.6 ^t	10.5 ^t	0.0 ^t	0.0 ^t	84.4 ^t	0.0 ^t	0.0 ^t	0.0 ^t	0.0 ^t	
2002 Q4	1045.5 ^t	1861.1 ^t	0.0 ^t	1848.4 ^t	823.5 ^t	34.1 ^t	54.2 ^t	0.0 ^t	87.2 ^t	1553.8 ^t	589.7 ^t </td			

Table 4. Pacific Bluefin tuna sample size used by SS3.

Fishing Year	Fishing Quarter	FL1	FL2	FL3	FL4	FL5	FL6	FL7	FL8	FL9	FL10	FL11	FL12	FL13
		Japanese Longline	Small pelagic fish purse seine	Tuna Purse seine on Sea of Japan	Tuna Purse seine on Pacific Ocean	Japanese Troll	Japanese Pole-and-Line	Northern part of Japanese Setnet	Western part of Japanese Setnet	Other areas Setnet	Taiwanese Longline	Eastern Pacific Ocean Commercial fishery	Eastern Pacific Ocean Sports fishery	Others
		Length Bin	Length Bin	Length Bin	Length Bin	Length Bin	Weight Bin	Length Bin	Length Bin	Length Bin	Length Bin	Length Bin	Length Bin	Weight Bin
1952	Q1	739 *1										10 *4		
	Q2	34 *3												
	Q3	55 *3												
	Q4	2865 *1												
1953	Q1	37 *3										9 *4		
	Q2	98 *3										3 *4		
	Q3	143 *2										3 *4		
	Q4	2689 *1										9 *4		
1954	Q1	1123 *1										23 *4		
	Q2	34 *3										1 *4		
	Q3	142 *2										2 *4		
	Q4	3769 *1										11 *4		
1955	Q1	529 *1										26 *4		
	Q2	162 *2										1 *4		
	Q3	63 *3										7 *4		
	Q4	2934 *1												
1956	Q1	161 *2										49 *4		
	Q2	36 *3										49 *4		
	Q3	16 *3										1 *4		
	Q4	1600 *1										3 *4		
												18 *4		
1957	Q1	104 *2										75 *4		
	Q2	20 *3										6 *4		
	Q3	105 *2										42 *4		
	Q4	776 *1												
1958	Q1	184 *2										80 *4		
	Q2	323 *1										4 *4		
	Q3	290 *1										2 *4		
	Q4	2461 *1										54 *4		
1959	Q1	229 *1										72 *4		
	Q2	639 *1										2 *4		
	Q3	563 *1										19 *4		
	Q4	10185 *1												
1960	Q1	295 *1										42 *4		
	Q2	506 *1												
	Q3	1555 *1										16 *4		
	Q4	9718 *1										88 *4		
1961	Q1	954 *1										2 *4		
	Q2	1046 *1										3 *4		
	Q3	888 *1										3 *4		
	Q4	11080 *1										23 *4		
1962	Q1	1270 *1										72 *4		
	Q2	177 *2										2 *4		
	Q3	1248 *1										14 *4		
	Q4	10886 *1												
1963	Q1	446 *1										100 *4		
	Q2	149 *2										1 *4		
	Q3	243 *1										15 *4		
	Q4	5711 *1												
1964	Q1	376 *1										80 *4		
	Q2	516 *1										1 *4		
	Q3	139 *2										1 *4		
	Q4	1931 *1										8 *4		
1965	Q1	91 *3										91 *4		
	Q2	317 *1										10 *4		
	Q3	34 *3												
	Q4	799 *1												
1966	Q1	497 *1												
	Q2	513 *1												
	Q3	39 *3												
	Q4	204 *1												
1967	Q1	671 *1												
	Q2	49 *3												
	Q3	6 *3												
	Q4	59 *3												
1968	Q1	170 *2												
	Q2	19 *3												
	Q3	305 *1												
	Q4	3325 *1												
1969	Q1												7 *4	
	Q2													
	Q3													
	Q4													

*1) When this value is used for SS3, it's set 200 because of the over 200 raw sample size.

*2) When this value is used for SS3, it's set same value as raw sample size because it was between 100 and 200.

*3) When this value is used for SS3, it's set 0 because of the under 100 raw sample size.

*4) When this value is used for SS3, it's set half of raw sample size of FL3 or FL11.

Table 4. Continued.

Fishing Year	Fishing Quarter	FL1	FL2	FL3	FL4	FL5	FL6	FL7	FL8	FL9	FL10	FL11	FL12	FL13
		Japanese Longline	Small pelagic fish purse seine	Tuna Purse seine on Sea of Japan	Tuna Purse seine on Pacific Ocean	Japanese Troll	Japanese Pole-and-Line	Northern part of Japanese Setnet	Western part of Japanese Setnet	Other areas Setnet	Taiwanese Longline	Eastern Pacific Ocean Commercial fishery	Eastern Pacific Ocean Sports fishery	Others
		Length Bin	Length Bin	Length Bin	Length Bin	Length Bin	Weight Bin	Length Bin	Length Bin	Length Bin	Length Bin	Length Bin	Length Bin	Weight Bin
1970	Q1											12 *4		
	Q2											16 *4		
1971	Q3											10 *4		
	Q4											1 *4		
1972	Q1													
	Q2													
1973	Q3													
	Q4											2 *4		
1974	Q1				19887 *1							13 *4		
	Q2				0 *3							9 *4		
1975	Q3				0 *3							5 *4		
	Q4				51052 *1							5 *4		
1976	Q1				25506 *1							12 *4		
	Q2				0 *3							5 *4		
1977	Q3				0 *3							2 *4		
	Q4				2884 *1							9 *4		
1978	Q1				18075 *1							55 *4		
	Q2				0 *3							1 *4		
1979	Q3				0 *3							12 *4		
	Q4				31331 *1							12 *4		
1980	Q1				27735 *1							16 *4		
	Q2				0 *3							4 *4		
1981	Q3				0 *3							5 *4		
	Q4				44795 *1							5 *4		
1982	Q1				19351 *1							25 *4		
	Q2				0 *3							11 *4		
1983	Q3				0 *3							14 *4		
	Q4				54583 *1							6 *4		
1984	Q1				51339 *1							14 *4		
	Q2				0 *3							6 *4		
1985	Q3				0 *3							12 *4		
	Q4				19194 *1							12 *4		
1986	Q1				22557 *1							24 *4		
	Q2				0 *3							3 *4		
1987	Q3				0 *3							12 *4		
	Q4				52278 *1							12 *4		
1988	Q1				280190 *1							34 *4		
	Q2				0 *3							5 *4		
1989	Q3				0 *3							1 *4		
	Q4				6499 *1							3 *4		
1990	Q1				15807 *1							14 *4		
	Q2				0 *3							2 *4		
1991	Q3				0 *3							15 *4		
	Q4				36624 *1							15 *4		
1992	Q1				134425 *1							26 *4		
	Q2				0 *3							15 *4		
1993	Q3				0 *3							4 *4		
	Q4				137778 *1							8 *4		
1994	Q1				20858 *1							13 *4		
	Q2				0 *3							1 *4		
1995	Q3				0 *3							3 *4		
	Q4				6499 *1							1 *4		
1996	Q1				15807 *1							14 *4		
	Q2				0 *3							2 *4		
1997	Q3				0 *3							15 *4		
	Q4				36624 *1							15 *4		
1998	Q1				4567 *1							41 *4		
	Q2				0 *3							6 *4		
1999	Q3				0 *3							1 *4		
	Q4				27585 *1							2 *4		
2000	Q1				28861 *1							13 *4		
	Q2				0 *3							2 *4		
2001	Q3				0 *3							13 *4		
	Q4				93187 *1							2 *4		
2002	Q1				24 *4	69513 *1						13 *4		
	Q2				0 *3							2 *4		
2003	Q3				0 *3							13 *4		
	Q4				27865 *1							2 *4		
2004	Q1				17 *4	29341 *1						16 *4		
	Q2				0 *3							8 *4		
2005	Q3				0 *3							17 *4		
	Q4				14414 *1							4 *4		
2006	Q1				25 *4	16781 *1						17 *4		
	Q2				0 *3							4 *4		
2007	Q3				0 *3							17 *4		
	Q4				2592 *1							4 *4		

*1) When this value is used for SS3, it's set 200 because of the over 200 raw sample size.

*2) When this value is used for SS3, it's set same value as raw sample size because it was between 100 and 200.

*3) When this value is used for SS3, it's set 0 because of the under 100 raw sample size.

*4) When this value is used for SS3, it's set half of raw sample size of FL3 or FL11.

Table 4. Continued.

Fishing Year	Fishing Quarter	FL1	FL2	FL3	FL4	FL5	FL6	FL7	FL8	FL9	FL10	FL11	FL12	FL13
		Japanese Longline	Small pelagic fish purse seine	Tuna Purse seine on Sea of Japan	Tuna Purse seine on Pacific Ocean	Japanese Troll	Japanese Pole-and-Line	Northern part of Japanese Setnet	Western part of Japanese Setnet	Other areas Setnet	Taiwanese Longline	Eastern Pacific Ocean Commercial fishery	Eastern Pacific Ocean Sports fishery	Others
		Length Bin	Length Bin	Length Bin	Length Bin	Length Bin	Weight Bin	Length Bin	Length Bin	Length Bin	Length Bin	Length Bin	Length Bin	Weight Bin
1990	Q1				17629 *1							11 *4		
	Q2				0 *3									
	Q3				0 *3									
	Q4				4794 *1									
1991	Q1			6 *4	24524 *1							4 *4		
	Q2				0 *3									
	Q3				0 *3									
	Q4				33536 *1									
1992	Q1			5 *4	36137 *1							1 *4	40 *3	
	Q2				0 *3									
	Q3				0 *3									
	Q4				1913 *1							247 *1	1 *4	
1993	Q1			2 *4	4657 *1							3 *4	1260 *1	
	Q2				0 *3									
	Q3				0 *3	163 *2							0 *3	
	Q4				900 *1	35 *3							0 *3	
1994	Q1	357 *1		138 *4	2575 *1	1421 *1	2049 *1	167 *2	217 *1	319 *1		2 *4	286 *1	12735 *1
	Q2	73 *3			0 *3	5064 *1	1346 *1	996 *1	1858 *1	428 *1				3631 *1
	Q3	86 *3			0 *3	2717 *1		15 *3	0 *3	885 *1			0 *3	
	Q4	1751 *1			772 *1	1348 *1	670 *1	909 *1	2388 *1	691 *1			13 *3	
1995	Q1	32 *3		15 *4	1923 *1	1164 *1	265 *1	1335 *1	173 *2	1407 *1		6 *4	750 *1	31978 *1
	Q2	21 *3			0 *3	2750 *1	930 *1	2575 *1	1194 *1	1510 *1				2597 *1
	Q3	247 *1			0 *3	731 *1		0 *3	353 *1				0 *3	
	Q4	4155 *1			1547 *1	913 *1	442 *1	0 *3	1618 *1	2004 *1			127 *2	0 *3
1996	Q1	54 *3		755 *4	1090 *1	1996 *1	1621 *1	1685 *1	84 *3	953 *1		67 *4	113 *2	32712 *1
	Q2	65 *3			0 *3	4287 *1	572 *1	2575 *1	1194 *1	692 *1				41387 *1
	Q3	341 *1			0 *3	2335 *1		0 *3	795 *1				0 *3	
	Q4	5201 *1			96 *3	1951 *1		176 *2	0 *3	1065 *1	6234 *1		33 *3	36 *3
1997	Q1	84 *3		46 *4	1969 *1	1268 *1	602 *1	87 *3	1030 *1		16 *4	376 *1	1228 *1	
	Q2	297 *1			0 *3	2922 *1		558 *1	595 *1	785 *1				2391 *1
	Q3	222 *1			747 *1		18 *3	0 *3	446 *1				0 *3	
	Q4	4571 *1			326 *1		991 *1	0 *3	1021 *1	3767 *1		18 *3	3 *3	
1998	Q1	332 *1		5 *4	1324 *1	2651 *1		850 *1	150 *2	434 *1		1 *4	665 *1	2753 *1
	Q2	393 *1			0 *3	7357 *1	637 *1	745 *1	1568 *1	907 *1				5214 *1
	Q3	270 *1			0 *3	953 *1	133 *2	45 *3	945 *1				2 *3	
	Q4	4354 *1			1318 *1	508 *1		4761 *1	0 *3	1261 *1	10067 *1		49 *4	1 *3
1999	Q1	50 *3		16 *4	2462 *1	1623 *1	545 *1	749 *1	32 *3	568 *1		2 *4	723 *1	1711 *1
	Q2	171 *2			0 *3	1765 *1	277 *1	1028 *1	1667 *1	838 *1				2494 *1
	Q3	149 *2			0 *3	823 *1		6 *3	1201 *1				0 *3	
	Q4	2279 *1			1689 *1	1107 *1	855 *1	529 *1	0 *3	1178 *1	9001 *1		8 *4	0 *3
2000	Q1	72 *3		31 *4	2531 *1	1168 *1	363 *1	2513 *1	147 *2	2363 *1		11 *4	2361 *1	1881 *1
	Q2	75 *3			0 *3	2584 *1	156 *2	3039 *1	1424 *1	2351 *1				5747 *1
	Q3	134 *2			0 *3	1444 *1		42 *3	0 *3	516 *1			33 *3	0 *3
	Q4	1713 *1			138 *2	524 *1		4208 *1	0 *3	1045 *1	5366 *1		374 *1	0 *3
2001	Q1	18 *3		127 *4	489 *1	2969 *1	258 *1	4072 *1	39 *3	673 *1		2 *4	6171 *1	3346 *1
	Q2	41 *3			0 *3	4120 *1	227 *1	2345 *1	997 *1	1054 *1				3922 *1
	Q3	46 *3		13445 *1	0 *3	987 *1		14 *3	0 *3	387 *1			11 *3	
	Q4	1397 *1		516688 *1	566 *1	275 *1	492 *1	1026 *1	0 *3	960 *1	5110 *1		406 *1	2 *3
2002	Q1	54 *3	23 *4	338765 *1	1589 *1	217 *1	278 *1	2773 *1	18 *3	2420 *1		1 *4	2307 *1	2522 *1
	Q2	40 *3		211065 *1	0 *3	1714 *1	158 *2	3347 *1	302 *1	1039 *1				6697 *1
	Q3	63 *3		19999 *1	0 *3	532 *1		1 *3	0 *3	476 *1			65 *3	7 *3
	Q4	1883 *1		435065 *1	297 *1	25 *3	1944 *1		361 *1	5441 *1			50 *3	0 *3
2003	Q1	17 *3	20 *4	254242 *1	265 *1	362 *1		8694 *1	37 *3	1929 *1		5 *4	4210 *1	3543 *1
	Q2	137 *2		221697 *1	0 *3	672 *1	780 *1	265 *1	1007 *1	333 *1				9248 *1
	Q3	201 *1		11270 *1	0 *3	735 *1		90 *3	0 *3	867 *1				107 *2
	Q4	2434 *1		203044 *1	729 *1	5 *3	1421 *1		1688 *1	5312 *1		8 *4		171 *2
2004	Q1	20 *3		1124 *1	386 *1	224 *1	2751 *1	102 *2	836 *1		6 *4	84 *3	7537 *1	
	Q2	85 *3		593499 *1	0 *3	1615 *1	138 *2	818 *1	965 *1	388 *1				7483 *1
	Q3	120 *2		469561 *1	0 *3	2399 *1	289 *1	512 *1	0 *3	1798 *1				40 *3
	Q4	2966 *1		466490 *1	548 *1	1603 *1	636 *1	4421 *1	0 *3	2792 *1	4228 *1		60 *3	11 *3
2005	Q1	17 *3	102 *4	583330 *1	222 *1	1260 *1		7236 *1	137 *2	2391 *1		1 *4	49 *3	8790 *1
	Q2	71 *3		243230 *1	0 *3	2467 *1		2513 *1	633 *1	424 *1				12187 *1
	Q3	62 *3		26920 *1	0 *3	1266 *1		100 *2	0 *3	1420 *1				15 *3
	Q4	1355 *1		470791 *1	459 *1	106 *2	1901 *1	0 *3	2211 *1	3834 *1		5 *4		543 *1
2006	Q1	36 *3	82 *4	19838 *1	242 *1	333 *1		8712 *1	245 *1	2005 *1		8 *4	127 *2	6829 *1
	Q2	13 *3		380307 *1	0 *3	2269 *1		1653 *1	950 *1	643 *1				10798 *1
	Q3	51 *3		48647 *1	0 *3	1222 *1	260 *1	433 *1	0 *3	771 *1				48 *3
	Q4	3252 *1		327484 *1	169 *2	198 *2	3704 *1	0 *3	1995 *1	4842 *1		1 *4		1 *3
2007	Q1	51 *3	46 *4	17087 *1	406 *1	350 *1		7359 *1	55 *3	1328 *1		6 *4	45 *3	4029 *1
	Q2	8 *3		100381 *1	0 *3	3697 *1		42 *3	1465 *1	834 *1				6075 *1
	Q3	144 *2		46924 *1	7926 *1		1924 *1	68 *3	1341 *1				110 *2	
	Q4	935 *1		498885 *1	1587 *1	111 *2	5109 *1	0 *3	4026 *1	2951 *1		5 *4	76 *3	31 *3
2008	Q1	11 *3	71 *4	699814 *1	1276 *1	153 *2		13670 *1	1905 *1	1946 *1		27 *4	656 *1	3553 *1
	Q2	21 *3		320099 *1	7825 *1			845 *1	690 *1	1643 *1				9100 *1
	Q3	81 *3		73265 *1	0 *3	5099 *1		1 *3	0 *3	1310 *1				102 *2
	Q4	1488 *1		486465 *1	48 *3	3 *3	3924 *1	0 *3	2563 *1	2295 *1		96 *3		15 *3
2009	Q1	27 *3	187259 *1	18 *4	628 *1	476 *1	366 *1	3212 *1	9 *3	755 *1	111 *2	3 *4	588 *1	6144 *1
	Q2	4 *3	6193 *1	0 *3	3386 *1	594 *1	1420 *1	81 *3	738 *1					7694 *1
	Q3	34 *3	117051 *1	0 *3	657 *1		0 *3	1519 *1					39 *3	
	Q4	759 *1	161886 *1	48 *3	2457 *1		93 *3	0 *3	4322 *1	578 *1		11 *4		0 *3
2010	Q1	10 *3	6210 *1	45 *4	0 *3	346 *1	1257 *1	146 *2	35 *3	1044 *1	42 *4		280 *1	8259 *1
	Q2	2 *3	7762 *1	0 *3	11092 *1	191 *2	17 *3	1609 *1	357 *1					8509 *1
	Q3	2880 *1		2940 *1		0 *3	1187 *1							
	Q4	623919 *1		2335 *1		482 *1	0 *3	1594 *1	902 *1		3 *4		550 *1	

*1) When this value is used for SS3, it's set 200 because of the over 200 raw sample size.

*2) When this value is used for SS3, it's set same value as raw sample size because it was between 100 and 200.

*3) When this value is used for SS3, it's set 0 because of the under 100 raw sample size.

*4) When this value is used for SS3, it's set half of raw sample size of FL3 or FL11.

Table 5. Pacific Bluefine Tuna CPUE Table for the Stock Assessment.

Fleet No.	Survey No.	SS3 Use	Fishery Fleet	Region	City	Data Period (Fishing year)
FL14	S1	○	Japanese Longline (coastal)	Spawning area		
FL15	S2	○	Japanese Longline			until 1973
FL16	S3	○	(offshore and distant water)			after 1974
FL17	S4	×	Tuna Purse Seine for Pacific Ocean	Sea of Japan		after 1982
FL18	S5	○	Japanese Troll	East China Sea	Nagasaki	1980 to 2010
FL19	S6	○		Pacific	Kochi and Wakayama	1980 to 2010
FL20	S7	×			Kochi	1980 to 2010
FL21	S8	×			Wakayama	1980 to 2010
FL22	S9	○	Taiwanese Longline			1998 to 2007
FL23	S10	×	US and Mexico Purse Seine			until 1982
FL24	S11	×				1999 to 2006

Table 6. Pacific Bluefin Tuna CPUE Table for the Stock Assessment.

Fishing Year	Fishing Quarter	Japan						Longline	Taiwan		US and Mexico	
		Offshore and Distant water Longline			Troll				1999 to 2006	Purse Seine		
		Coastal Longline	until 1973	after 1974	Sea of Japan	East China Sea	Pacific	Pacific Kochi	Wakayama	FL22	FL23	FL24
		FL14	FL15	FL16	FL17 ¹	FL18	FL19	FL20	FL21	SS3 use	SS3 nonuse	SS3 nonuse
		SS3 use	SS3 use	SS3 use	SS3 nonuse	SS3 use	SS3 use	SS3 nonuse	SS3 nonuse	SS3 use	SS3 nonuse	SS3 nonuse
1952	Q4		0.014									
1953	Q4		0.013									
1954	Q4		0.011									
1955	Q4		0.008									
1956	Q4		0.006									
1957	Q4		0.007									
1958	Q4		0.016									
1959	Q4		0.026									
1960	Q1									1.037		
	Q4		0.020									
1961	Q1									1.542		
	Q4		0.019									
1962	Q1									1.398		
	Q4		0.017									
1963	Q1									1.754		
	Q4		0.012									
1964	Q1									1.053		
	Q4		0.013									
1965	Q1									1.197		
	Q4		0.010									
1966	Q1									1.934		
	Q4		0.013									
1967	Q1									1.552		
	Q4		0.006									
1968	Q1									0.578		
	Q4		0.006									
1969	Q1									0.819		
	Q4		0.007									
1970	Q1									0.992		
	Q4		0.005									
1971	Q1									0.922		
	Q4		0.003									
1972	Q1									1.350		
	Q4		0.003									
1973	Q1									0.650		
	Q4		0.002									
1974	Q1									0.610		
	Q4		0.002									
1975	Q1									1.249		
	Q4		0.001									
1976	Q1									0.821		
	Q4		0.003									
1977	Q1									0.514		
	Q4		0.003									
1978	Q1									0.979		
	Q4		0.004									
1979	Q1									0.716		
	Q4		0.002									
1980	Q1					0.640				0.624		
	Q2					0.003						
	Q4											
1981	Q1					1.112		0.819		0.335		
	Q2					0.003						
	Q4											
1982	Q1					0.570		0.252		0.376		
	Q2					0.002						
	Q4											
1983	Q2					0.872		0.212				
	Q4		0.001									
1984	Q2					0.876		1.138				
	Q4		0.001									
1985	Q2					0.816		0.770				
	Q4		0.001									
1986	Q2					0.931		0.283				
	Q4		0.001									
1987	Q1		710 *1			0.666		0.161				
	Q2					0.001						
	Q4											
1988	Q1		354 *1			0.760		0.576				
	Q2					0.002						
	Q4											
1989	Q1		599 *1			0.610		0.315				
	Q2					0.002						
	Q4											
1990	Q2		1.205			0.002		0.641				
	Q4											

*1) This value is nominal CPUE

Table 6. Continued.

Fishing Year	Fishing Quarter	Japan						Taiwan		US and Mexico	
		Coastal Longline	Offshore and Distant water Longline			Troll			Longline	Purse Seine	
			FL14	FL15	FL16	FL17 ^{*1}	FL18	FL19	FL20	FL21	FL22
		SS3 use	SS3 use	SS3 use	SS3 nonuse		SS3 use	SS3 use	SS3 nonuse	SS3 use	SS3 nonuse
1991	Q1					289 *1					
	Q2							1.294		0.577	
	Q4					0.004					
1992	Q1					486 *1					
	Q2							0.553		0.296	
	Q4					0.004					
1993	Q1					600 *1					
	Q2							0.462		0.508	
	Q4	1.769				0.005					
1994	Q1					2402 *1					
	Q2							1.933	2.360	3.201	1.396
	Q4	1.280				0.004					
1995	Q1					1169 *1					
	Q2							1.047	0.841	1.045	0.782
	Q4	1.596				0.006					
1996	Q1					706 *1					
	Q2							1.567	0.850	0.899	1.264
	Q4	1.654				0.007					
1997	Q1					460 *1					
	Q2							0.889	0.464	0.485	0.708
	Q4	1.460				0.005					
1998	Q1					551 *1					
	Q2							0.807	1.110	1.540	0.554
	Q4	1.041				0.005					
1999	Q1					766 *1					#####
	Q2							1.469	0.249	0.326	0.183
	Q4	0.797				0.004					0.342
2000	Q1					755 *1					0.564
	Q2							1.139	0.322	0.324	0.526
	Q4	0.621				0.003					0.201
2001	Q1					439 *1					0.551
	Q2							1.148	1.564	2.115	0.942
	Q4	0.711				0.003					0.127
2002	Q1					460 *1					0.245
	Q2							0.725	0.665	0.826	0.622
	Q4	1.182				0.005					0.180
2003	Q1					475 *1					2.382
	Q2							0.637	0.320	0.397	0.299
	Q4	1.272				0.004					0.174
2004	Q1					753 *1					1.642
	Q2							1.274	3.173	3.470	4.372
	Q4	1.508				0.003					0.092
2005	Q1					857 *1					0.508
	Q2							1.352	0.871	0.994	1.076
	Q4	0.741				0.003					0.109
2006	Q1					388 *1					0.295
	Q2							0.704	0.822	0.930	1.041
	Q4	1.056				0.003					0.092
2007	Q1					866 *1					0.272
	Q2							1.375	1.273	1.473	1.511
	Q4	0.578				0.003					0.121
2008	Q1					752 *1					0.413
	Q2							1.406	0.684	0.661	1.202
	Q4	0.370				0.003					0.093
2009	Q1					585 *1					1.637
	Q2							1.088	0.082	0.084	0.127
	Q4	0.194				0.003					0.059
2010	Q1					604 *1					3.007
	Q2							1.073	1.351	1.966	0.398
	Q4	0.172				0.003					0.107

*1) This value is nominal CPUE

Table 7. Pacific Bluefin Tuna CV of CPUE Table for the Stock Assessment.

Fishing Year	Fishing Quarter	Japan						Taiwan		US and Mexico		
		Coastal Longline			Troll			Longline	Purse Seine			
		Offshore and Distant water Longline	until 1973	after 1974	Sea of Japan	East China Sea	Pacific	Pacific Kochi	Pacific Wakayama	until 1982	1999 to 2006	
		FL14	FL15	FL16	FL17	FL18	FL19	FL20	FL21	FL22	FL23	FL24
		SS3 use	SS3 use	SS3 use	SS3 nonuse	SS3 use	SS3 use	SS3 nonuse	SS3 nonuse	SS3 use	SS3 nonuse	SS3 nonuse
1952	Q4		0.200									
1953	Q4		0.200									
1954	Q4		0.200									
1955	Q4		0.200									
1956	Q4		0.200									
1957	Q4		0.200									
1958	Q4		0.200									
1959	Q4		0.200									
1960	Q1									1.068		
	Q4		0.200									
1961	Q1									0.795		
	Q4		0.200									
1962	Q1									0.798		
	Q4		0.200									
1963	Q1									0.792		
	Q4		0.200									
1964	Q1									0.720		
	Q4		0.200									
1965	Q1									0.730		
	Q4		0.200									
1966	Q1									0.552		
	Q4		0.200									
1967	Q1									0.833		
	Q4		0.200									
1968	Q1									0.966		
	Q4		0.200									
1969	Q1									0.953		
	Q4		0.200									
1970	Q1									0.885		
	Q4		0.200									
1971	Q1									0.855		
	Q4		0.200									
1972	Q1									0.811		
	Q4		0.200									
1973	Q1									1.010		
	Q4		0.200									
1974	Q1					0.200				1.064		
	Q4											
1975	Q1					0.200				0.871		
	Q4											
1976	Q1					0.200				0.878		
	Q4											
1977	Q1					0.200				1.105		
	Q4											
1978	Q1					0.200				0.943		
	Q4											
1979	Q1					0.200				1.099		
	Q4											
1980	Q1					0.200				1.025		
	Q2											
	Q4											
1981	Q1					0.200		0.512		1.317		
	Q2											
	Q4											
1982	Q1					0.200		0.515		1.253		
	Q2											
	Q4											
1983	Q2					0.200		0.578				
	Q4											
1984	Q2					0.200		0.513				
	Q4											
1985	Q2					0.200		0.495				
	Q4											
1986	Q2					0.200		0.485				
	Q4											
1987	Q1					0.200		0.456				
	Q2											
	Q4											
1988	Q1					0.200		0.327				
	Q2											
	Q4											
1989	Q1					0.200		0.322				
	Q2											
	Q4											

Table 7. Continued.

Fishing Year	Fishing Quarter	Japan						Taiwan		US and Mexico	
		Offshore and Distant water Longline			Troll			Longline	Purse Seine		
		Coastal Longline	until 1973	after 1974	Sea of Japan	East China Sea	Pacific	Pacific Kochi	Pacific Wakayama	FL22	until 1982 1999 to 2006
		FL14	FL15	FL16	FL17	FL18	FL19	FL20	FL21	FL22	FL23 FL24
		SS3 use	SS3 use	SS3 use	SS3 nonuse	SS3 use	SS3 use	SS3 nonuse	SS3 nonuse	SS3 use	SS3 nonuse SS3 nonuse
1990	Q2					0.200			0.279		
	Q4				0.200						
1991	Q1					0.200					
	Q2						0.200		0.314		
	Q4				0.200						
1992	Q1					0.200					
	Q2						0.200		0.310		
	Q4				0.200						
1993	Q1					0.200					
	Q2						0.200		0.235		
	Q4	0.021			0.200						
1994	Q1					0.200					
	Q2						0.200	0.200	0.200	0.200	0.200
	Q4	0.017			0.200						
1995	Q1					0.200					
	Q2						0.200	0.200	0.210	0.200	
	Q4	0.019			0.200						
1996	Q1					0.200					
	Q2						0.200	0.200	0.200	0.200	
	Q4	0.018			0.200						
1997	Q1					0.200					
	Q2						0.200	0.200	0.234	0.200	
	Q4	0.017			0.200						
1998	Q1					0.200					
	Q2						0.200	0.200	0.223	0.200	0.200
	Q4	0.013			0.200						
1999	Q1					0.200					1.895
	Q2						0.200	0.200	0.210	0.200	0.200
	Q4	0.012			0.200						
2000	Q1					0.200					0.766
	Q2						0.200	0.200	0.213	0.200	0.200
	Q4	0.011			0.200						
2001	Q1					0.200					0.926
	Q2						0.200	0.200	0.200	0.200	0.200
	Q4	0.011			0.200						
2002	Q1					0.200					0.753
	Q2						0.200	0.200	0.212	0.200	0.200
	Q4	0.013			0.200						
2003	Q1					0.200					0.632
	Q2						0.200	0.200	0.230	0.200	0.200
	Q4	0.011			0.200						
2004	Q1					0.200					0.599
	Q2						0.200	0.200	0.231	0.200	0.200
	Q4	0.013			0.200						
2005	Q1					0.200					0.640
	Q2						0.200	0.200	0.200	0.200	0.200
	Q4	0.012			0.200						
2006	Q1					0.200					0.576
	Q2						0.200	0.200	0.211	0.200	0.200
	Q4	0.012			0.200						
2007	Q1					0.200					0.588
	Q2						0.200	0.200	0.200	0.200	0.200
	Q4	0.011			0.200						
2008	Q1					0.200					0.610
	Q2						0.200	0.200	0.225	0.200	0.200
	Q4	0.013			0.200						
2009	Q1					0.200					0.676
	Q2						0.200	0.219	0.255	0.200	0.200
	Q4	0.013			0.200						
2010	Q1					0.200					0.595
	Q2						0.200	0.200	0.222	0.200	0.200
	Q4	0.018			0.200						

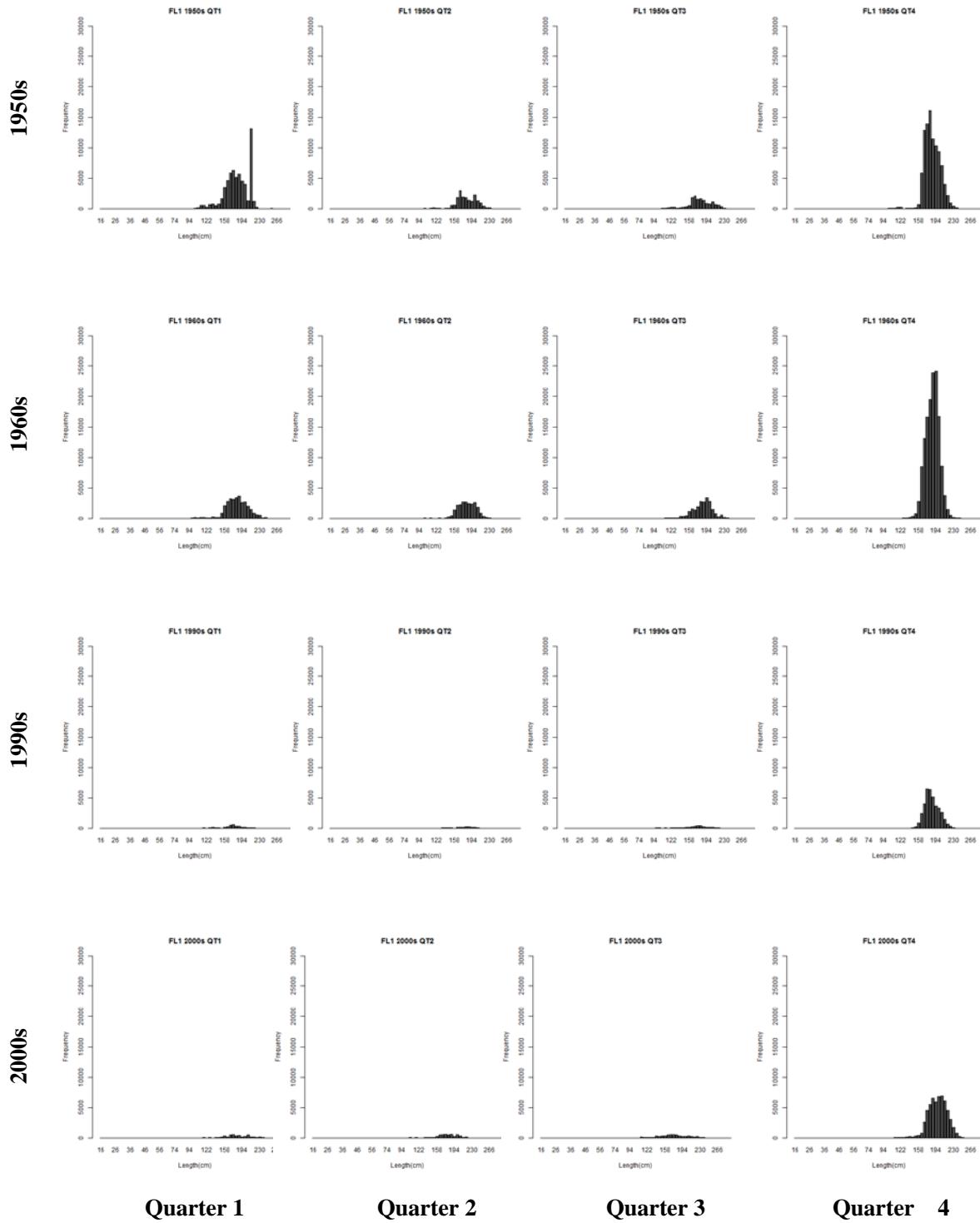
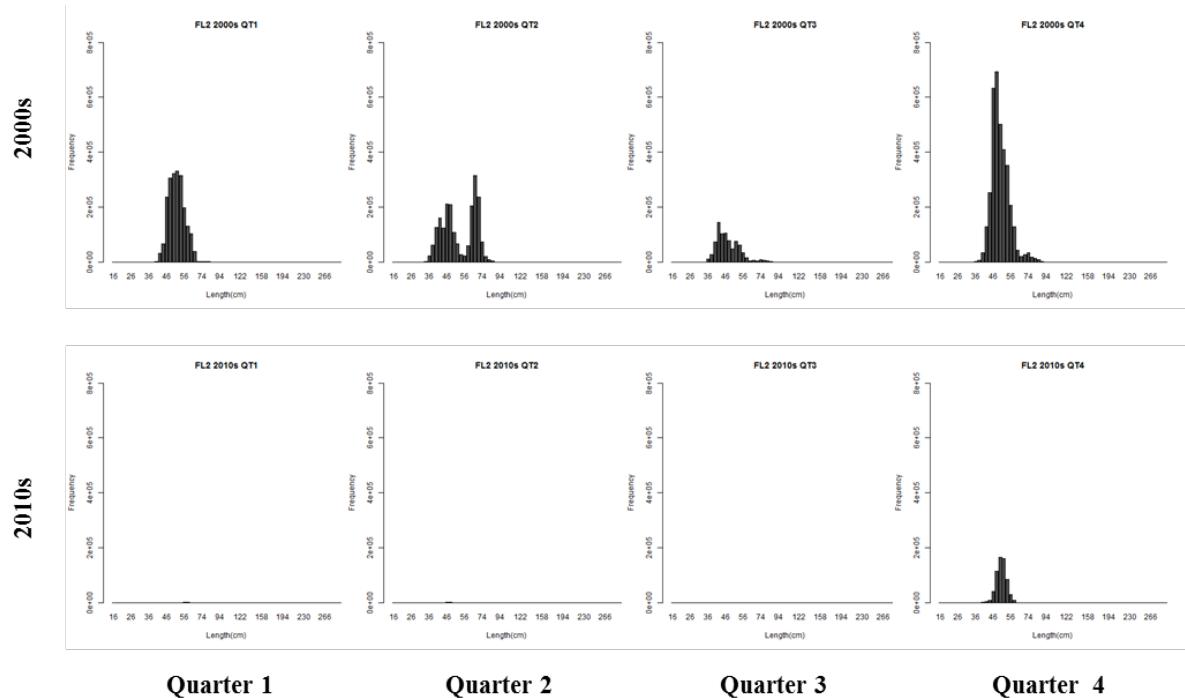
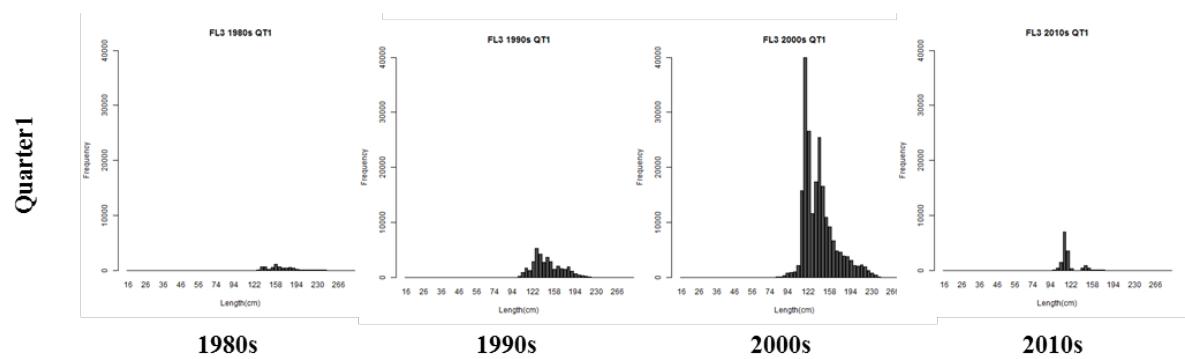


Fig. 1-1. Distribution of fleet1's length frequency by decade - quarter

**Fig. 1-2. Distribution of fleet2's length frequency by decade - quarter****Fig. 1-3. Distribution of fleet3's length frequency by decade - quarter**

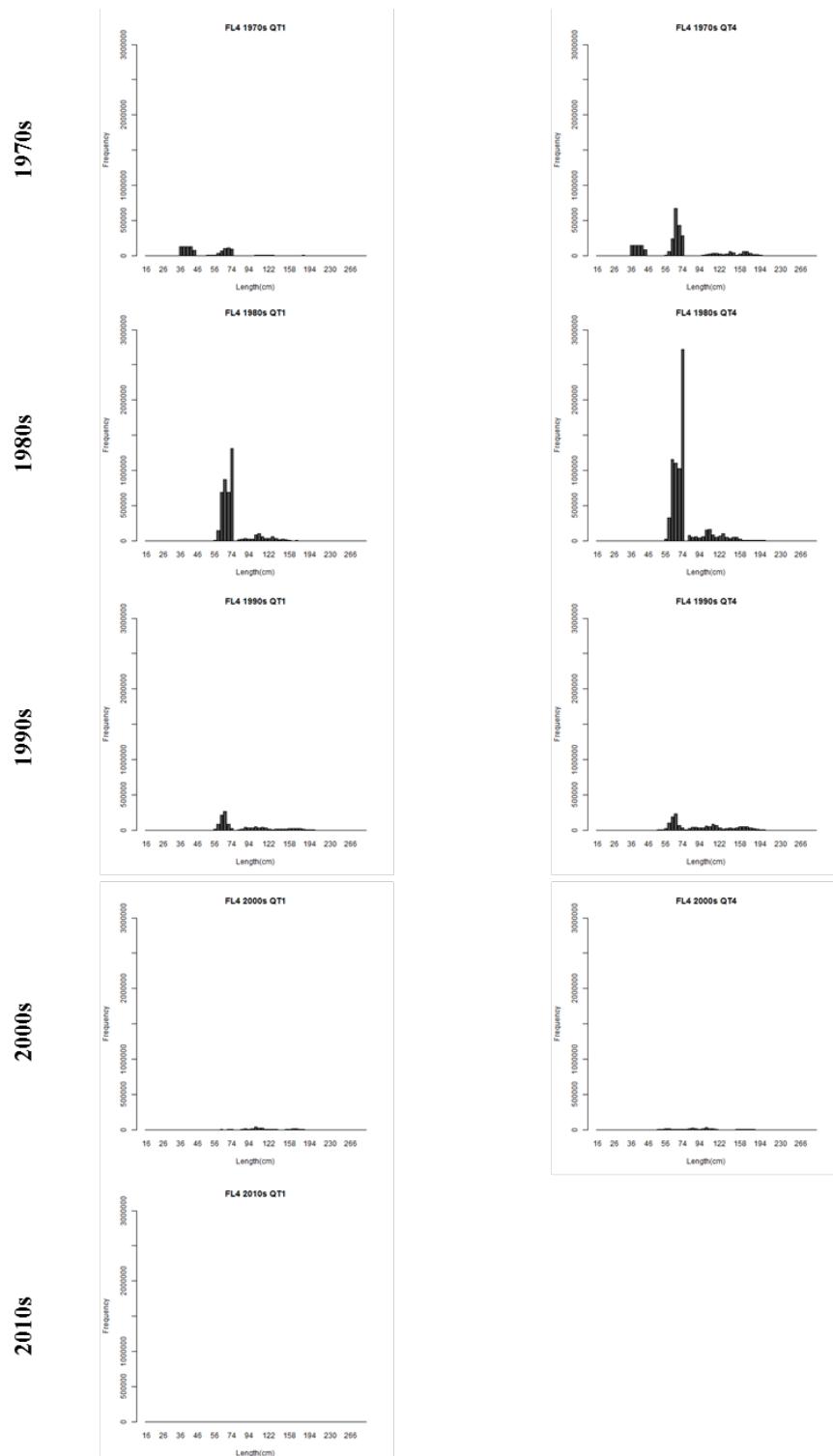


Fig. 1-4. Distribution of fleet4's length frequency by decade - quarter

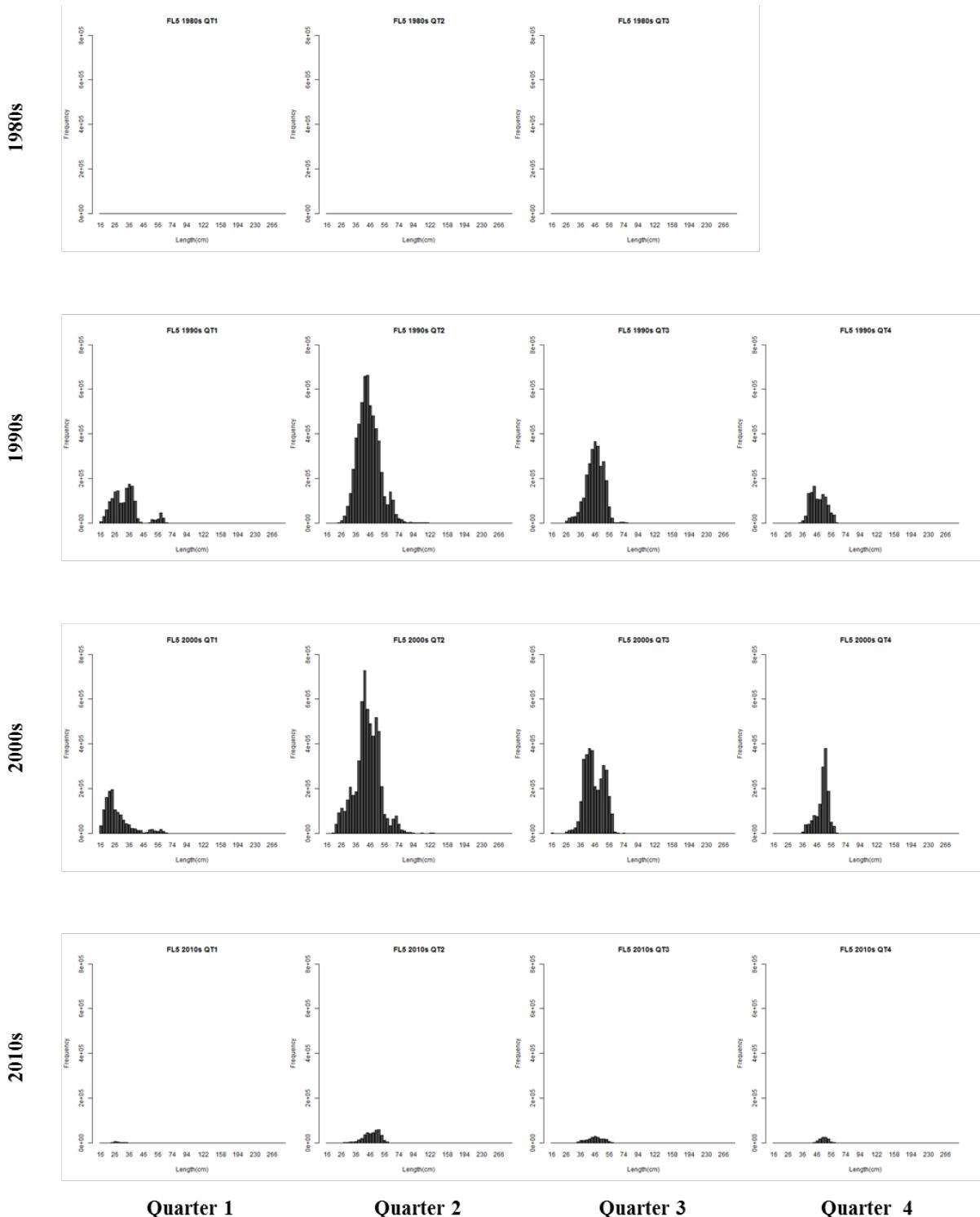


Fig. 1-5. Distribution of fleet5's length frequency by decade - quarter

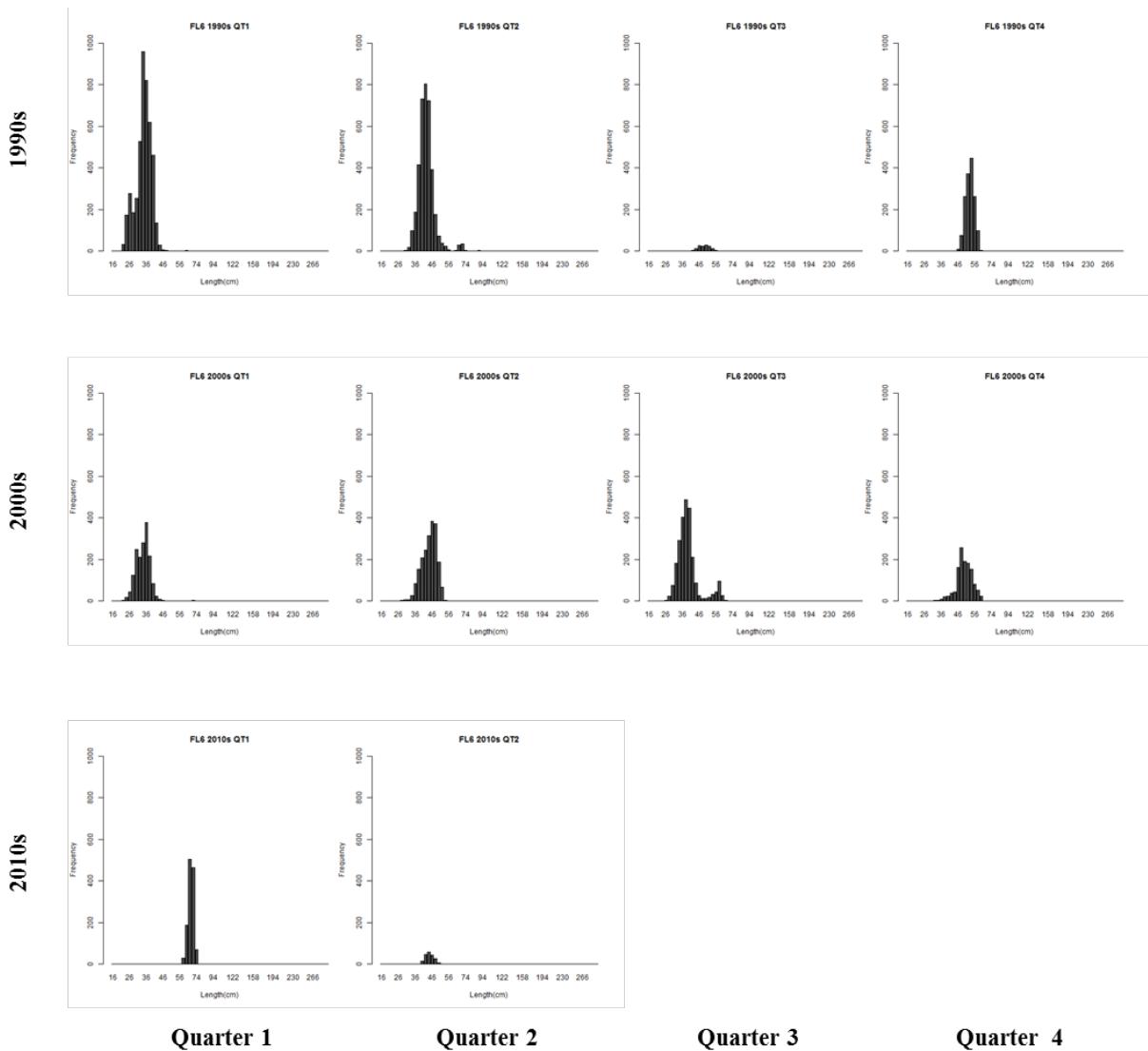


Fig. 1-6. Distribution of fleet6's length frequency by decade - quarter

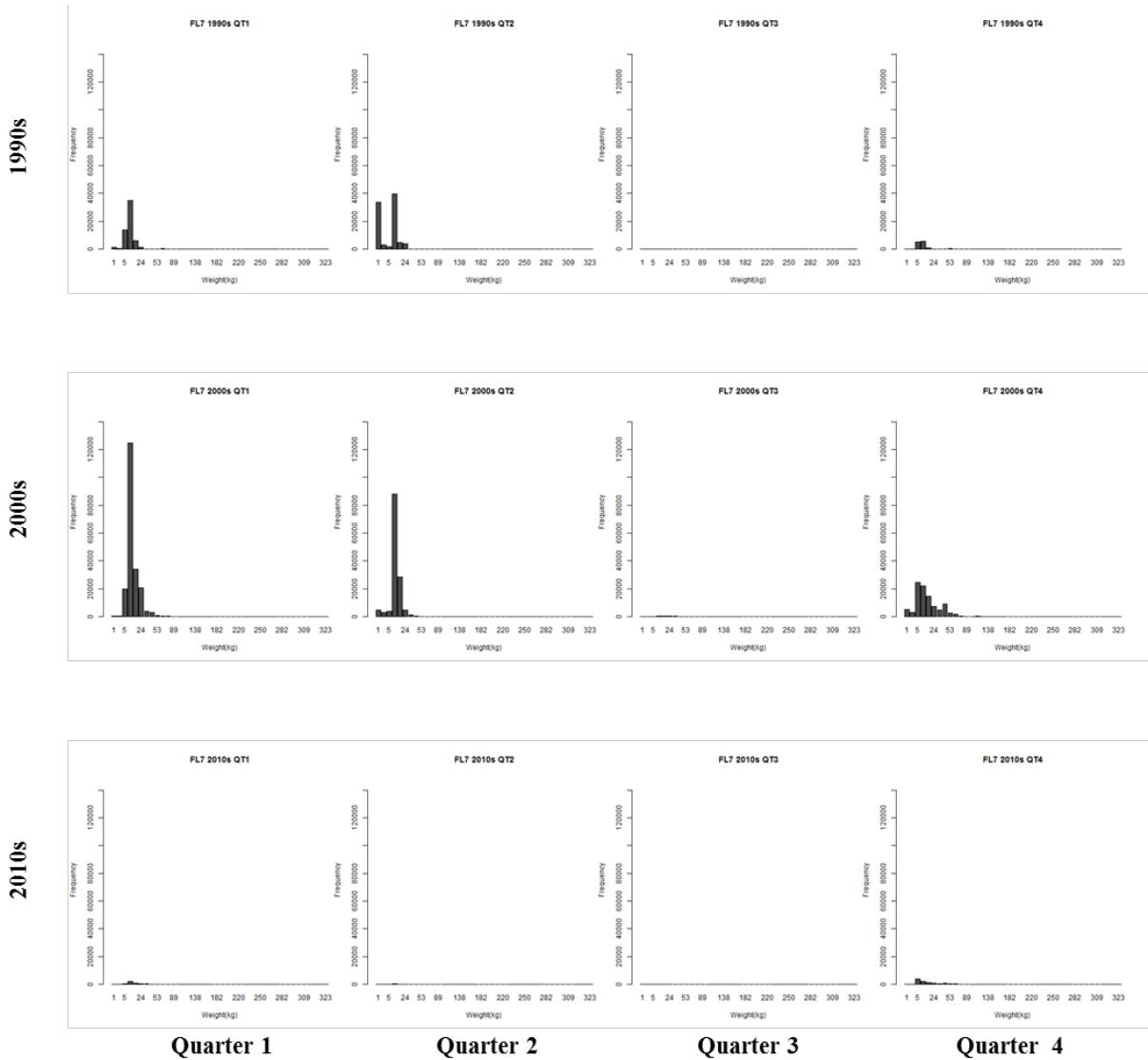


Fig. 1-7. Distribution of fleet7's weight frequency by decade - quarter

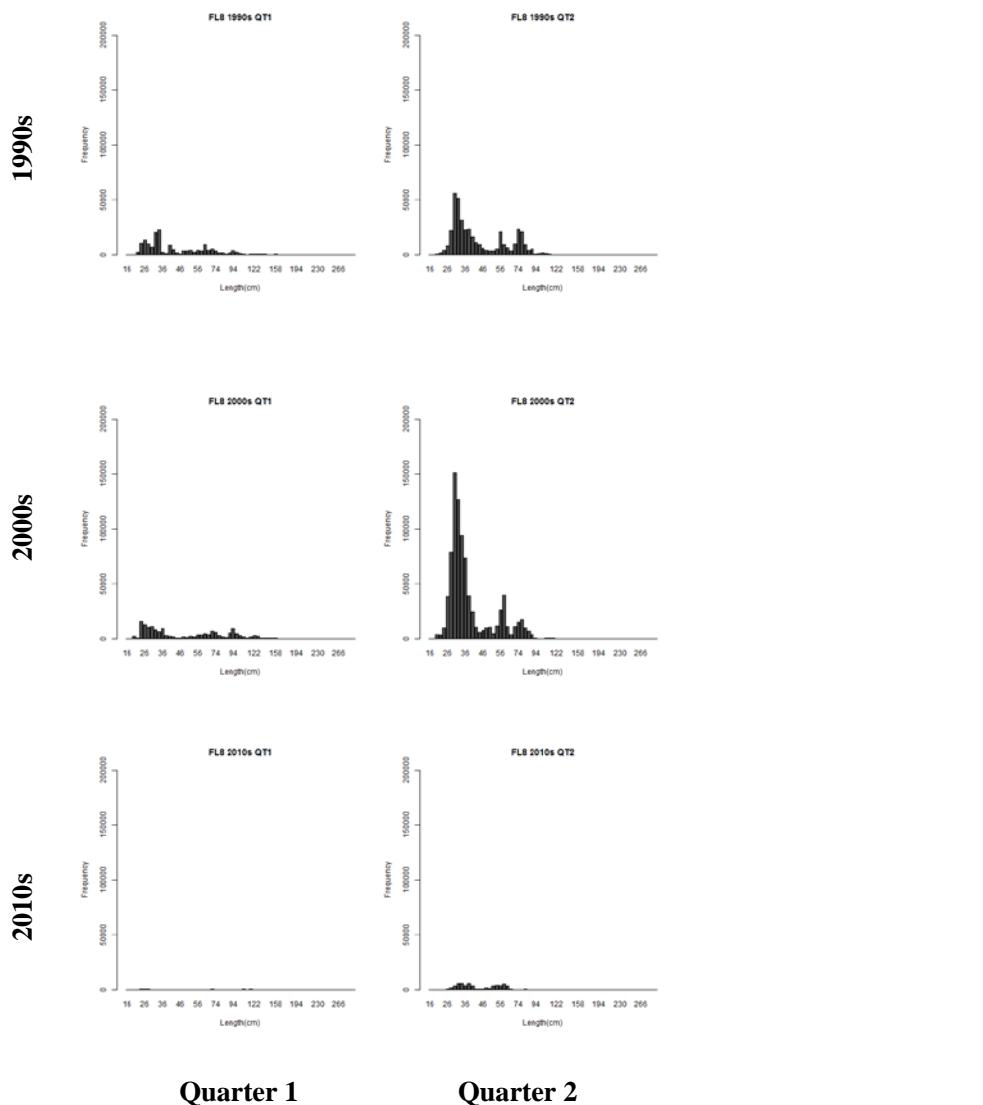


Fig. 1-8. Distribution of fleet8's length frequency by decade - quarter

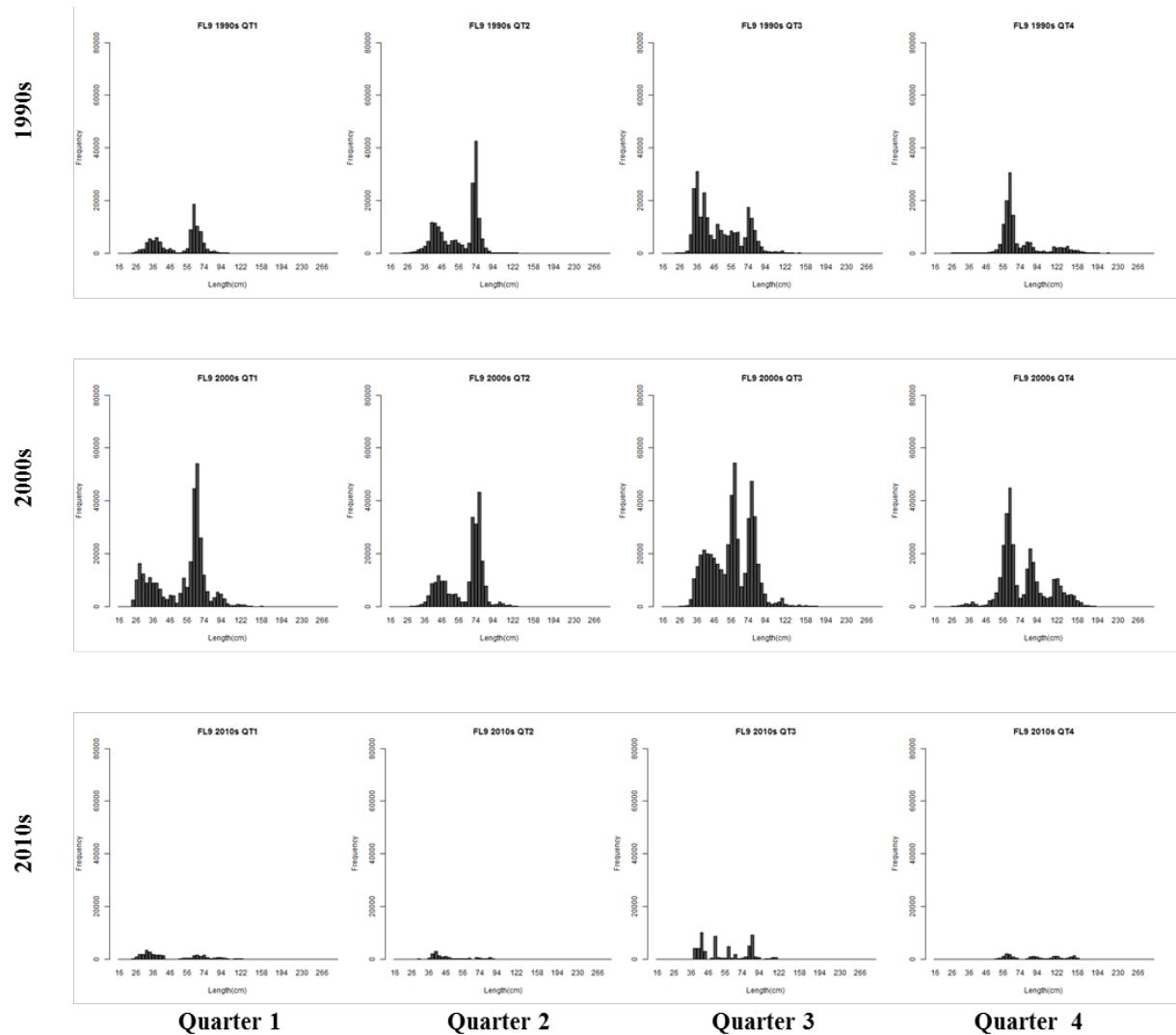


Fig. 1-9. Distribution of fleet9's length frequency by decade - quarter

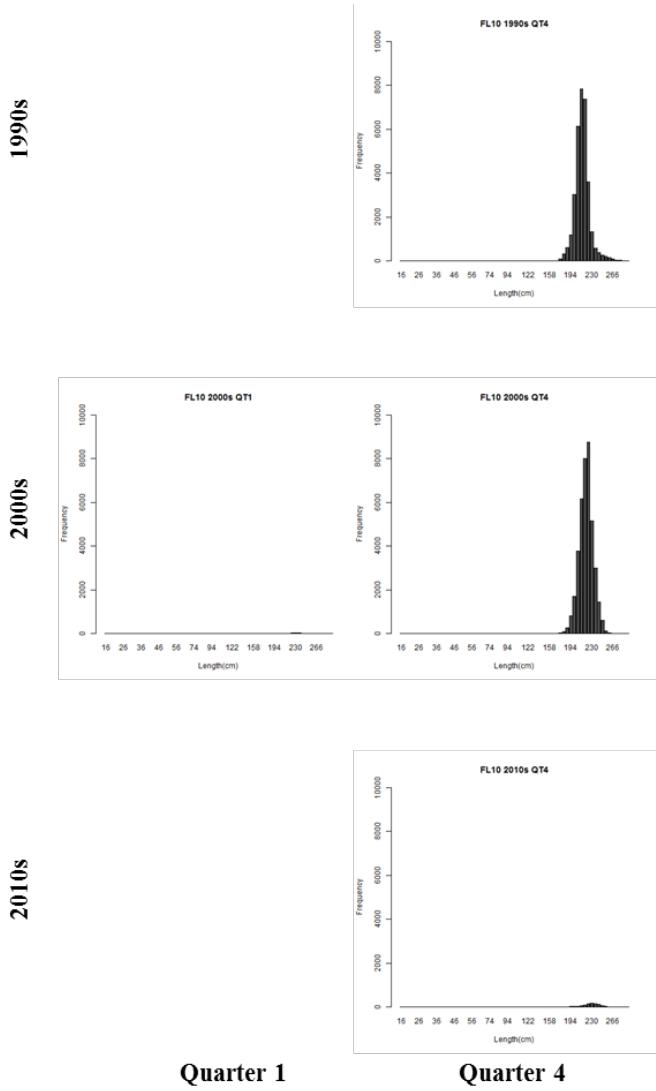


Fig. 1-10. Distribution of fleet10's length frequency by decade - quarter

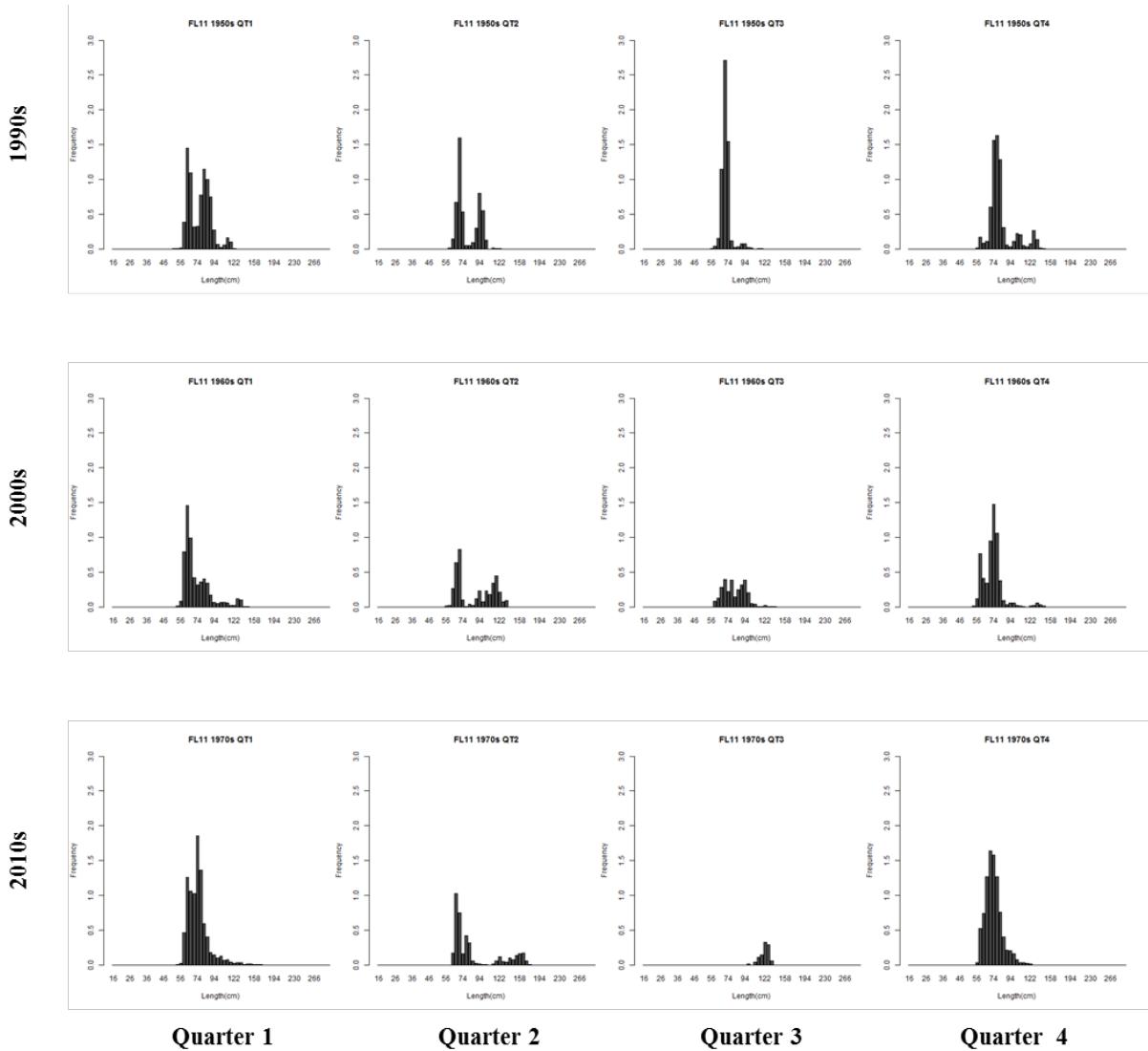
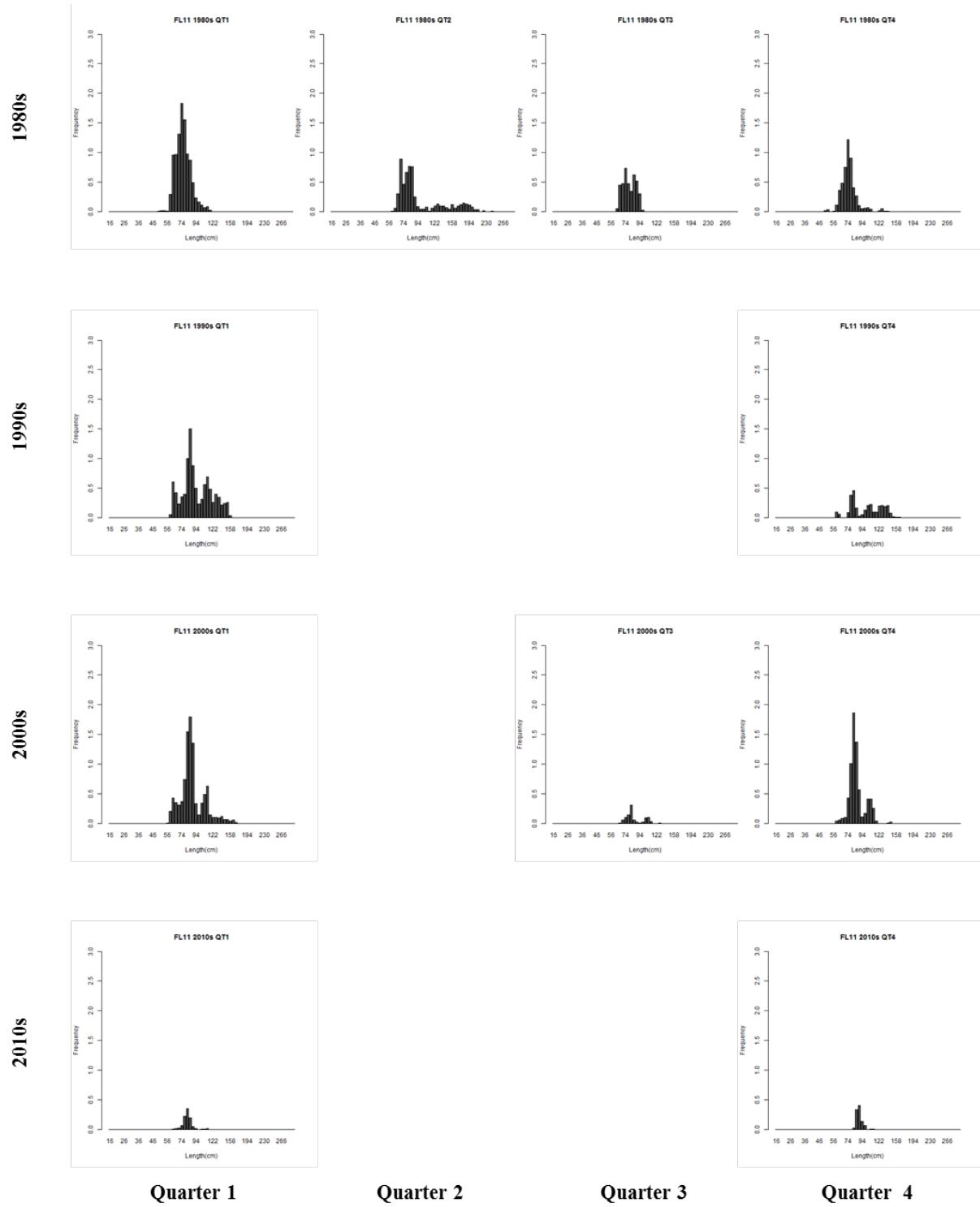


Fig. 1-11. Distribution of fleet11's length frequency by decade - quarter

**Fig. 1-11. Continued.**

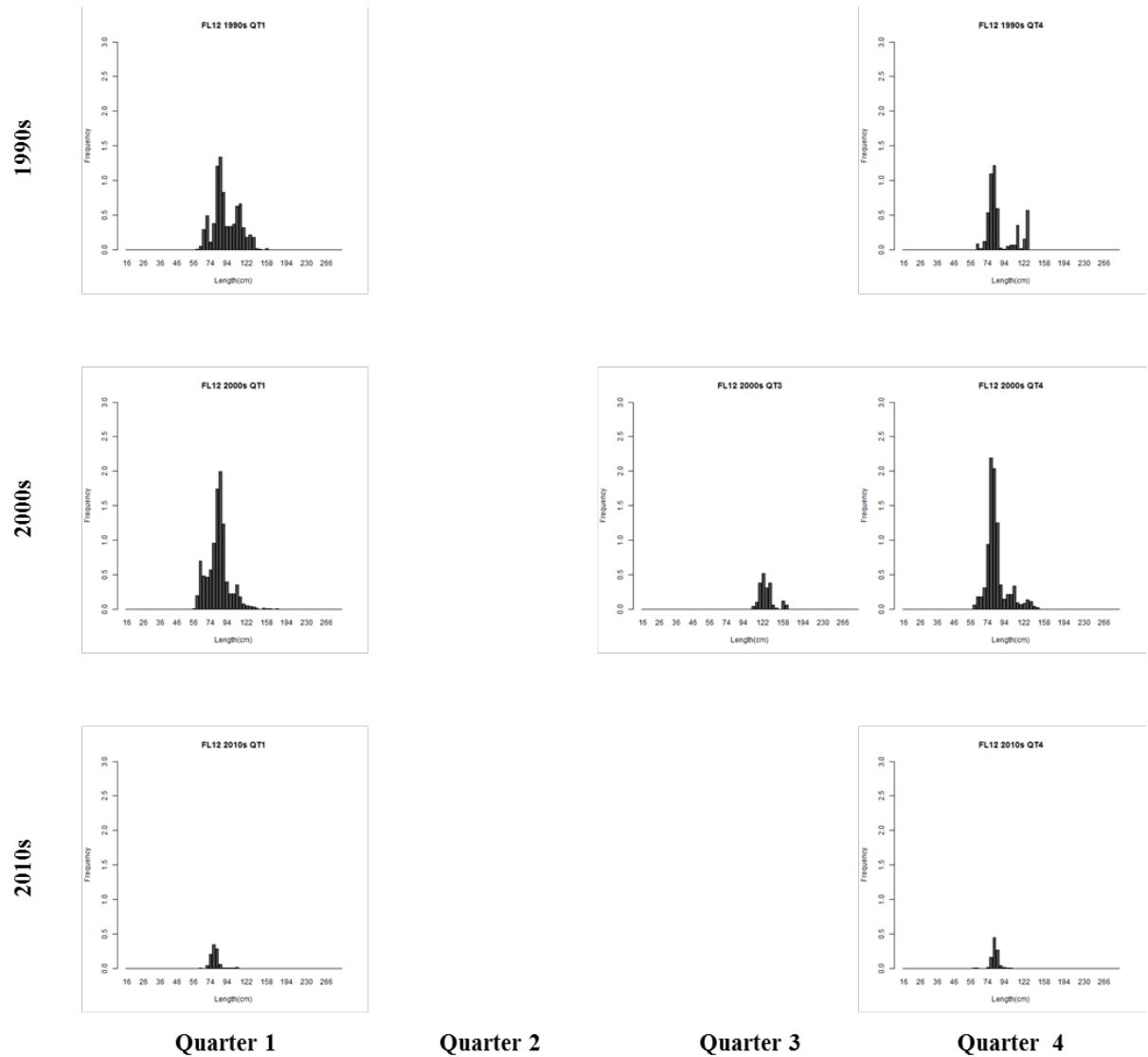


Fig. 1-12. Distribution of fleet12's length frequency by decade - quarter

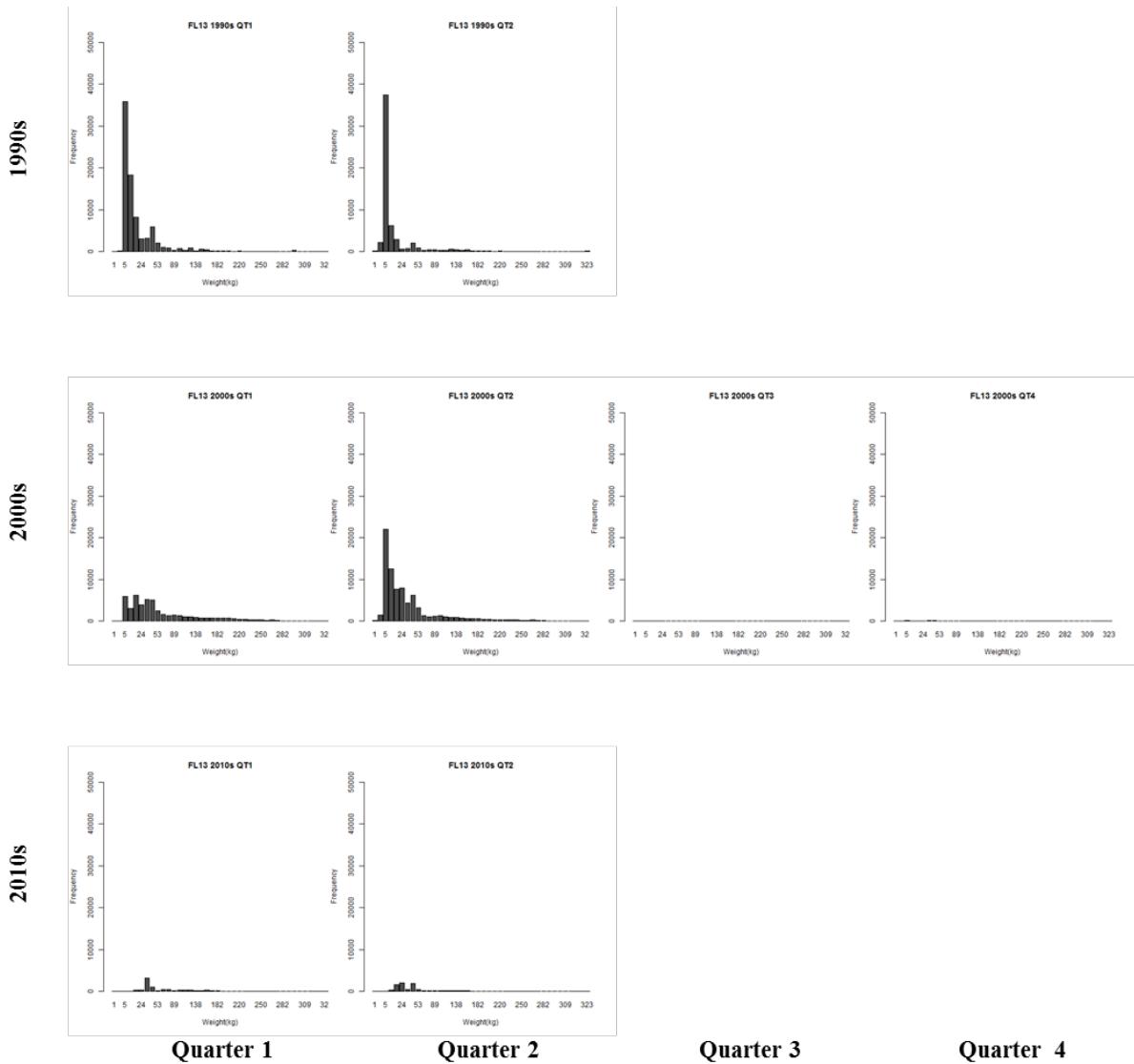


Fig. 1-13. Distribution of fleet13's length frequency by decade - quarter

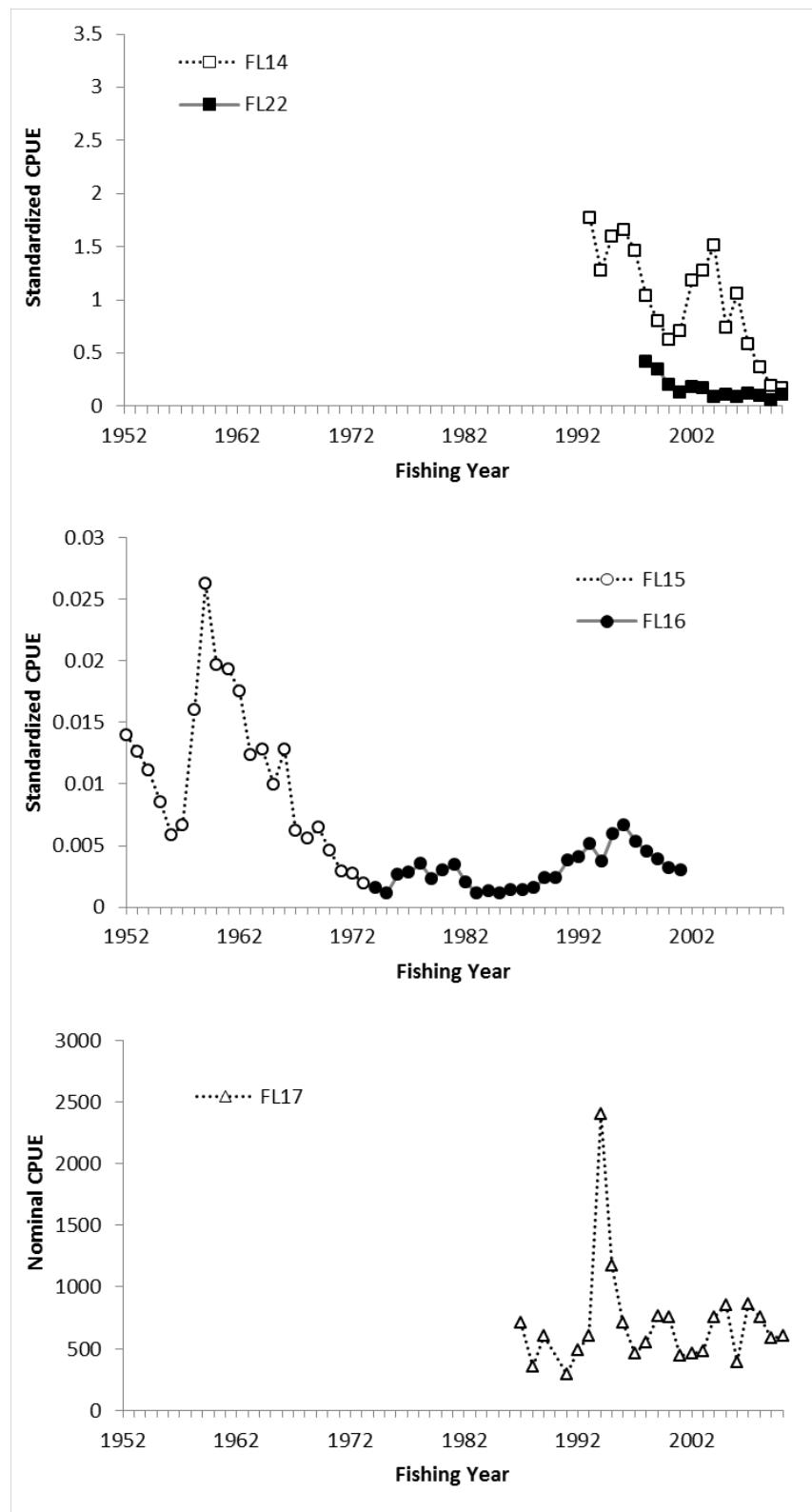


Fig. 2. Comparison of yearly changes in Longline CPUEs. FL14, 15, 16, 22 are standardized CPUE and FL17 is nominal CPUE

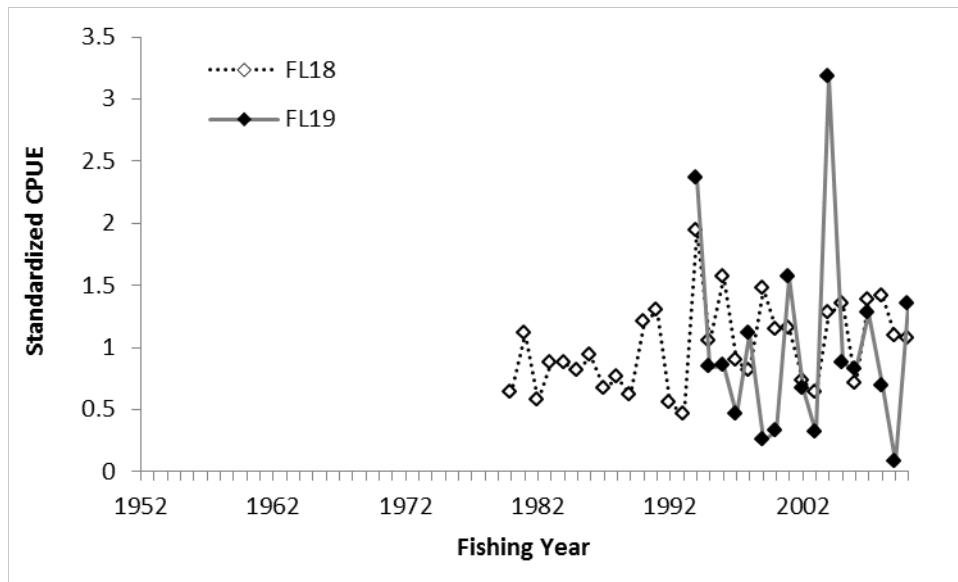


Fig. 3. Comparison of yearly changes in Troll CPUEs. FL18, 19 are standardized CPUE.

Appendix

Some errors were found in the quarterly catch data for small pelagic fish purse seine (Fleet2) made thorough the last input data updates which distributed on April 27, 2012. Fleet 2 includes Japanese and Korean fisheries. Therefore the quarterly catch data for this fleet was calculated by summing Japanese data and Korean data. However, in the last data updates, Japanese data which already contains Korean data by mistake was added to Korean data again. This mistake was occurred in the data during the following two periods: the first quarter of 2002 to the second quarter of 2008 and the first quarter of 2011 and the second quarter of 2011. Table A-1 shows the quarterly catch data before and after revision and those differences. The ranges of the differences were 10 to 1,548 metric ton and 317 metric ton on average.

Table A-1. Pacific Bluefin tuna quarterly catch for small pelagic fish purse seine (FL2).

Comparison of before and after data revision.

Calender		Fishing		Quarterly catch data revision		Difference
Year	QT	Year	QT	before	after	
2002	1	2001	3	202	70	-132
	2		4	2310	2166	-144
	3	2002	1	1462	1042	-420
	4		2	1998	1925	-73
2003	1		3	326	130	-196
	2		4	2185	1861	-324
	3	2003	1	930	858	-72
	4		2	3917	2369	-1548
2004	1		3	96	53	-43
	2		4	1606	1149	-458
	3	2004	1	81	33	-48
	4		2	2234	2147	-87
2005	1		3	1336	1306	-30
	2		4	2431	2152	-278
	3	2005	1	3715	3500	-215
	4		2	3213	3143	-70
2006	1		3	477	279	-199
	2		4	3031	2751	-280
	3	2006	1	979	605	-374
	4		2	2709	2613	-97
2007	1		3	1170	861	-310
	2		4	1081	1071	-10
	3	2007	1	582	483	-99
	4		2	3377	2741	-636
2008	1		3	1274	795	-478
	2		4	3438	2613	-826
2011	1	2010	3	870	254	-617
	2		4	4287	3488	-799