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Updates of input data for stock assessment model, Stock Synthesis 3, on Pacific bluefin tuna

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Oshima et al. (2013)

Summary

Update of stock assessment on Pacific bluefin tuna (PBF) will be conducted in February 2014. Input data for the 2011 and 2012 fishing years were added to those used for the previous stock assessment in 2012, where fishery data from 1952 fishing year to 2010 fishing year were included and essentially did not changed. Quarterly catch data were updated for all fleets. Size frequency data were updated for all fleets except for three fleets of which size data had low priority to update.. Abundance indices from Japanese longliners, Japanese troll and Taiwanese longliners were updated up to the 2012 fishing year.

Introduction

The ISC-PBFWG proposed conducting an update of stock assessment on Pacific bluefin tuna (PBF) early in 2014 (Anon. 2013a). Work plans relevant to the stock assessment model were as follows:

- ✓ Conduct model run with an additional two years (2011 and 2012) of data using the same SS model (version 3.23b from the 2012 stock assessment) for the stock assessment platform and using the same model structure and parameters as the representative run (base-case run) from the 2012 stock assessment.
- ✓ The stock assessment time period will be from July 1952 to June 2013.
- ✓ The WG will not change the fishery data (quarterly catch, size composition) from 1952-2010 (July 1952-June 2011) that was used in 2012 stock assessment.
- ✓ In the case of CPUE time series, due to the nature of the CPUE standardizations method, the whole time series will need to be re-standardized with the additional 2 years data.

Updates of input data of quarterly catch data, quarterly size frequency data and abundance indices were conducted according to these work plans. This document summarizes the updates of input data for the 2014 stock assessment and also mentions errors found in the quarterly catch data used the 2012 stock assessment.

Definition of fishing year

Fishing year were applied in the SS3 model for PBF. It starts from July 1st and ends to June 30th. In this document, hereafter, year refers to fishing year unless otherwise specified.

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Definition of fleet

Pacific bluefin tuna are caught in coastal and offshore waters of both sides of Pacific Ocean by various fisheries of Japan, Korea, Taiwan, Mexico and USA. In the SS3 model for PBF, these fisheries are grouped into 14 fleets, which lastly had been constructed in the ISC-PBF Workshop held in November 2012, in consideration of characteristic features of each fishery such as

seasonality and size selectivity. The fisheries categorized into each fleet are summarized in **Table 1**. Fleet 1 (FL1) was set for Japanese longline fishery including the distant water and offshore longliners and the coastal longliners. Japanese and Korean small pelagic fish purse seiners shared Fleet 2 (FL2). Japanese tuna purse seine fishery in the Sea of Japan was allocated to Fleet 3 (FL3), which included minor amount of Taiwanese purse seiners. Fleet 4 (FL4) was set for Japanese tuna purse seine off the Pacific coast of Japan. Fleet 5 (FL5) was Japanese troll fishery. Fleet 6 (FL6) was set for Japanese pole-and-line fishery and included Japanese drift net, Taiwanese drift net and Taiwanese other fishery. Fleets 7 to 10 (FL7-10) were set for Japanese set net fishery. Four kinds of the set net fisheries were separated in consideration of differences in size selectivity derived from regionality and seasonality. Taiwanese longline was representative fishery of Fleet 11 (FL11), which included catches from out of ISC members. Fleet 12 (FL12) is composed of commercial fisheries operated in the Eastern Pacific Ocean and is dominated by Mexican purse seine fishery since 2000s. Fleet 13 (FL13) corresponded to US sports fishing. Fleet 14 (FL14) was set for Japanese other fishery including angling, trawl and other longline fisheries.

Quarterly catch data

The 2012 stock assessment included the quarterly catch data from the 1st quarter of 1952 (3rd quarter of 1952 in calendar year) to the 4th quarter of 2010 (2nd quarter of 2011 in calendar year). For the 2014 stock assessment, the quarterly catch data for the 2011 and 2012 were added to the quarterly catch data used for the 2012 stock assessment, where the catch data before 2011, in principle, did not changed according to the work plans proposed by the ISC-PBFWG (Anon. 2013a) (**Table 2**). Annual catches from Japanese troll fishery for farming from 1998 to 2012 were reported in the ISC-PBFWG Workshop held in July 2013 (Anon. 2013b). The catches from Japanese troll for farming were exceptionally added to the catches for FL5 in the 1st quarters of 1998-2012 in order to reflect practical catch of Japanese troll fishery. The quarterly catch data by fleet prepared in the manner mentioned above were applied for the 2014 stock assessment.

Differences between annual total of the quarterly catch used for the 2012 stock assessment and annual catch by country and by fishery reported by the ISC-PBFWG were found in FL1, FL6, FL7, FL8, FL9, FL10, FL11 and FL14. Errors causing those differences included in the previous quarterly catch data were identified by each fleet and removed through revisions of data (**Table 3 and Fig. 1**). The revised quarterly catch data would be applied in sensitivity runs to confirm effects of the differences on estimation of SSB, recruitment and so on in the SS3 model.

Size frequency data

Size frequency data of Japanese fisheries for 2011 and 2012 fishing years were constructed through the same procedures, which were applied in data preparation for the 2012 stock assessment

and mentioned by Uematsu et al. (2012). The quarterly size frequency data for the last two fishing years were updated for all fleets with exception for FL4, FL6 and FL13 (**Fig. 2**). The ISC-PBFWG tentatively decided to use the catch-at-size data for FL4 from 1995 to 2006 fishing years, because there was not an appropriate method to construct the catch-at-size data for this fleet. The length frequency data from FL6 and FL13 were not used to estimate selectivity curves (PBFWG 2012). Hence, there were low priorities to update the size frequency data for these fleets. Effective sample size used for length frequency data was mentioned by Fukuda et al. (2014).

Abundance indices

Time series of abundance indices from Japanese longline (FL15 and S1), Japanese troll in East China Sea (FL19 and S5) and Taiwanese longline (FL23 and S9) were updated up to 2012 fishing year (Hiraoka et al. 2014; Fujioka et al. 2014; Wang et al. 2014) (**Table 4**). A value of 0.2 was applied for a coefficient of variation (CV) of CPUE from these fleets except for FL15 after 2004. In the 2012 stock assessment, the ISC-PBFWG decided to increase CV of CPUE from FL15 linearly with year from 2004 to 2010 fishing years based on recommendation by Oshima et al. (2012). Value of CV for the 2010 fishing year were tentatively used for 2011 fishing year onward.

References

Anonymous. 2013a. Report of the thirteenth meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. ISC13 Plenary Report. Plenary Report. 1-59. http://isc.ac.affrc.go.jp/pdf/ISC13pdf/ISC13_Plenary_Report-%2012_18%20.pdf

Anonymous. 2013b. Report of Pacific bluefin tuna Working Group Workshop. ISC13 Plenary Report. Annex 1. 1-72. http://isc.ac.affrc.go.jp/pdf/ISC13pdf/Annex%2014%20PB%20final%20version_0.pdf

Fujioka, K., Oshima, K., Tei, Yaoki., Ichinokawa, M., Takeuchi, Y. 2014. Abundance Indecies of young Pacific bluefin tuna determined by Japanese troll fishery. ISC/14/PBFWG-1/07. 1-11.

Fukuda, H., Oshima, K., Takeuchi, Y. 2014. A review of the model setting for the update of stock assessment for Pacific bluefin tuna. ISC/14-1/PBFWG/11. 1-20.

Hiraoka, Y., Ichinokawa, M., Oshima, K., Takeuchi, Y. 2014. Updated standardized CPUE and length frequency for Pacific Bluefin tuna caught by Japanese coastal longliners. ISC/14-1/PBFWG/02. 1-15.

Ichinokawa, M., Takeuchi, Y. 2012. Standardized CPUE of North Pacific Bluefin tuna caught by Japanese coastal longliners: updates until 2011. ISC/12-1/PBFWG/8. 1-15.

ISC-WPFWG. 2012 Stock assessment of Pacific bluefin tuna in 2012. Available at: http://isc.ac.affrc.go.jp/pdf/Stock_assessment/Stock%20Assessment%20of%20Pacific%20Bl

uefin%20Assmt%20Report%20-%20May15.pdf

Oshima, K., Mizuno, A., Ichinokawa, M., Takeuchi, Y., Nakano, H., Uozumi, Y. 2012. Shift of fishing efforts for Pacific bluefin tuna and target shift occurred in Japanese coastal longliners in recent years. ISC/12/PBFWG-3/05. 1-18.

Uematsu, S., Oshima, K., Kanaiwa, M., Ichinokawa, M., Kai, M., Abe, M., Iwata, S., Fujioka, K., Fukuda, H., Mizuno, A., Yoo, J.T, Yoon, S.C., Hsu, C.C., Teo, S, Aires-da-Silva, A., Dreyfus, M. and Takeuchi, Y. 2012. Input data for stock assessment model, Stock Synthesis 3, on Pacific bluefin tuna, Thunnus orientalis. ISC/12-2/PBFWG/02. 1-34.

Wang, H.Y., Shih, J.L., Hsu, C.C. 2014. Standardized catch per unit effort of Pacific bluefin tuna (Thunnus orientalis) by general linear model for Taiwanese small-scale longline fishery in the southwestern North Pacific Ocean. ISC/14-01/PBFWG/01. 1-21.

Table 1 Definition of fleets in the SS3 model. Each fleet was composed of single or multiple fisheries. Component 1 was a representative fishery of each fleet.

Fleet	**Abbr.**	**Component 1 (Representative fishery)**	**Component 2**	**Component 3**	**Component 4**	**Component 5**
FL1	JLL	Jpn longline				
FL2	SPelPS	Jpn small pelagic fish purse seine	Kor small pelagic fish purse seine	Kor trawl		
FL3	TunaPSJS	Jpn tuna purse seine in the Sea of Japan				
FL4	TunaPSPO	Jpn tuna purse seine off the Pacific coast of Japan				
FL5	JpnTroll	Jpn Troll				
FL6	JpnPL	Jpn Pole-and-line	Jpn drift net	Twn drift net	Twn others	
FL7	JpnSetNet NOJWeight	Set net of northern part of Japan[1]				
FL8	JpnSetNet NOJLength	Set net of Hokuriku region of Japan[2] for quarters 3 and 4				
FL9	JpnSetNetOA LengthQt1-3	Set net of other area in Japan for quarters of 1 to 3	Jpn miscellaneous fishery for quarters of 1 to 3			
FL10	JpnSetNetOA LengthQt4	Set net of other area in Japan for 4th quarter	Jpn miscellaneous fishery for 4th quarter			
FL11	TWLL	Twn longline	Out of ISC members			
FL12	EPOPS	US purse seine	US others	Mex purse seine	Mex others	EPO others

Table 1 *Continued*.

Fleet	Abbr.	Component 1 (Representative fishery)	Component 2	Component 3	Component 4	Component 5
FL13	EPOSP	US sports				
FL14	Others	Jpn angling (Hand line)	Jpn trawl	Jpn other longline		

[1]Northrn part of Japan consisted of Hokkaido and Aomori.

[2]Hokuriku region consisted of Ishikawa and Toyama.

Table 2 Quarterly catch by fleet from 1952 fishing year and 2012 fishing year. A unit of number of fish (1000 inds) was applied only for FL13, although catch for other fleets was based on metric ton.

Fishing year	Quarter	FL1 (MT)	FL2 (MT)	FL3 (MT)	FL4 (MT)	FL5 (MT)	FL6 (MT)	FL7 (MT)	FL8 (MT)	FL9 (MT)	FL10 (MT)	FL11 (MT)	FL12 (MT)	FL13 (1000inds)	FL14 (MT)
1952	1	1072.8	0.0	0.0	4935.9	23.3	712.7	236.0	266.0	148.4	0.0	0.0	1950.6	0.1	0.0
	2	132.0	0.0	0.0	0.0	498.1	504.5	170.2	231.8	175.1	0.0	0.0	24.1	0.0	171.5
	3	144.5	0.0	0.0	0.0	282.4	796.1	0.2	0.0	501.9	0.0	0.0	0.0	0.0	0.0
	4	1897.5	0.0	0.0	1990.0	39.3	906.9	17.2	0.0	0.0	554.7	0.0	0.1	0.0	0.0
1953	1	763.9	0.0	0.0	3579.6	51.4	649.6	254.6	71.8	293.1	0.0	0.0	3843.2	2.9	0.0
	2	241.0	0.0	0.0	0.0	1098.4	705.5	185.8	113.2	342.3	0.0	0.0	589.7	0.9	131.2
	3	263.2	0.0	0.0	0.0	317.9	609.2	1.9	0.0	430.3	0.0	0.0	0.0	0.0	0.0
	4	1577.7	0.0	0.0	1917.1	44.2	815.3	106.5	0.0	0.0	1426.5	0.0	2289.1	0.0	0.0
1954	1	1096.0	0.0	0.0	3448.4	57.9	744.2	860.5	106.4	1002.4	0.0	0.0	6844.8	0.6	0.0
	2	177.8	0.0	0.0	0.0	1236.2	923.4	612.9	309.2	722.6	0.0	0.0	403.1	0.0	218.5
	3	176.6	0.0	0.0	0.0	289.1	568.6	0.7	0.0	567.2	0.0	0.0	483.0	0.0	0.0
	4	1309.7	0.0	0.0	5008.0	40.2	761.0	42.6	0.0	0.0	724.5	0.0	3130.5	0.9	0.0
1955	1	1171.6	0.0	0.0	9008.1	52.7	664.8	363.9	109.9	397.1	0.0	0.0	2466.5	4.0	0.0
	2	311.0	0.0	0.0	0.0	1124.5	861.9	259.9	372.5	417.3	0.0	0.0	92.9	0.0	100.9
	3	123.7	0.0	0.0	0.0	338.3	812.5	0.7	0.0	895.9	0.0	0.0	0.0	0.0	0.0
	4	1103.7	0.0	0.0	7496.0	47.1	1087.4	37.8	0.0	0.0	1072.2	0.0	0.0	0.0	0.0
1956	1	1521.3	0.0	0.0	13483.3	61.6	952.5	261.9	203.0	390.7	0.0	0.0	4753.0	29.6	0.0
	2	160.8	0.0	0.0	0.0	1315.9	1231.5	184.9	622.4	500.0	0.0	0.0	974.0	1.9	192.3
	3	163.0	0.0	0.0	0.0	459.0	359.2	2.5	0.0	493.1	0.0	0.0	0.0	0.0	0.0
	4	904.6	0.0	0.0	6036.0	63.9	480.7	97.8	0.0	0.0	837.3	0.0	140.8	0.0	0.0
1957	1	566.3	0.0	0.0	12111.4	83.6	424.5	73.6	199.4	305.5	0.0	0.0	8778.5	6.3	0.0
	2	98.1	0.0	0.0	0.0	1785.1	544.5	25.0	353.4	434.4	0.0	0.0	295.6	0.0	194.3
	3	135.0	0.0	0.0	0.0	287.3	467.8	0.3	0.0	284.0	0.0	0.0	0.0	0.0	0.0
	4	384.0	0.0	0.0	3936.5	40.0	626.0	13.7	0.0	0.0	381.4	0.0	2634.5	0.0	0.0
1958	1	113.0	0.0	0.0	4649.6	52.3	541.4	10.3	102.0	80.8	0.0	0.0	11187.5	0.7	0.0
	2	211.1	0.0	0.0	0.0	1117.3	709.0	3.5	208.6	102.8	0.0	0.0	112.0	0.2	183.2
	3	371.2	0.0	0.0	0.0	141.3	117.2	1.0	0.0	364.2	0.0	0.0	0.0	0.0	0.0
	4	1572.7	0.0	0.0	4430.5	19.7	156.9	38.9	0.0	0.0	501.8	0.0	1277.9	0.0	0.0
1959	1	841.1	0.0	0.0	5565.2	25.7	134.9	29.2	113.5	110.0	0.0	0.0	2487.2	1.3	0.0
	2	916.2	0.0	0.0	0.0	549.5	177.7	9.9	257.8	148.3	0.0	0.0	0.0	0.0	153.4
	3	641.5	0.0	0.0	0.0	361.7	120.1	0.3	0.0	457.4	0.0	0.0	102.8	0.0	0.0
	4	4028.7	0.0	0.0	3475.3	50.3	160.7	15.4	0.0	0.0	561.7	0.0	1492.0	0.0	0.0
1960	1	705.6	0.0	0.0	7065.5	65.9	204.3	112.6	138.4	163.1	0.0	0.0	2911.9	0.1	0.0
	2	728.7	0.0	0.0	0.0	1406.9	182.0	79.8	343.8	159.8	0.0	0.0	40.3	0.0	302.2
	3	781.3	0.0	0.0	0.0	612.8	132.5	0.4	0.0	682.7	0.0	0.0	0.0	0.0	0.0
	4	3940.0	0.0	0.0	3355.6	85.3	177.3	16.2	0.0	0.0	863.3	0.0	1163.6	0.0	0.0
1961	1	1471.8	0.0	0.0	5768.3	111.6	170.1	12.2	229.3	200.8	0.0	0.0	6754.9	2.2	0.0
	2	596.6	0.0	0.0	0.0	2383.4	200.8	4.1	481.8	219.3	0.0	0.0	216.5	0.1	580.0
	3	799.8	0.0	0.0	0.0	323.0	149.4	0.8	0.0	566.0	0.0	0.0	108.1	0.0	0.0
	4	4331.2	0.0	0.0	3980.5	44.9	200.0	31.9	0.0	0.0	560.9	0.0	2376.1	0.0	0.0
1962	1	592.8	0.0	0.0	6676.8	58.8	176.4	71.0	618.6	125.5	0.0	0.0	8578.2	2.2	0.0
	2	458.7	0.0	0.0	0.0	1256.1	226.5	43.4	393.3	134.0	0.0	0.0	0.7	0.2	287.6
	3	541.4	0.0	0.0	0.0	487.8	251.4	1.6	0.0	528.2	0.0	0.0	72.4	0.0	0.0
	4	5129.9	0.0	0.0	3485.0	67.9	336.4	72.8	0.0	0.0	702.3	0.0	2428.1	0.0	0.0
1963	1	599.5	0.0	0.0	6301.2	88.9	304.9	240.0	181.5	224.0	0.0	0.0	9718.1	0.5	0.0
	2	255.4	0.0	0.0	0.0	1897.1	381.0	157.6	399.0	290.0	0.0	0.0	53.4	0.3	276.3
	3	312.6	0.0	0.0	0.0	534.2	207.5	0.7	0.0	408.2	0.0	0.0	16.5	0.0	0.0
	4	2321.0	0.0	0.0	3174.9	74.3	277.7	30.1	0.0	0.0	380.0	0.0	1768.3	0.0	0.0
1964	1	359.7	0.0	0.0	5798.2	97.3	246.0	48.7	135.8	62.4	0.0	0.0	7419.8	0.6	0.0
	2	260.2	0.0	0.0	0.0	2077.8	314.5	27.2	306.4	75.1	0.0	0.0	12.5	0.0	365.7
	3	322.2	0.0	0.0	0.0	376.7	229.2	0.8	0.0	444.7	0.0	0.0	26.4	0.0	0.0
	4	1944.6	0.0	0.0	4024.2	52.4	241.7	31.5	0.0	0.0	584.2	54.0	544.9	0.0	0.0
1965	1	160.3	0.0	0.0	7471.4	68.6	212.8	36.5	320.6	164.3	0.0	0.0	5399.5	0.1	0.0
	2	336.4	0.0	0.0	0.0	1465.1	199.5	17.7	337.1	183.4	0.0	0.0	918.3	0.0	312.6
	3	121.9	0.0	0.0	0.0	309.7	145.3	1.1	0.0	298.1	0.0	0.0	0.8	0.0	0.0
	4	862.3	0.0	0.0	3057.8	43.1	188.5	45.7	0.0	0.0	379.5	0.0	4873.0	0.0	0.0
1966	1	284.8	0.0	0.0	7024.5	56.4	188.1	57.3	99.5	60.2	0.0	0.0	11021.3	1.9	0.0
	2	275.2	0.0	0.0	0.0	1204.4	133.0	28.9	223.2	67.4	0.0	0.0	2.0	0.0	81.3
	3	217.6	0.0	0.0	0.0	628.2	284.9	1.5	0.0	846.3	0.0	0.0	16.0	0.0	0.0
	4	386.6	0.0	0.0	2376.1	87.4	373.0	60.6	0.0	0.0	568.4	53.0	3064.4	0.0	0.0
1967	1	245.8	0.0	0.0	4085.4	114.4	330.1	83.8	183.3	88.9	0.0	0.0	2767.7	2.8	0.0
	2	72.8	0.0	0.0	0.0	2443.3	261.3	44.2	630.0	96.4	0.0	0.0	39.9	0.4	258.5
	3	179.0	0.0	0.0	0.0	301.0	221.1	3.2	0.0	630.1	0.0	0.0	49.8	0.0	0.0
	4	140.3	0.0	0.0	3740.5	41.9	307.4	129.6	0.0	0.0	817.0	33.0	788.8	0.1	0.0
1968	1	134.7	0.0	0.0	5527.0	54.8	255.0	176.7	253.9	201.2	0.0	0.0	4812.0	1.0	0.0
	2	53.8	0.0	0.0	0.0	1170.7	206.1	92.5	508.3	245.7	0.0	0.0	325.4	0.1	205.6
	3	75.3	0.0	0.0	0.0	425.8	159.7	3.3	0.0	375.2	0.0	0.0	11.0	0.0	0.0
	4	661.4	0.0	0.0	1175.5	59.2	196.8	141.4	0.0	0.0	431.9	23.0	1608.4	0.1	0.0
1969	1	108.7	0.0	0.0	2060.5	77.6	184.3	319.4	185.1	108.5	0.0	0.0	5257.9	1.3	0.0
	2	53.9	0.0	0.0	0.0	1656.1	212.9	196.0	287.9	138.1	0.0	0.0	48.7	0.1	160.3
	3	37.1	0.0	0.0	0.0	229.9	177.6	3.4	0.0	232.4	0.0	0.0	13.7	0.0	0.0
	4	523.7	0.0	0.0	1273.7	32.0	203.9	140.1	0.0	0.0	432.5	0.0	1415.8	0.3	0.0
1970	1	22.9	0.0	0.0	1632.8	41.9	210.2	190.1	100.7	181.7	0.0	0.0	2534.0	0.7	0.0
	2	35.1	0.0	0.0	0.0	894.3	194.2	99.3	163.7	234.7	0.0	0.0	1.5	0.8	161.1
	3	181.3	0.0	0.0	0.0	286.4	233.7	4.1	0.0	159.0	0.0	0.0	31.4	0.0	0.0
	4	504.8	0.0	0.0	2834.7	39.8	269.3	170.8	0.0	0.0	257.7	1.0	4039.2	0.0	0.0

Table 2 *Continued*.

Fishing year	Quarter	FL1 (MT)	FL2 (MT)	FL3 (MT)	FL4 (MT)	FL5 (MT)	FL6 (MT)	FL7 (MT)	FL8 (MT)	FL9 (MT)	FL10 (MT)	FL11 (MT)	FL12 (MT)	FL13 (1000inds)	FL14 (MT)
1971	1	18.5	0.0	0.0	886.5	52.2	229.7	339.9	67.4	108.2	0.0	0.0	3349.1	0.5	0.0
	2	43.3	0.0	0.0	0.0	1113.8	240.2	202.2	113.1	132.1	0.0	0.0	939.3	0.2	212.4
	3	46.5	0.0	0.0	0.0	161.7	297.0	2.7	0.0	195.4	0.0	0.0	3.4	0.0	0.0
	4	445.5	0.0	0.0	2048.7	22.5	77.8	110.9	0.0	0.0	203.4	14.0	2879.2	0.0	0.0
1972	1	15.3	0.0	0.0	2163.4	29.4	449.0	163.8	63.7	54.5	0.0	0.0	8861.1	1.4	0.0
	2	31.4	0.0	0.0	0.0	628.8	158.5	88.6	155.2	68.8	0.0	0.0	1603.4	0.0	123.8
	3	56.5	0.0	0.0	0.0	404.5	72.6	1.5	0.0	480.2	0.0	0.0	10.5	0.0	0.0
	4	798.5	0.0	0.0	463.7	56.3	160.2	69.5	0.0	0.0	487.5	33.0	2043.2	1.8	0.0
1973	1	21.0	0.0	0.0	1802.7	73.7	419.1	276.8	235.6	110.5	0.0	0.0	8690.3	3.6	0.0
	2	25.0	0.0	0.0	0.0	1573.3	183.1	186.2	381.2	121.9	0.0	0.0	0.0	0.0	285.8
	3	15.1	0.0	0.0	0.0	317.9	450.2	3.5	0.0	1307.7	0.0	0.0	0.3	0.0	0.0
	4	977.3	0.0	0.0	416.0	44.2	245.7	155.4	0.0	0.0	1386.4	47.0	1227.4	0.0	0.0
1974	1	52.4	0.0	0.0	3690.4	57.9	482.5	545.7	587.8	261.1	0.0	0.0	4237.9	5.7	0.0
	2	24.3	0.0	0.0	0.0	1236.4	363.3	361.5	1063.5	346.9	0.0	0.0	151.4	0.0	368.3
	3	28.9	0.0	0.0	0.0	197.8	805.6	1.3	0.0	286.6	0.0	0.0	0.0	0.0	0.0
	4	890.6	0.0	0.0	3414.7	27.5	131.6	72.7	0.0	0.0	349.4	61.0	3065.3	0.0	0.0
1975	1	121.3	0.0	0.1	1076.8	36.0	1095.5	604.7	186.2	123.1	0.0	0.0	5747.6	3.1	0.0
	2	61.0	0.0	0.0	0.0	769.4	49.6	431.4	212.7	165.1	0.0	0.0	769.2	0.3	131.9
	3	36.6	0.0	0.0	0.0	159.2	80.1	5.4	0.0	230.8	0.0	0.0	615.6	0.0	0.0
	4	297.5	0.0	0.0	1122.0	22.1	270.7	240.0	0.0	0.0	430.3	17.0	2282.5	0.0	0.0
1976	1	53.7	0.0	0.0	1026.4	29.0	1300.3	818.0	111.3	189.6	0.0	0.0	7250.1	1.6	0.0
	2	15.4	0.0	0.0	0.0	619.2	518.3	539.6	186.6	244.6	0.0	0.0	496.8	0.4	151.9
	3	69.1	0.0	0.0	0.0	415.7	169.0	2.3	0.0	320.2	0.0	0.0	1.6	0.0	0.0
	4	243.7	0.0	0.0	4062.7	57.8	1337.6	107.7	0.0	0.0	410.9	131.0	2014.5	0.2	0.0
1977	1	36.5	0.0	0.0	1047.2	75.7	1258.4	485.2	127.3	94.7	0.0	0.0	3093.5	1.6	0.0
	2	11.5	0.0	0.0	0.0	1616.6	376.9	330.8	267.4	110.6	0.0	0.0	348.4	0.1	168.1
	3	57.5	0.0	0.0	0.0	866.9	51.0	2.3	0.0	376.8	0.0	0.0	86.4	0.0	0.0
	4	242.5	0.0	0.0	10346.2	120.6	426.1	106.5	0.0	0.0	527.2	66.0	704.3	0.0	0.0
1978	1	339.9	0.0	2.8	78.2	157.9	2328.9	441.1	136.3	146.0	0.0	0.0	4402.9	0.5	0.0
	2	16.4	0.0	0.0	0.0	3371.6	380.4	298.1	310.0	202.0	0.0	0.0	20.5	0.0	246.4
	3	54.7	0.0	0.0	0.0	509.6	454.1	2.2	0.0	733.3	0.0	0.0	10.6	0.0	0.0
	4	580.2	0.0	0.0	11144.8	70.9	210.6	114.9	0.0	0.0	1010.9	58.0	2330.9	0.0	0.0
1979	1	103.9	0.0	0.0	2736.3	92.8	1720.2	768.0	301.0	225.9	0.0	0.0	3539.4	0.0	0.0
	2	23.9	0.0	0.0	0.0	1981.9	406.0	540.9	622.2	239.2	0.0	0.0	227.0	0.0	888.2
	3	42.9	0.0	0.0	0.0	293.8	572.0	3.0	0.0	362.7	0.0	0.0	0.0	0.0	0.0
	4	749.0	0.0	0.0	6167.6	40.9	195.4	139.8	0.0	0.0	378.7	114.0	1434.8	0.0	0.0
1980	1	19.8	0.0	0.0	5159.4	53.5	1640.5	573.8	246.5	75.8	0.0	0.0	1439.0	0.7	0.0
	2	40.6	0.0	0.0	0.0	1142.6	467.6	387.4	276.8	76.3	0.0	0.0	59.1	0.0	473.9
	3	184.5	0.0	0.0	0.0	283.1	84.9	1.0	0.0	406.1	0.0	0.0	0.0	0.0	0.0
	4	336.2	0.0	0.0	6344.0	0.0	115.4	53.8	0.0	0.0	404.0	179.0	355.7	0.1	0.0
1981	1	55.9	0.0	1297.2	17780.7	67.7	2381.5	352.3	192.8	78.3	0.0	0.0	742.2	0.5	0.0
	2	40.9	0.0	0.0	0.0	1426.1	301.9	247.8	302.8	90.4	0.0	0.0	1.1	0.0	523.0
	3	63.1	7.6	0.0	0.0	435.4	336.2	1.5	0.0	276.6	0.0	0.0	0.0	0.0	0.0
	4	582.5	11.7	0.0	5410.4	53.2	671.2	68.5	0.0	0.0	340.9	207.0	59.6	0.1	0.0
1982	1	72.5	6.3	1614.6	12209.0	4.8	1904.8	300.0	150.6	47.3	0.0	0.0	2681.8	0.5	0.0
	2	19.5	5.4	0.0	0.0	370.1	443.8	204.0	215.8	61.6	0.0	0.0	405.6	0.1	132.4
	3	38.3	3.2	0.0	0.0	81.2	30.8	0.8	0.0	189.2	0.0	0.0	91.0	0.0	0.0
	4	161.2	4.9	0.0	11950.8	0.0	107.3	35.4	0.0	0.0	206.8	175.0	7.8	0.1	0.0
1983	1	8.1	2.7	570.2	2262.3	21.1	896.7	113.0	90.0	53.0	0.0	0.0	630.5	0.8	0.0
	2	15.0	2.3	0.0	0.0	1925.3	130.9	73.8	138.3	71.2	0.0	0.0	124.7	1.1	309.5
	3	41.0	1.0	0.0	0.0	287.2	32.9	3.2	0.0	380.3	0.0	0.0	72.3	0.0	0.0
	4	94.1	1.5	0.0	2448.2	0.0	116.3	138.4	0.0	0.0	431.0	477.0	143.5	0.2	0.0
1984	1	20.4	0.8	806.6	1183.7	28.4	587.8	342.8	230.6	80.8	0.0	0.0	562.7	2.1	0.0
	2	9.0	0.7	0.0	0.0	1558.3	390.6	214.5	312.3	100.2	0.0	0.0	89.5	0.5	336.2
	3	23.5	0.2	0.0	0.0	538.1	1010.5	3.3	0.0	264.5	0.0	0.0	61.9	0.0	0.0
	4	73.5	0.4	0.0	2897.0	135.2	464.4	153.4	0.0	0.0	358.1	210.0	1572.1	0.0	0.0
1985	1	8.4	0.2	448.0	889.4	11.6	961.4	714.0	114.6	114.3	0.0	0.0	1263.6	4.9	0.0
	2	8.0	0.2	0.0	0.0	1165.0	119.6	488.4	183.9	167.9	0.0	0.0	1126.4	0.3	447.0
	3	19.1	84.4	0.0	0.0	224.0	74.4	2.5	0.0	368.5	0.0	0.0	109.1	0.0	0.0
	4	83.7	129.6	0.0	6340.0	0.0	460.0	117.9	0.0	0.0	547.0	70.0	428.1	0.1	0.0
1986	1	7.6	70.3	16.0	1072.4	5.0	668.3	563.9	137.4	237.2	0.0	0.0	3759.1	0.6	0.0
	2	5.2	59.7	0.0	0.0	1238.4	212.3	386.7	277.3	275.6	0.0	0.0	800.7	0.0	402.6
	3	19.8	21.8	0.0	0.0	354.4	1089.0	1.7	0.0	273.9	0.0	0.0	92.8	0.0	0.0
	4	194.6	33.5	0.0	4873.6	15.0	131.5	89.2	0.0	0.0	298.9	365.0	31.2	0.0	0.0
1987	1	20.2	18.2	249.9	3550.4	5.9	518.8	612.2	119.7	73.3	0.0	0.0	812.7	0.8	0.0
	2	9.0	15.4	0.0	0.0	505.2	97.7	431.9	216.6	80.7	0.0	0.0	63.3	1.2	186.8
	3	18.8	7.9	0.0	0.0	88.5	145.5	0.9	0.0	93.6	0.0	0.0	0.0	0.0	0.0
	4	122.6	28.1	0.0	1027.4	0.0	356.9	45.2	0.0	0.0	113.4	108.0	220.6	0.0	0.0
1988	1	35.4	6.5	742.1	2010.2	15.0	795.8	227.9	50.4	36.0	0.0	0.0	973.9	0.2	0.0
	2	10.1	11.7	0.0	0.0	1020.0	41.8	157.0	68.3	49.8	0.0	0.0	226.5	0.2	127.2
	3	27.2	19.9	0.0	0.0	259.3	68.4	0.4	0.0	85.7	0.0	0.0	6.5	0.0	0.0
	4	190.0	29.2	0.0	2133.8	26.6	355.7	24.0	0.0	0.0	124.5	205.0	0.1	0.0	0.0
1989	1	20.0	102.4	579.9	3622.8	87.7	410.7	186.2	42.5	38.4	0.0	0.0	987.8	5.2	0.0
	2	4.2	32.1	0.0	0.0	529.0	146.2	132.4	56.7	57.2	0.0	0.0	129.6	1.3	109.5
	3	21.0	32.4	0.0	0.0	165.7	17.0	0.6	0.0	164.7	0.0	0.0	15.9	0.0	0.0
	4	279.7	54.7	0.0	360.0	91.9	212.7	25.5	0.0	0.0	133.4	189.0	0.6	0.0	0.0
1990	1	24.2	59.2	149.0	2474.2	2.9	830.2	90.0	30.4	33.3	0.0	0.0	1311.4	3.5	0.0
	2	10.2	140.5	0.0	0.0	989.7	47.1	59.7	126.3	52.4	0.0	0.0	194.2	0.2	198.5
	3	16.0	164.1	0.0	0.0	635.5	30.0	1.1	0.0	420.7	0.0	0.0	0.0	0.0	0.0
	4	193.4	125.8	0.0	645.6	160.7	78.5	49.1	0.0	0.0	287.8	342.0	85.8	0.0	0.0

Table 2 *Continued*.

Fishing year	Quarter	FL1 (MT)	FL2 (MT)	FL3 (MT)	FL4 (MT)	FL5 (MT)	FL6 (MT)	FL7 (MT)	FL8 (MT)	FL9 (MT)	FL10 (MT)	FL11 (MT)	FL12 (MT)	FL13 (1000inds)	FL14 (MT)
1991	1	14.2	236.1	224.2	3465.9	81.8	429.3	146.1	97.1	26.2	0.0	1.5	334.1	4.9	0.0
	2	14.4	5211.2	0.0	0.0	1190.6	103.2	94.5	340.1	22.7	0.0	0.0	5.1	0.4	414.4
	3	36.4	464.3	0.0	0.0	273.6	18.0	1.6	0.0	182.8	0.0	0.0	0.0	0.0	0.0
	4	462.2	2169.4	0.0	1677.0	0.0	35.2	67.6	0.0	0.0	331.9	464.0	11.3	0.1	0.0
1992	1	10.2	313.7	469.0	2182.5	0.0	944.3	116.1	77.9	95.0	0.0	0.3	1649.8	8.3	0.0
	2	20.4	247.6	0.0	0.0	641.7	64.6	66.3	134.9	134.4	0.0	0.0	327.8	0.2	193.3
	3	15.0	591.6	0.0	0.0	144.5	12.2	0.7	0.0	102.0	0.0	0.0	0.0	0.0	0.0
	4	707.5	766.4	0.0	1243.1	34.1	38.4	26.6	0.0	0.0	280.0	471.0	45.1	0.0	0.0
1993	1	62.4	107.2	82.7	3830.7	47.5	204.2	32.0	50.4	110.3	0.0	5.6	525.1	10.4	0.0
	2	37.3	19.3	0.0	0.0	319.8	35.9	15.8	66.9	163.4	0.0	0.0	112.7	0.1	206.5
	3	42.4	37.0	0.0	0.0	67.1	0.2	1.1	0.0	70.0	0.0	0.0	1.8	0.0	0.0
	4	1084.5	580.8	0.0	2676.8	15.2	16.6	15.7	0.0	0.0	481.1	559.0	4.1	0.1	0.0
1994	1	77.3	24.1	694.4	3973.3	458.0	206.3	35.6	144.9	23.0	0.0	1.9	966.5	2.1	0.0
	2	22.2	194.1	0.0	0.0	3570.2	65.4	30.6	256.2	100.2	0.0	0.0	57.6	0.0	271.8
	3	11.2	607.5	0.0	0.0	2475.3	9.1	0.2	0.0	131.9	0.0	0.0	0.0	0.0	0.0
	4	616.3	563.1	0.0	2039.6	733.2	135.5	23.3	0.0	0.0	255.5	335.0	0.1	0.0	0.0
1995	1	35.0	4223.2	496.1	2798.2	439.8	143.1	212.5	87.6	155.3	0.0	1.8	715.8	16.0	0.0
	2	25.2	9002.3	0.0	0.0	1130.0	94.1	204.8	289.8	498.3	0.0	0.0	0.0	0.0	476.3
	3	30.9	1380.4	0.0	0.0	136.0	4.7	0.0	0.0	84.3	0.0	0.0	0.0	0.0	0.0
	4	827.1	178.3	0.0	3123.5	57.2	0.7	15.5	0.0	0.0	253.3	956.0	757.1	1.6	0.0
1996	1	25.3	471.5	450.0	1966.7	256.2	90.0	141.9	62.5	66.3	0.0	4.2	7651.7	1.1	0.0
	2	26.4	175.9	0.0	0.0	3190.8	66.0	109.7	307.4	108.3	0.0	0.0	0.3	0.0	503.3
	3	26.8	852.9	0.0	0.0	846.0	0.9	0.0	0.0	114.1	0.0	0.0	0.6	0.0	0.0
	4	1214.9	1509.7	0.0	1401.7	550.1	3.6	6.3	0.0	0.0	199.3	1814.0	61.0	3.0	0.0
1997	1	27.0	3214.9	707.9	4027.2	224.3	113.1	20.0	125.4	40.1	0.0	14.3	2637.9	5.4	0.0
	2	43.8	2491.4	0.0	0.0	1119.6	25.4	52.8	143.7	101.9	0.0	0.0	40.5	0.0	702.0
	3	17.7	605.4	0.0	0.0	605.2	1.6	0.6	0.0	158.3	0.0	0.0	4.4	0.0	0.0
	4	1149.9	589.3	0.0	13.1	515.0	2.4	15.3	0.0	0.0	130.7	1910.0	8.3	0.7	0.0
1998	1	53.1	587.4	325.5	2376.2	143.2	108.0	29.1	33.5	80.2	0.0	20.4	2016.5	19.0	0.0
	2	45.7	1081.6	0.0	0.0	1613.2	63.5	67.9	273.0	85.7	0.0	0.0	23.8	0.7	608.7
	3	33.3	748.8	0.0	0.0	797.8	10.2	0.6	0.0	278.8	0.0	0.0	0.0	0.0	0.0
	4	1075.8	1082.9	0.0	5592.1	360.0	2.4	32.4	0.0	0.0	264.8	3089.0	2280.4	0.6	0.0
1999	1	25.2	2280.4	578.6	5448.2	182.5	64.5	15.8	75.7	31.9	0.0	21.2	442.3	35.2	0.0
	2	40.6	697.7	0.0	0.0	2100.6	16.7	46.1	251.8	98.9	0.0	0.0	49.2	1.0	481.6
	3	39.3	1398.3	0.0	0.0	1455.7	0.7	0.1	0.0	167.5	0.0	0.0	0.0	0.1	0.0
	4	893.0	3977.2	0.0	3403.4	769.7	82.8	4.9	0.0	0.0	164.1	2780.0	668.5	8.0	0.0
2000	1	15.2	3243.7	746.9	4042.3	211.6	65.5	86.6	26.9	127.3	0.0	20.9	3203.5	12.6	0.0
	2	12.2	2074.7	0.0	0.0	2779.5	5.6	72.4	272.6	202.2	0.0	0.0	0.0	0.0	637.8
	3	8.4	1857.6	0.0	0.0	934.2	0.0	0.5	0.0	358.0	0.0	0.0	0.0	0.1	0.0
	4	748.9	3090.2	0.0	981.4	464.3	4.4	45.0	0.0	0.0	189.4	1839.0	382.0	0.7	0.0
2001	1	12.9	414.8	239.0	1918.3	220.3	167.2	174.3	25.8	47.2	0.0	49.8	821.0	19.8	0.0
	2	26.1	294.8	0.0	0.0	1847.1	112.5	232.2	168.2	125.1	0.0	0.0	0.0	1.4	682.5
	3	43.5	222.2	0.0	0.0	988.4	16.5	0.0	0.0	112.9	0.0	0.0	0.0	0.1	0.0
	4	752.8	2300.5	0.0	556.3	697.2	50.5	6.3	0.0	0.0	114.9	1523.0	274.6	1.3	0.0
2002	1	24.7	1468.2	598.8	2766.9	215.5	223.5	234.7	55.5	96.8	0.0	65.6	1497.4	30.5	0.0
	2	33.7	1922.5	0.0	0.0	705.5	24.0	250.9	130.1	97.8	0.0	0.0	0.0	1.5	409.1
	3	41.8	337.2	0.0	0.0	519.6	10.5	0.0	0.0	84.4	0.0	0.0	0.0	0.0	0.0
	4	1045.5	2165.1	0.0	184.8	823.5	34.1	54.2	0.0	0.0	87.2	1553.8	589.7	0.5	0.0
2003	1	53.7	870.9	571.0	200.4	300.8	57.6	290.5	49.7	46.2	0.0	26.6	2704.3	20.8	0.0
	2	63.1	4039.9	0.0	0.0	415.9	5.8	70.6	131.4	25.0	0.0	0.0	0.0	0.9	403.1
	3	47.0	90.9	0.0	0.0	182.3	5.2	3.0	0.0	108.6	0.0	0.5	0.0	0.0	0.0
	4	1508.5	1699.8	0.0	609.1	54.4	15.0	46.7	0.0	0.0	266.3	1459.9	3619.6	0.7	0.0
2004	1	60.0	69.0	2100.0	2225.0	340.8	114.3	81.3	77.2	58.4	0.0	13.6	5285.4	2.6	0.0
	2	191.2	2236.0	0.0	0.0	1867.9	93.5	68.2	161.4	24.7	0.0	0.0	0.0	0.0	420.5
	3	43.5	1306.0	0.0	0.0	1173.1	164.4	14.9	0.0	379.1	0.0	0.2	0.0	0.0	0.0
	4	1705.7	2152.4	0.0	263.5	906.2	318.5	216.9	0.0	0.0	571.8	1148.9	1986.0	0.4	0.0
2005	1	52.8	3499.8	3693.5	76.9	520.0	170.7	136.9	136.0	278.3	0.0	32.9	2764.0	5.3	0.0
	2	88.4	3143.0	0.0	0.0	1034.1	30.2	101.8	125.4	220.8	0.0	0.0	0.0	0.1	412.9
	3	24.9	278.8	0.0	0.0	513.3	68.3	6.7	0.0	267.1	0.0	0.3	640.2	0.0	0.0
	4	977.3	2751.4	0.0	940.2	84.6	21.7	134.5	0.0	0.0	286.6	982.2	4714.3	5.1	0.0
2006	1	49.5	604.8	2011.8	692.0	567.2	314.8	327.8	13.4	103.8	0.0	19.1	4572.9	2.3	0.0
	2	45.5	2612.8	0.0	0.0	694.9	16.5	69.0	155.8	56.4	0.0	0.0	0.6	0.0	331.0
	3	104.5	860.9	0.0	0.0	228.1	31.9	10.0	0.0	244.2	0.0	0.0	0.0	0.0	0.0
	4	1805.7	1070.6	0.0	478.5	70.4	4.5	126.7	0.0	0.0	256.0	1167.3	1424.1	0.3	0.0
2007	1	107.1	483.1	2122.9	363.7	539.1	237.9	380.6	15.0	115.3	0.0	38.4	2722.9	0.6	0.0
	2	79.1	2741.0	0.0	0.0	1985.0	105.1	51.7	233.6	69.9	0.0	0.0	44.0	0.0	1012.9
	3	110.8	795.2	0.0	0.0	619.1	12.2	2.1	0.0	248.6	0.0	0.1	0.0	0.0	0.0
	4	749.5	2612.8	0.0	0.8	220.4	27.9	238.8	0.0	0.0	800.3	830.5	1794.3	0.6	0.0
2008	1	47.6	3069.0	3028.2	0.0	376.1	286.6	186.4	136.6	224.0	0.0	17.3	2612.9	9.7	0.0
	2	38.0	2580.8	0.0	0.0	1162.5	13.8	94.5	98.2	328.5	0.0	0.0	0.8	0.0	796.7
	3	66.0	1219.5	0.0	0.0	868.3	32.6	1.4	0.0	419.2	0.0	0.2	0.1	0.0	0.0
	4	1195.4	2390.0	0.0	0.6	241.4	53.3	276.3	0.0	0.0	987.4	705.8	1209.2	0.5	0.0
2009	1	41.5	2986.7	1298.8	827.6	190.4	13.4	180.7	78.6	77.4	0.0	57.0	2221.2	11.3	0.0
	2	15.9	289.7	0.0	0.0	703.1	54.0	106.4	8.8	99.9	0.0	0.0	2.5	0.3	692.5
	3	15.0	1334.0	0.0	0.0	263.9	51.7	1.3	0.0	279.5	0.0	0.0	0.0	0.0	0.0
	4	713.0	1814.0	0.0	35.3	37.8	63.7	234.7	0.0	0.0	333.6	301.7	2446.5	3.5	0.0
2010	1	67.0	149.2	1051.6	35.0	302.4	47.5	67.5	41.4	147.3	0.0	30.8	5299.5	4.2	0.0
	2	11.0	518.4	0.0	0.0	978.9	60.3	8.0	33.2	37.5	0.0	0.0	0.9	0.8	677.3
	3	1.2	253.9	0.0	0.0	460.6	17.9	2.8	0.0	91.1	0.0	0.0	0.0	0.0	0.0
	4	584.3	3488.0	0.0	0.0	300.7	9.8	285.7	0.0	0.0	1258.8	228.6	450.9	1.9	0.0
2011	1	87.2	635.8	1906.3	320.4	245.6	3.1	85.6	68.9	26.6	0.0	42.9	2379.2	26.2	0.0
	2	54.1	2429.4	0.0	0.0	883.1	37.3	21.0	76.2	57.3	0.0	0.0	10.8	0.9	567.4
	3	48.2	169.6	0.0	0.0	241.9	103.0	4.4	0.0	333.7	0.0	0.0	0.7	0.0	0.0
	4	434.6	1203.5	0.0	3.0	7.3	103.2	139.2	0.0	0.0	461.6	198.2	1286.0	4.0	0.0
2012	1	88.9	819.2	840.7	198.8	88.3	2.5	460.4	92.1	97.6	0.0	35.9	5420.9	35.0	0.0
	2	22.4	647.8	0.0	0.0	232.8	6.4	45.6	66.9	96.2	0.0	0.0	3.4	1.0	643.8
	3	21.2	83.8	0.0	0.0	230.4	24.9	3.9	0.0	183.4	0.0	0.0	0.3	0.0	0.0
	4	584.1	1234.8	0.0	0.4	15.3	47.4	157.0	0.0	0.0	352.7	327.8	1357.1	3.0	0.0

Table 3 List of errors included in quarterly catch data used for the 2012 stock assessment.

Fleet	Description of error
1	In 1974 calendar year, catch from Japanese distant water and offshore longliners were not included.
1	Annual total of quarterly catch for 2002-2010 calendar years differed from the annual catches reported by the ISC-PBFWG.
6	Catches from Taiwanese other fisheries did not include after 2004 fishing year.
7-10	Catches calendar from Japanese miscellaneous fishery did not include before 2010 fishing year.
7-10	Annual total of quarterly catch for 2010 calendar year differed from the annual catch reported the ISC-PBFWG.
11	Annual total of quarterly catch for 2002 to 2010 calendar years differed from the annual catches reported by the ISC-PBFWG.
11	Catches from out of ISC members did not include after 2002 fishing year.
14	Quarterly catches for 2009 and 2010 fishing years were misplaced each other.

Table 4 Previous and updated abundance indices from FL15 (JLL), FL19 (JpnTroll) and FL23 (TWLL). Previous ones were used for the 2012 stock assessment. Abundance indices from these fleets were updated for the 2014 stock assessment.

Fishing year	FL15 (JLL)				FL19 (JpnTroll)				FL23 (TWLL)			
	2012 stock assessment (Ichinokawa et al. (2012))		2014 stock assessment (Hiraoka et al. (2014))		2012 stock assessment (Ichinokawa et al. (2012))		2014 stock assessment (Fujioka et al. (2014))		2012 stock assessment		2014 stock assessment	
	Estimate	CV	Estimate	CV	Estimate	CV	Estimate	CV	Estimate	CV	Estimate	CV
1980					0.64	0.20	0.66	0.20				
1981					1.11	0.20	1.14	0.20				
1982					0.57	0.20	0.58	0.20				
1983					0.87	0.20	0.89	0.20				
1984					0.88	0.20	0.89	0.20				
1985					0.82	0.20	0.83	0.20				
1986					0.93	0.20	0.95	0.20				
1987					0.67	0.20	0.68	0.20				
1988					0.76	0.20	0.77	0.20				
1989					0.61	0.20	0.62	0.20				
1990					1.20	0.20	1.23	0.20				
1991					1.29	0.20	1.32	0.20				
1992					0.55	0.20	0.57	0.20				
1993	1.77	0.20	1.91	0.20	0.46	0.20	0.47	0.20				
1994	1.28	0.20	1.39	0.20	1.93	0.20	1.97	0.20				
1995	1.60	0.20	1.72	0.20	1.05	0.20	1.07	0.20				
1996	1.65	0.20	1.80	0.20	1.57	0.20	1.60	0.20				
1997	1.46	0.20	1.57	0.20	0.89	0.20	0.90	0.20				
1998	1.04	0.20	1.13	0.20	0.81	0.20	0.82	0.20	0.41	0.20	0.43	0.20
1999	0.80	0.20	0.87	0.20	1.47	0.20	1.49	0.20	0.34	0.20	0.35	0.20
2000	0.62	0.20	0.68	0.20	1.14	0.20	1.15	0.20	0.20	0.20	0.21	0.20
2001	0.71	0.20	0.79	0.20	1.15	0.20	1.16	0.20	0.13	0.20	0.13	0.20
2002	1.18	0.20	1.31	0.20	0.73	0.20	0.73	0.20	0.18	0.20	0.19	0.20
2003	1.27	0.20	1.39	0.20	0.64	0.20	0.65	0.20	0.17	0.20	0.18	0.20
2004	1.51	0.20	1.64	0.20	1.27	0.20	1.29	0.20	0.09	0.20	0.09	0.20
2005	0.74	0.24	0.82	0.24	1.35	0.20	1.36	0.20	0.11	0.20	0.11	0.20
2006	1.06	0.28	1.15	0.28	0.70	0.20	0.71	0.20	0.09	0.20	0.10	0.20
2007	0.58	0.31	0.63	0.31	1.38	0.20	1.38	0.20	0.12	0.20	0.12	0.20
2008	0.37	0.35	0.40	0.35	1.41	0.20	1.44	0.20	0.09	0.20	0.09	0.20
2009	0.19	0.39	0.21	0.39	1.09	0.20	1.11	0.20	0.06	0.20	0.06	0.20
2010	0.17	0.43	0.21	0.43	1.07	0.20	1.09	0.20	0.11	0.20	0.11	0.20
2011			0.14	0.43			0.94	0.20			0.15	0.20
2012			0.23	0.43			0.52	0.20			0.16	0.20

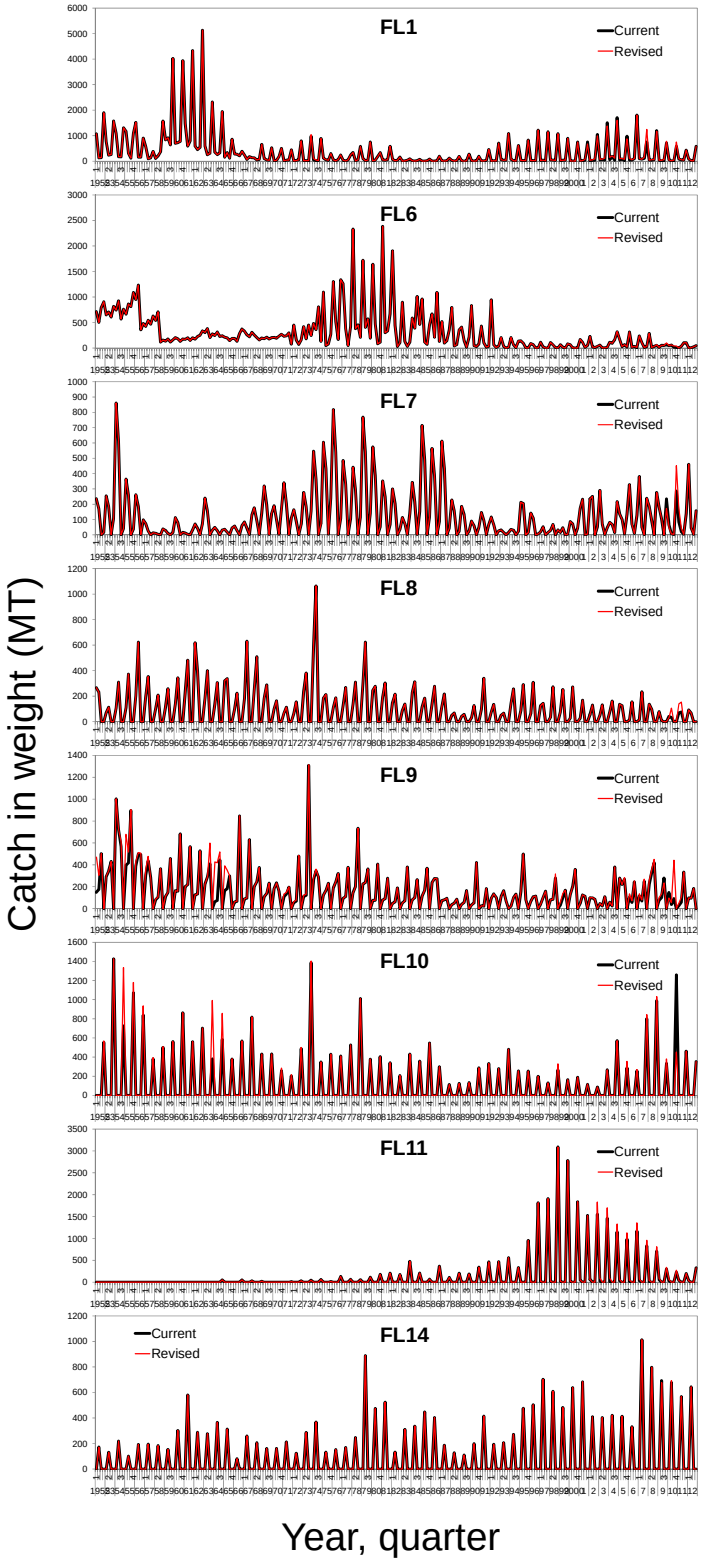

Fig. 1 Time series of quarterly catch for FL1, FL6, FL7, FL8, FL9, FL10, FL11 and FL14 from the 1952 fishing year to the 2012 fishing year. Black and blue lines indicates current (unrevised) and revised quarterly catch data, respectively.

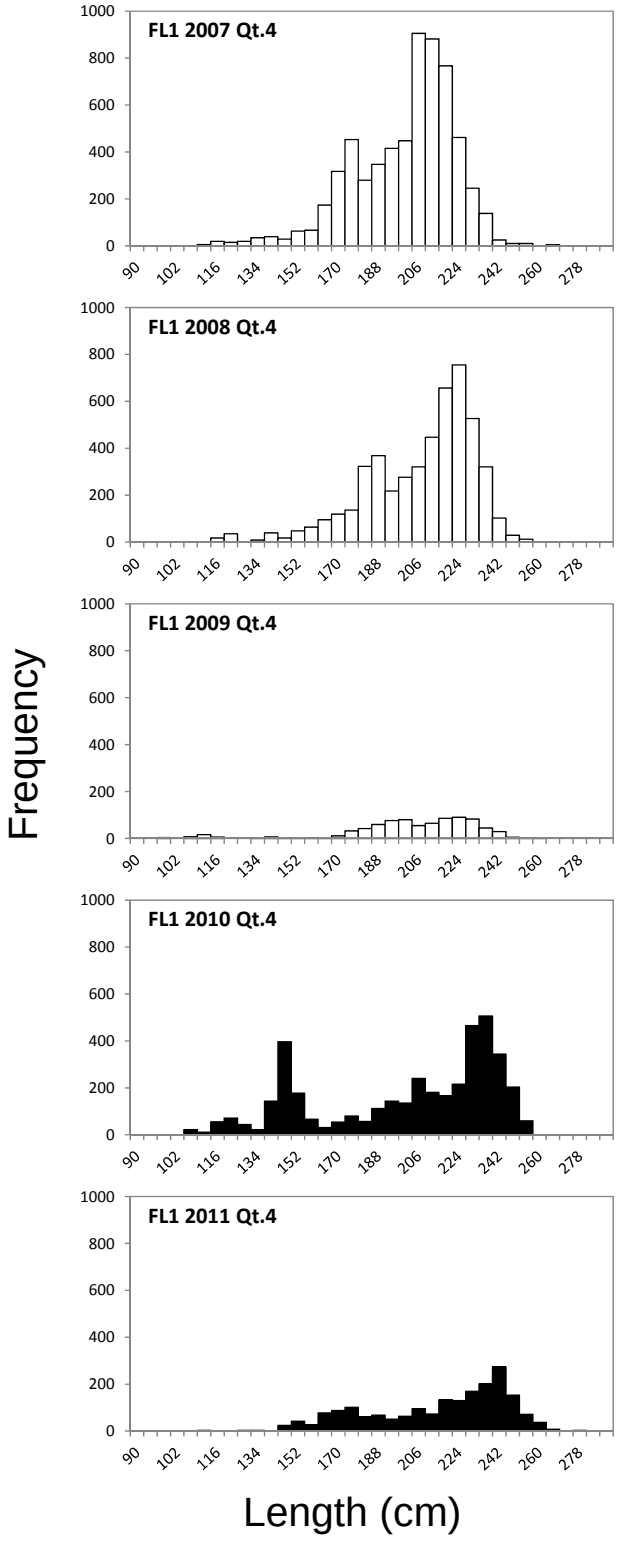

Fig. 2-1 Length frequency distributions of Fleet 1 for last five years. Black histograms indicate updated length frequencies.

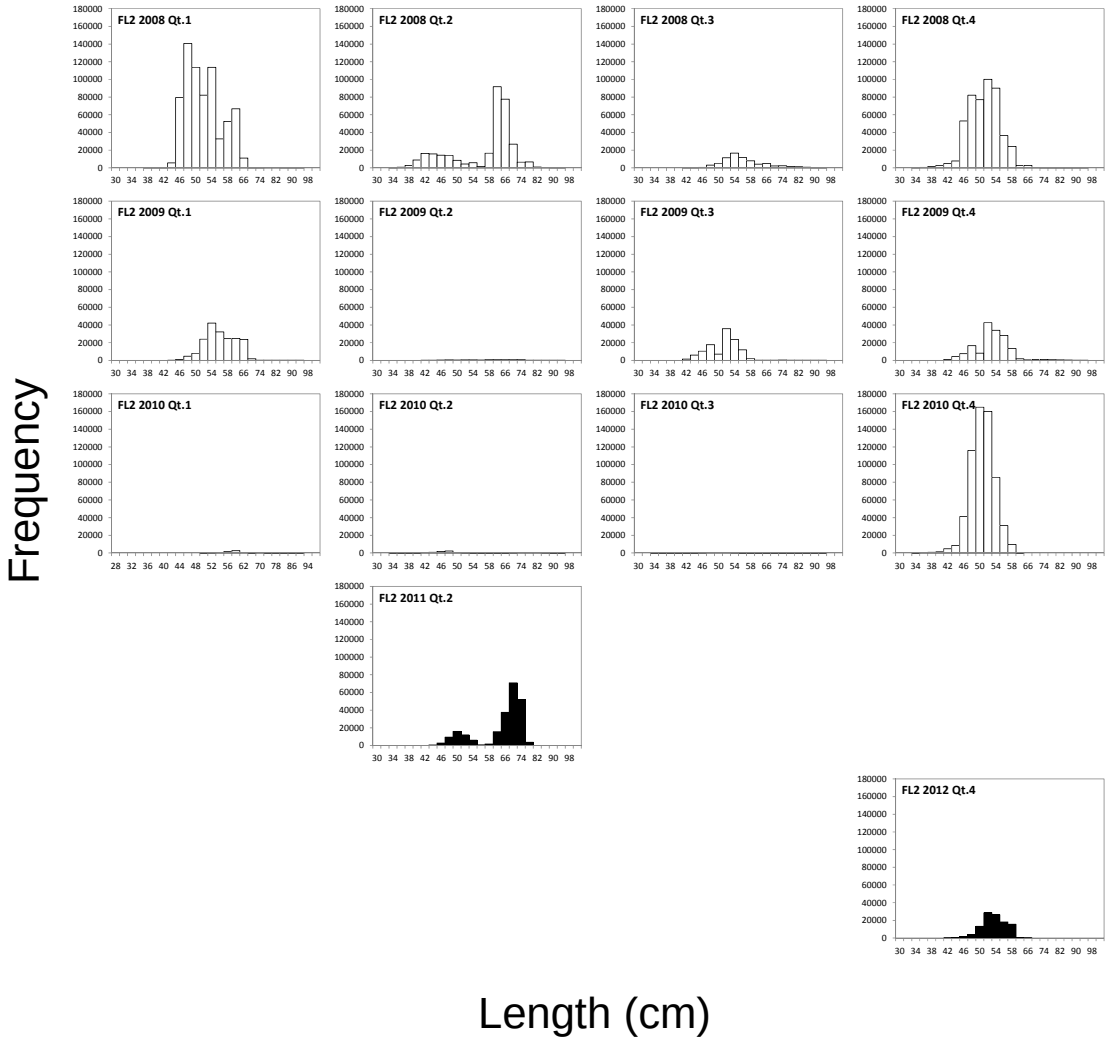

Fig. 2-2 Length frequency distributions of Fleet 2 by quarter for last five years. Black histograms indicate updated length frequencies.

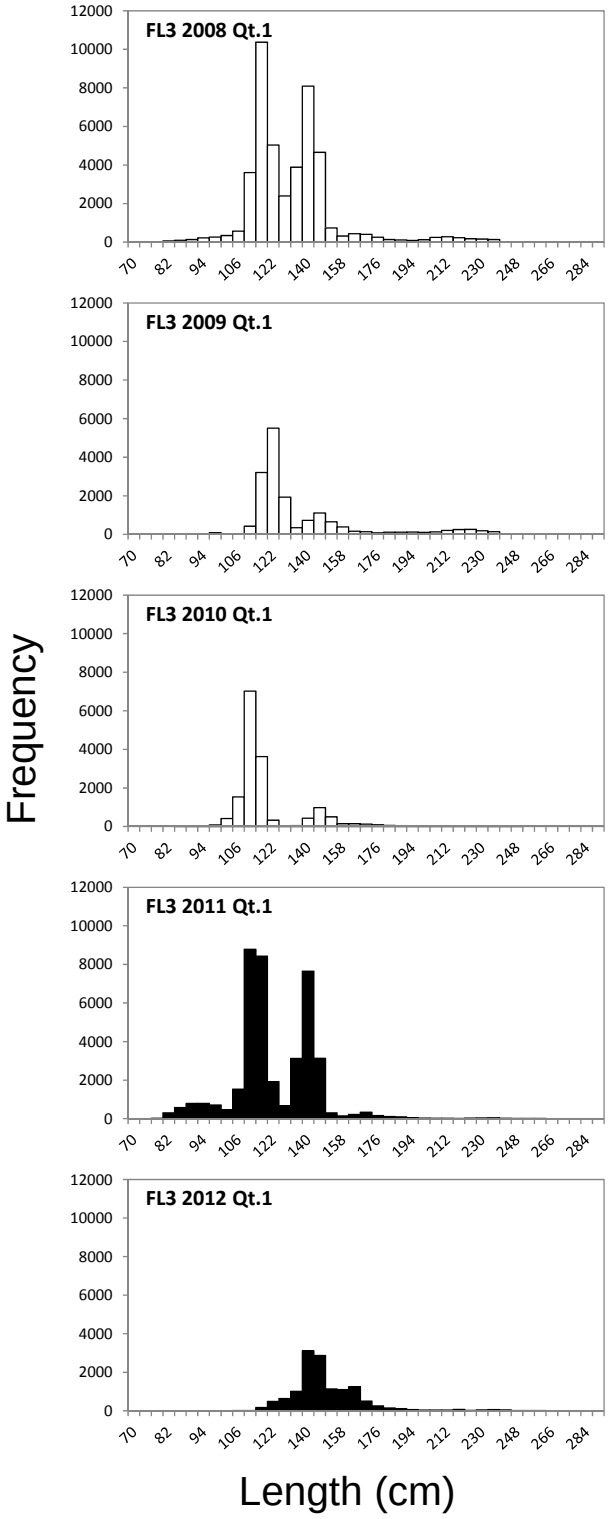

Fig. 2-3 Length frequency distributions of Fleet 3 for last five years. Black histograms indicate updated length frequencies.

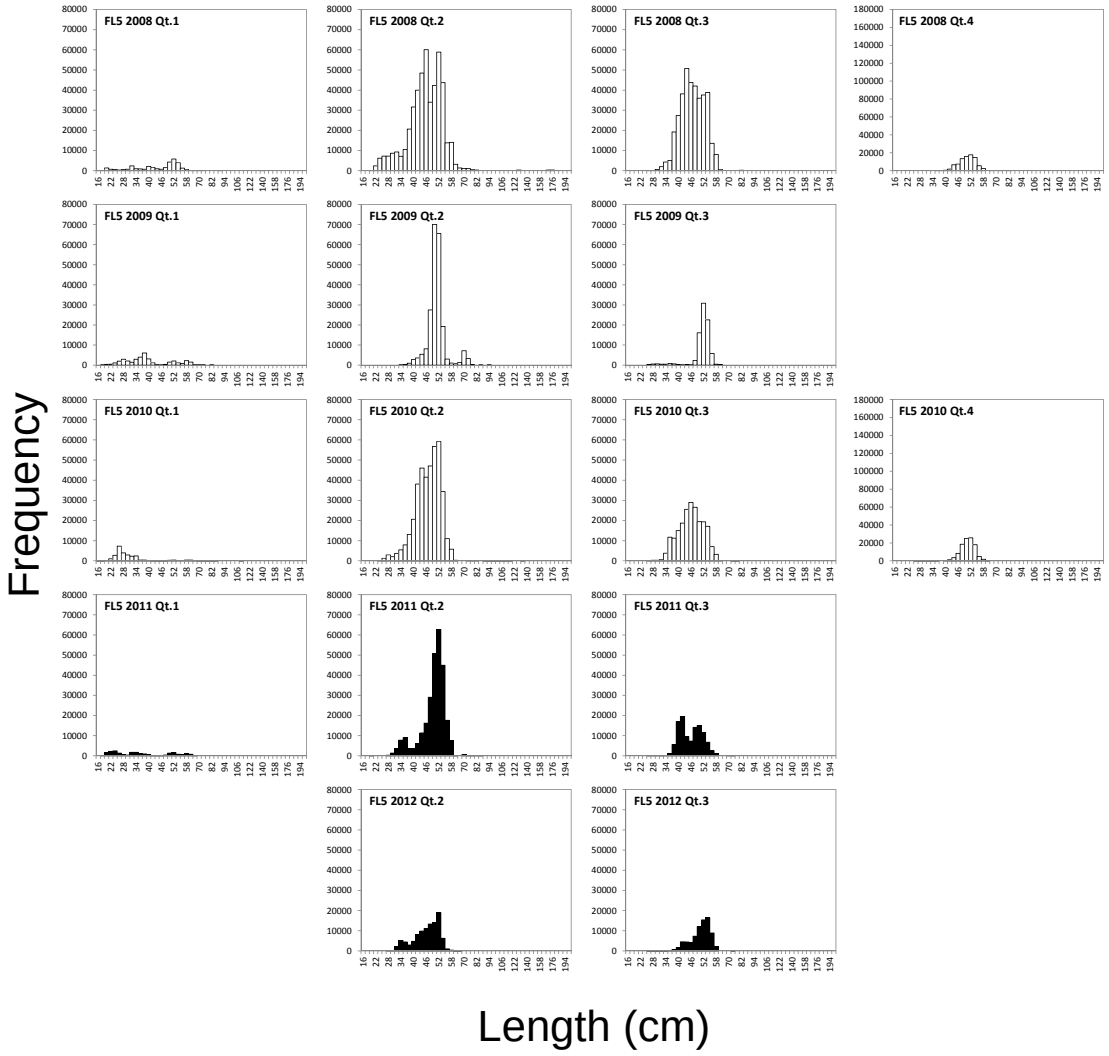

Fig. 2-4 Length frequency distributions of Fleet 5 by quarter for last five years. Black histograms indicate updated length frequencies.

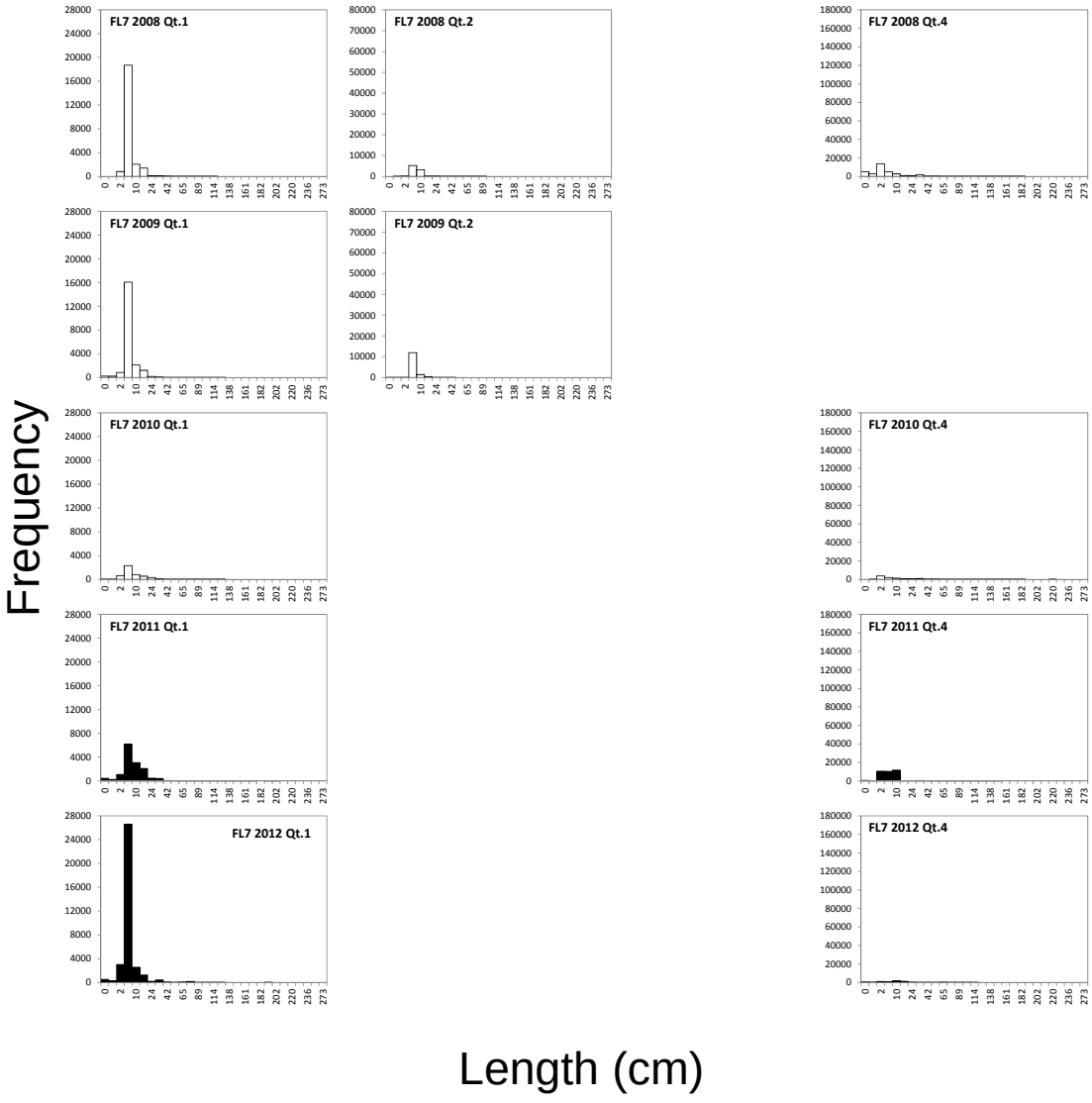

Fig. 2-5 Weight frequency distributions of Fleet 7 by quarter for last five years. Black histograms indicate updated weight frequencies.

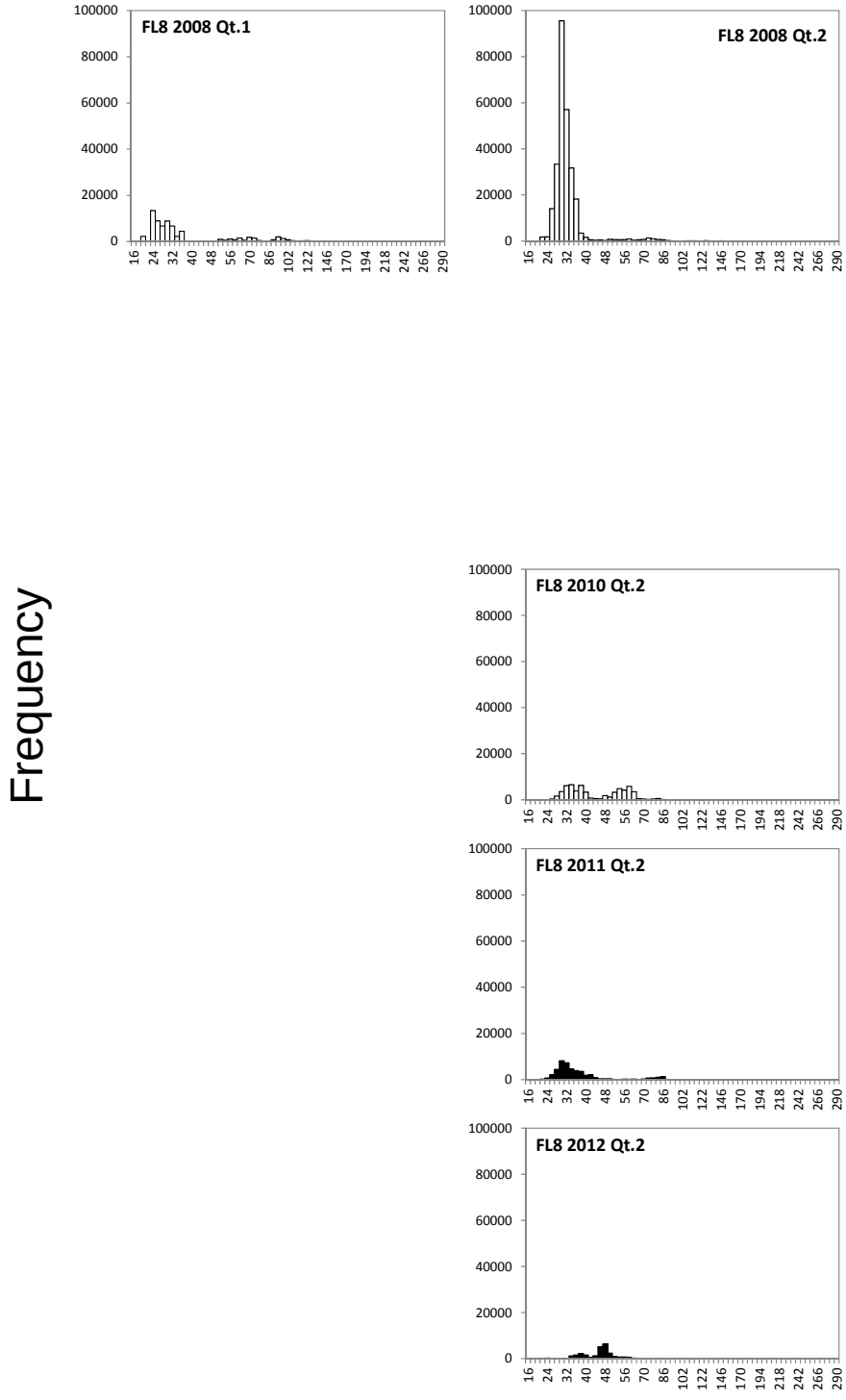

Fig. 2-6 Length frequency distributions of Fleet 8 by quarter for last five years. Black histograms indicate updated length frequencies.

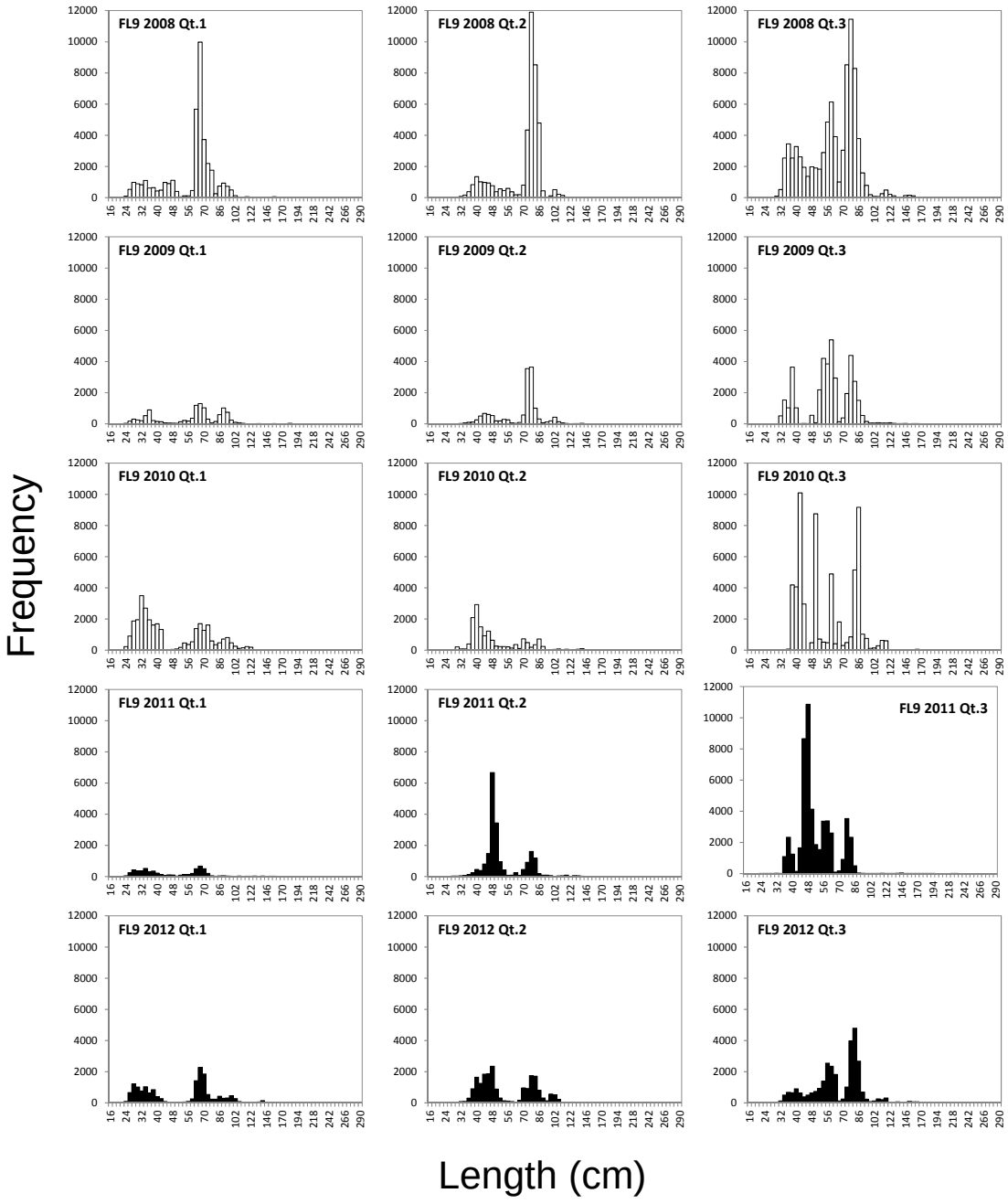

Fig. 2-7 Length frequency distributions of Fleet 9 by quarter for last five years. Black histograms indicate updated length frequencies.

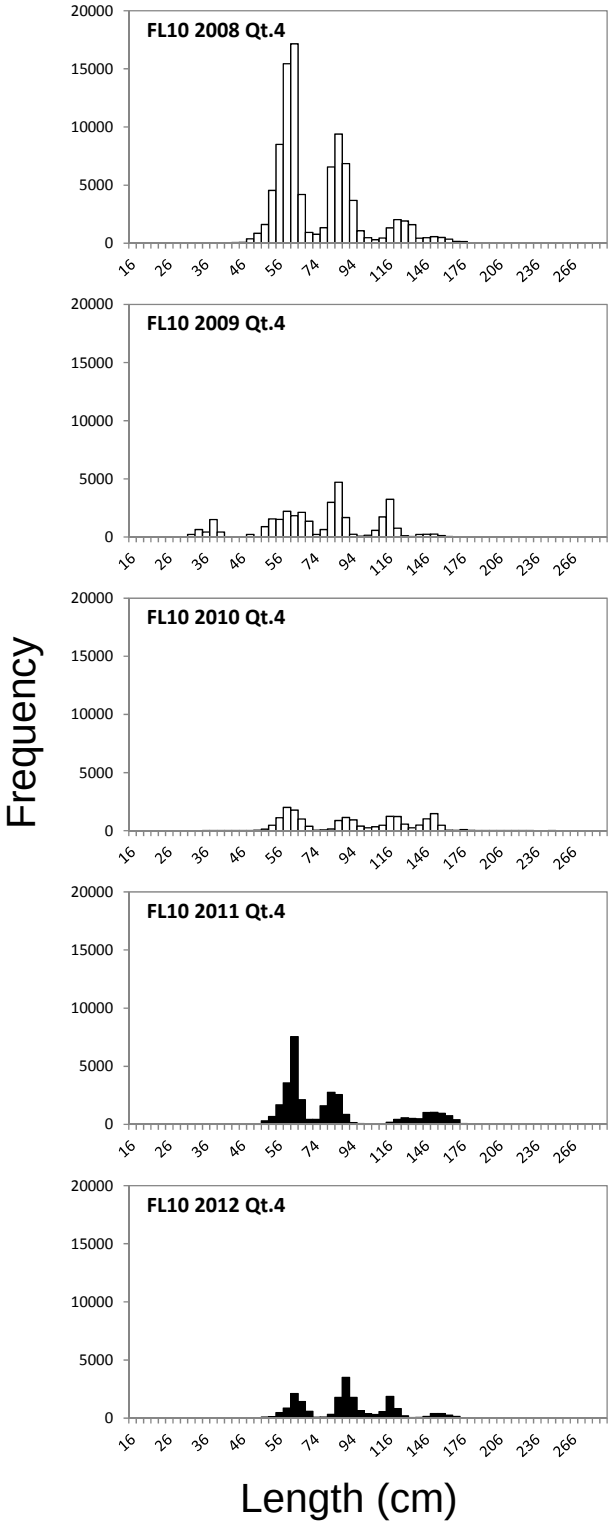

Fig. 2-8 Length frequency distributions of Fleet 10 for last five years. Black histograms indicate updated length frequencies.

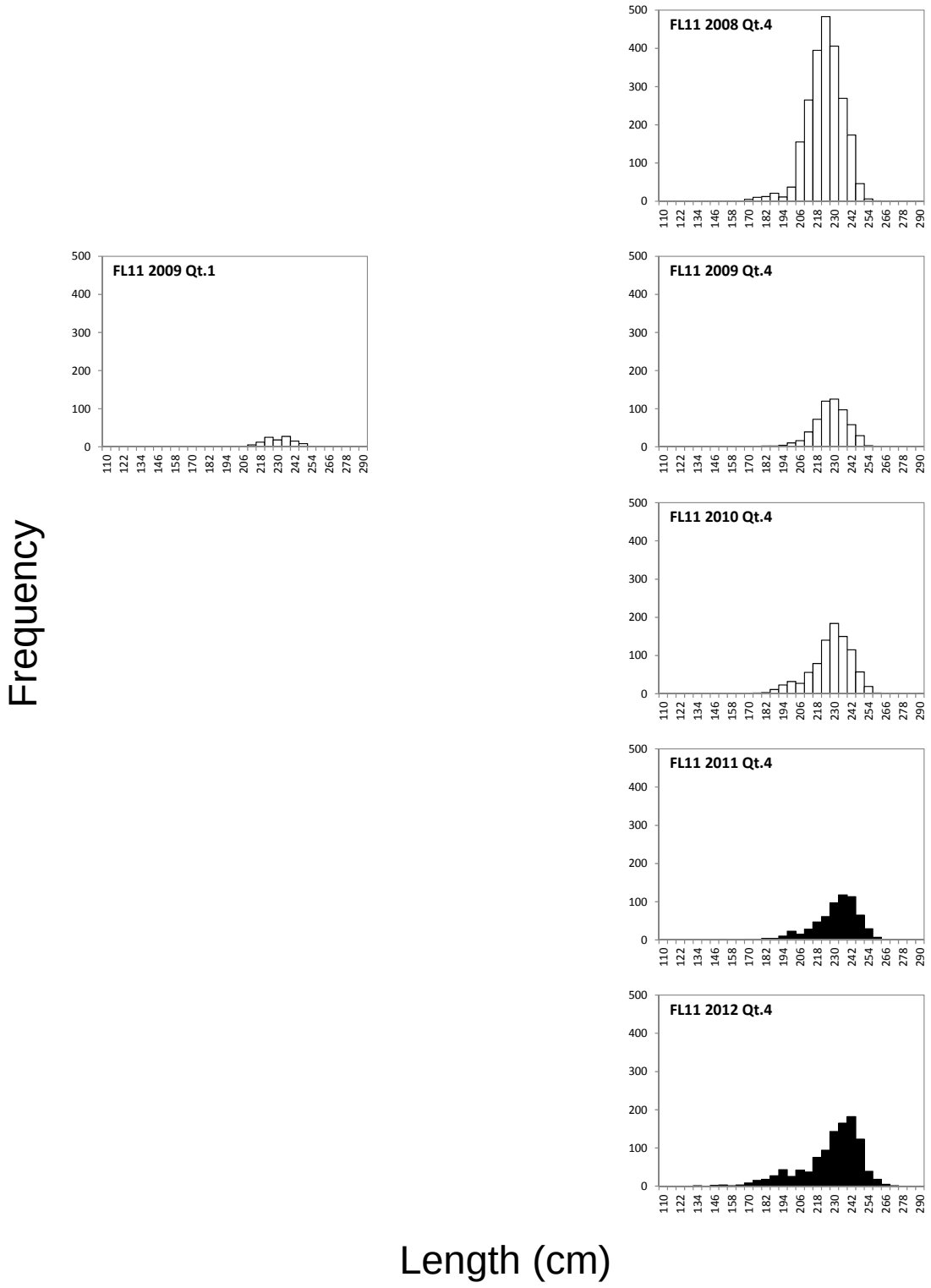

Fig. 2-9 Length frequency distributions of Fleet by quarter 11 for last five years. Black histograms indicate updated length frequencies.

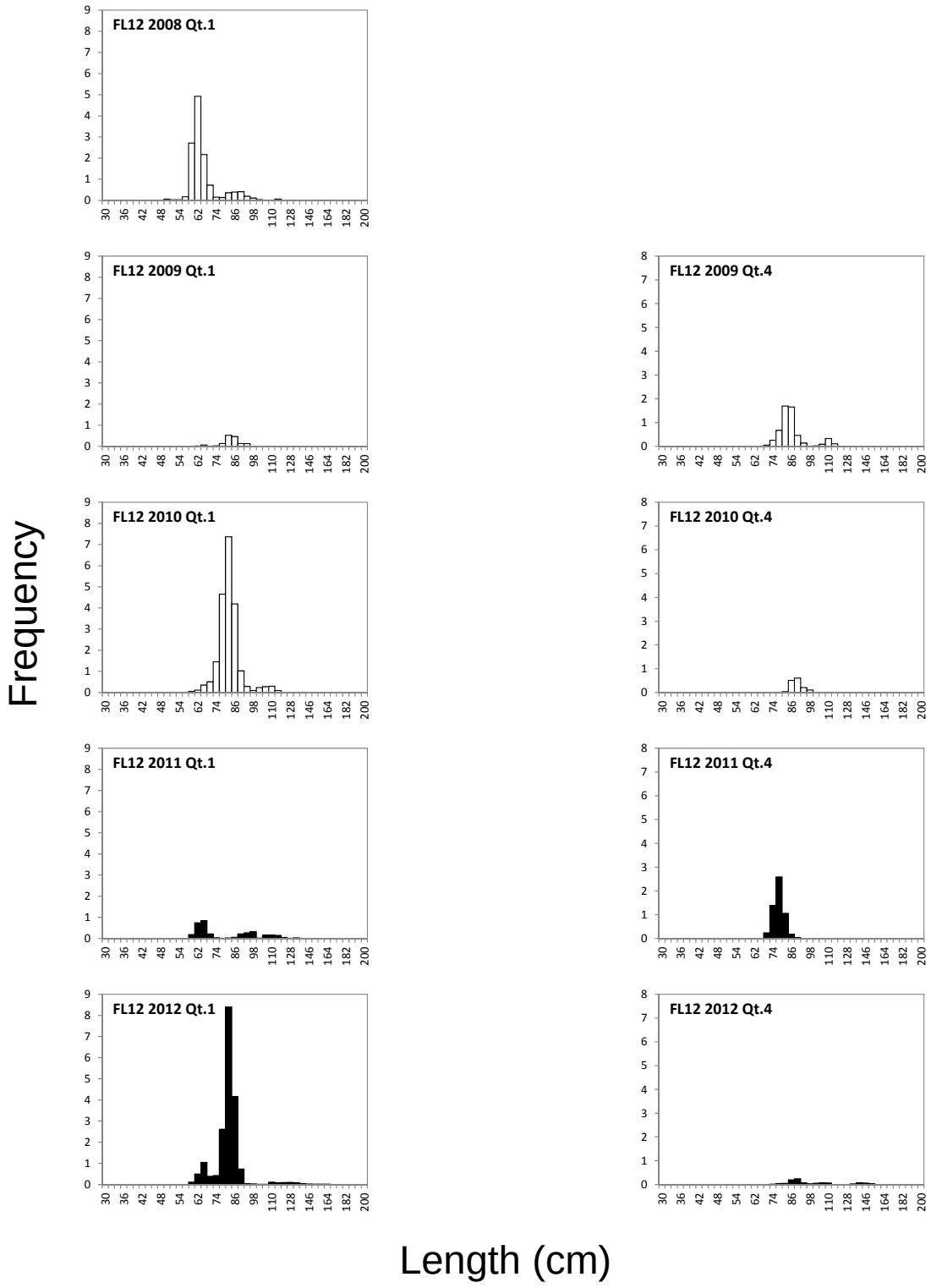

Fig. 2-10 Length frequency distributions of Fleet by quarter 12 for last five years. Black histograms indicate updated length frequencies.

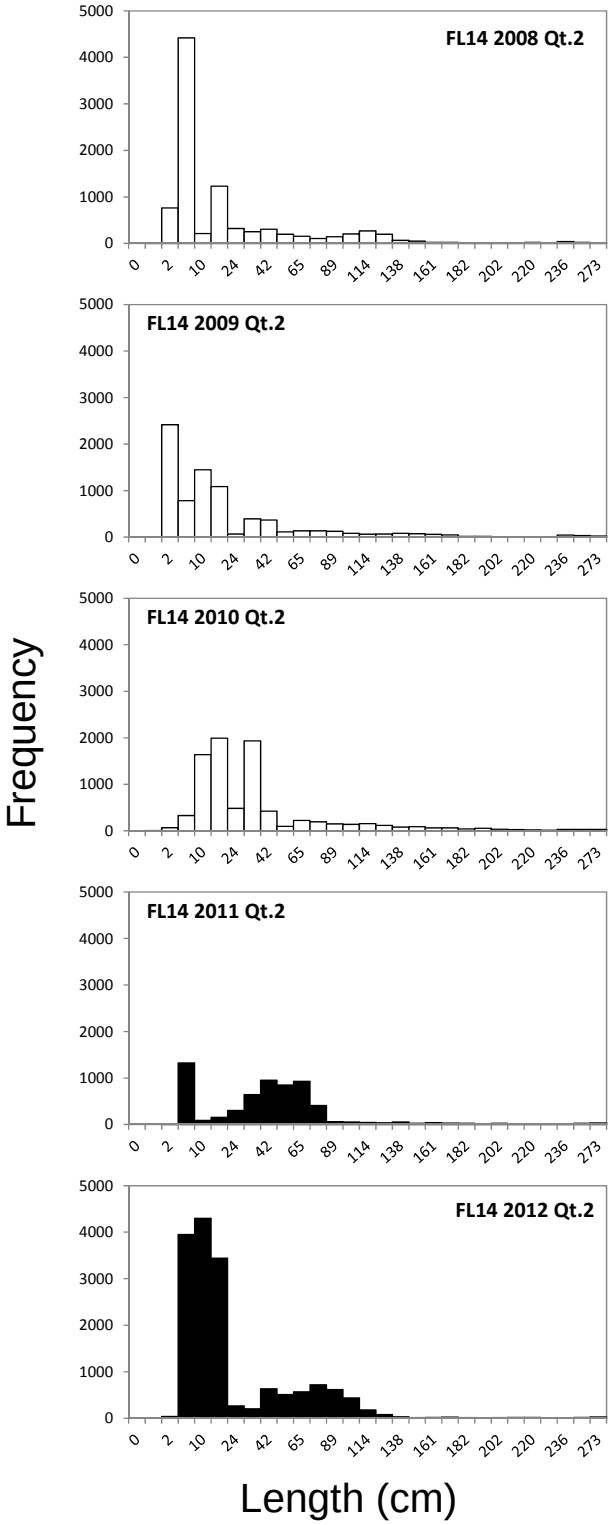

Fig. 2-11 Weight frequency distributions of Fleet 14 for last five years. Black histograms indicate updated weight frequencies.