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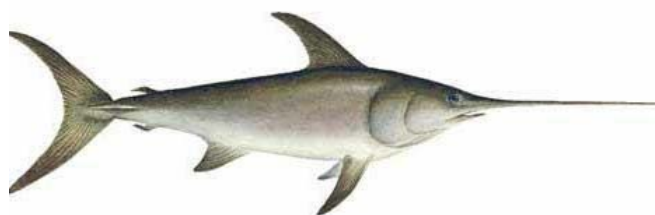
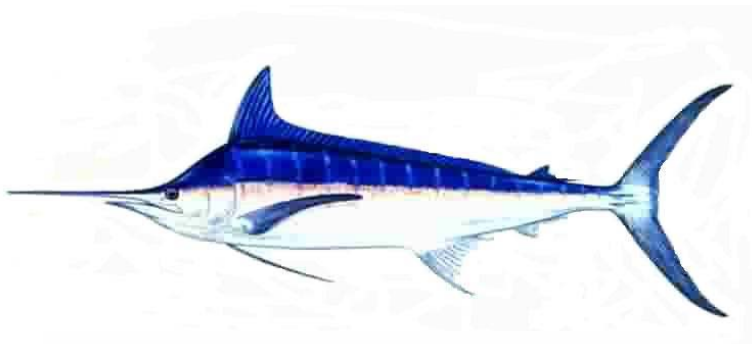
Catch amount of Swordfish (*Xiphias gladius*) by the Japanese coastal, offshore, and distant-water longline fishery in the Pacific

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Introduction

The Billfish Working Group is proposed to examine the two stock structure scenario for the swordfish stock assessment scheduled in 2009. This study estimated the catch amount of swordfish caught by Japanese coastal, offshore, and distant-water longliners by quarterly bases, for the two stock scenario with a boundary between the North Pacific Ocean (NPO) and the Eastern Pacific Ocean (EPO).

Materials and Methods

Japan Fishery Agency started to collect the log book of Japanese coastal longliners (defined as the longliners less than 20 tons) in 1994. The information on the operations of Japanese offshore and distant-water longliners in the Pacific Ocean was available since 1952 when the collection of log book has initiated by Japan Fishery Agency. There are two types of data for catch information, e.g. catch number and catch weight. Former one is available since 1952 while later one is only available since 1971. In this study, aggregated catch data by month and 5x5 degree grids were used.

Catch amount of swordfish caught by Japanese offshore and distant-water longliners for the period between 1952 and 2007 was calculated by quarter for the NPO and EPO stock. Due to the lack of data of the catch weight in between 1952 and 1970, they were obtained by multiplying the catch number by the average weight, which was calculated by catch number and weight information in the period between 1971 and 1990. For the calculation of the average weight, the study area was stratified into 4 areas for each stock (Figure 1).

The trends of swordfish catch caught by Japanese coastal longliners for the period between 2000 and 2007 were also obtained by quarter. Because the operational area of Japanese coastal longliners is limited to the northwest Pacific, the whole data was included in the NPO stock. Although the data was collected since 1994, the quarterly catch only estimated from 2000, because some mismatch of the number of record was found in the data before 2000.

Results and Discussion

Table 1 shows the average weight by quarter and by area (Figure 1), which was calculated by catch number and catch weight between 1971 and 1990 for the NPO and the EPO stock. For both stocks, the average weight was quite similar in all quarters. There was no significant difference between the stocks, and the average weight for the NPO stock was 0.8 to 1.2 times higher than the one for the EPO stock. In this study, the information of the average weight after 1991 was not used for the estimation of catch weight in the period before 1971, because no clear historical change was observed in the calculated average weight.

Figures 2a and 2b show the trends of swordfish catch (ton) by quarter caught by offshore and distant-water longliners for the NPO and the EPO stock. For the NPO stock, the amount of catch was increased rapidly since the data was available in 1952. The historical highest levels were observed in 1960 and 1961, which were over 20,000 tons. It showed a rapid decrease since then, and remained below 10,000 tons. Although relatively large catch (over 5,000 tons) was observed in the middle of 60s and 80s, in the late 70s, and in the early 90s, the catch remained about 5,000 tons in most recent year (1999-2007). The swordfish catch by offshore and distant-water longliners in the NPO area is rather stable since the early 1970s. Largest catch is obtained in the first quarter throughout the analyzed period.

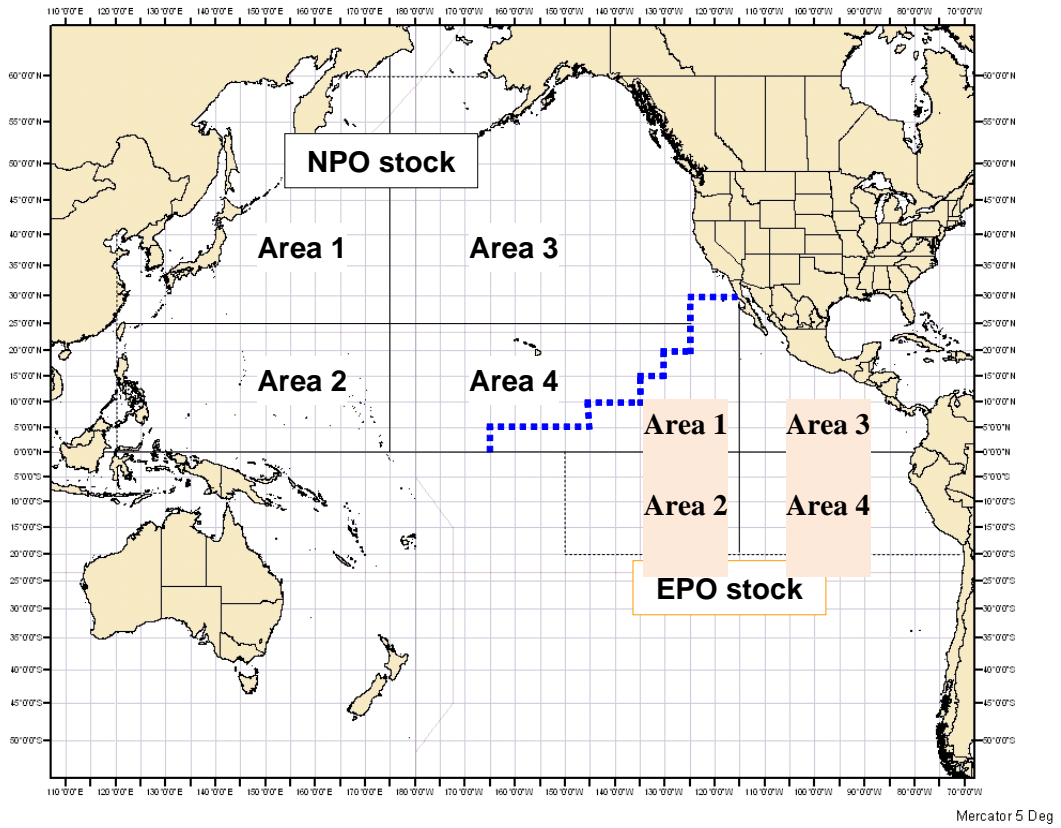
For the EPO stock, the swordfish catch amount was historical high in 1969, and largely fluctuated and decreased to a low level in the beginning of the 80s. It mostly remained over 2,000 tons from the late 80s to the early 2000s. However, the swordfish catch was decreased to about 1,500 tons in recent year. Throughout the analyzed period, the catch in each quarter is about equally contributed to the total amount of catch. Compared to the NPO stock, the total amount of catch was lower in the analyzed period.

Finally, Figure 3 shows the trends of swordfish catch (ton) by quarter caught by coastal longliners in the north Pacific. The catch amount stayed in the same level (about 1,000 tons) for the period between 2000 and 2003. It showed a continuous increasing trend since 2004, and the catch amount reached at 1,800 tons in 2007.

References

Ichinokawa, M., and Brodziak, J. 2008. Stock boundary between possible swordfish stocks in the northwest and southeast Pacific judged from fisheries data of Japanese longliners. ISC/08/Special Session on Billfish Stock Structure/#4

The Two Stock Scenario



Adapted from Ichinokawa and Brodziak (2008; Figure 7d)

Figure 1. Area stratifications used in the analysis of average weight for the two stock scenario (the NPO and the EPO stock).

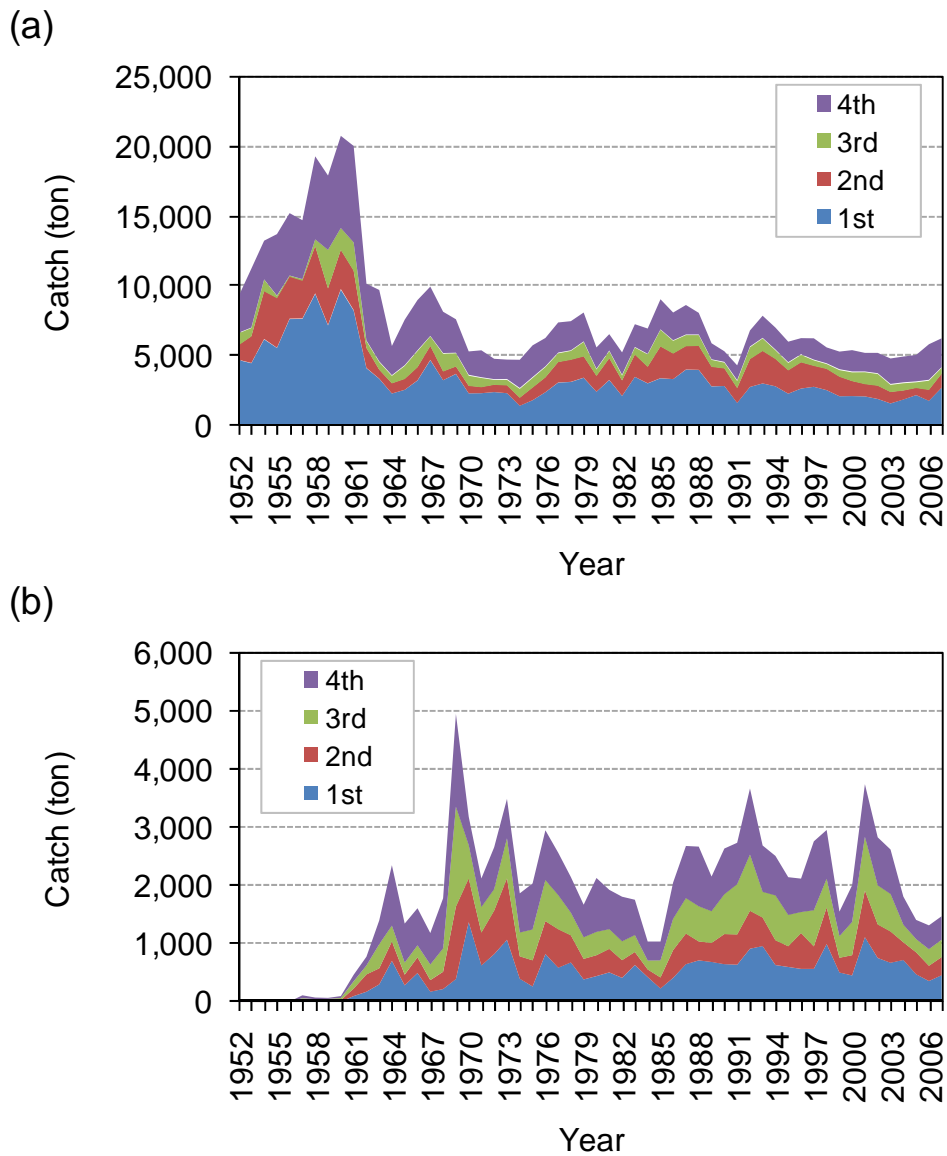


Figure 2. Catch amount (ton) of swordfish caught by quarter by Japanese offshore and distant-water longliners for (a) the NPO and (b) the EPO stock.

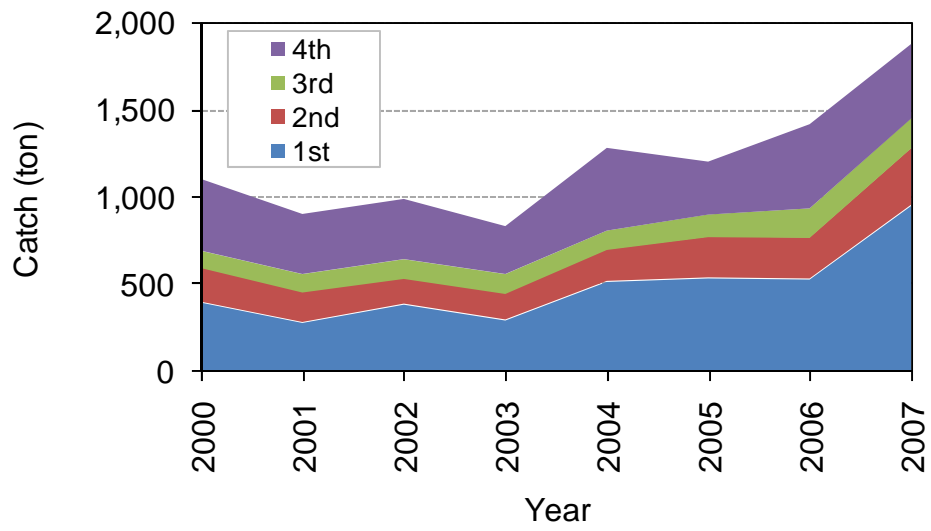


Figure 3. Catch amount (ton) of swordfish caught by quarter by Japanese coastal longliners for the NPO stock.

Table 1. Average weight of swordfish between 1971 and 1990 by area and by quarter for the NPO and EPO stock. (a) the first, (b) the second, (c) third, and (d) fourth quarter.

(a) The 1st quarter

Area	1	2	3	4
NPO	52.10	41.59	54.08	44.39
EPO	45.98	48.33	42.53	41.63

(b) The 2nd quarter

Area	1	2	3	4
NPO	51.53	39.69	51.93	41.95
EPO	44.98	48.17	40.90	42.12

(c) The 3rd quarter

Area	1	2	3	4
NPO	55.10	39.46	52.16	45.19
EPO	45.24	48.52	41.80	41.80

(d) The 4th quarter

Area	1	2	3	4
NPO	53.37	40.48	54.31	47.19
EPO	46.29	48.75	43.74	41.66