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ANNUAL REPORT TO THE COMMISION
PART1: INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

National Tuna Fisheries Report of Japan

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If no, please indicate the reason(s) and intended actions:	

SUMMARY

This paper describes recent trends in the Japanese tuna and billfish fisheries, e.g., longline, pole-and-line, purse seine and other miscellaneous coastal fisheries in the WCPFC Convention Area (WCP-CA), including fleet size, catch and fishing effort statistics. Total number of commercial longline vessels shows a declining trend, from 460 vessels in 2010 to 361 in 2014. Total number of pole-and-line vessels (larger than 20 GRT) has decreased during the 2010-2014. For the purse seine vessels, the number of vessels shows no apparent trend in the 5-year period, ranging between 70 and 75 vessels.

The total 2014 WCP-CA catch of tunas (Pacific bluefin, albacore, bigeye, yellowfin and skipjack) by the Japanese fishery was still provisional and estimated to be 364,741 mt, and this is corresponding to 94% of 2013 total tunas catch (389,401 mt). In 2014, the total tuna catch by the purse seine fishery was 211,235 mt (58% of the total), with 100,173 mt (28%) by the pole-and-line fishery, 43,402 mt (12%) by the longline, and the remaining (2%) by the other gears. It is apparent that the yellowfin catch shows a declining trend during the 2010-2014 period for 5 fisheries which took more than 1,000 mt of yellowfin per year.

Japan has conducted several research activities in relation to biological and stock assessment studies on tunas, and other bycatch species in the WCP-CA in 2014 and early 2015 such as several research cruises on larvae/juvenile sampling for pacific bluefin tuna and tropical tunas, and mitigation studies for bycatch species.

1. Introduction

This paper describes recent trends in the Japanese tuna and billfish fisheries, e.g., longline, pole-and-line, purse seine and the fisheries in the WCPFC Convention Area (WCP-CA), including fleet size, catch and fishing effort statistics. With respect to the recent research activities, a brief explanation was given at section 6 of this report.

The catch statistics is given not only in WCP-CA but in the other areas, depending on species, according to the section on “Annual Catch Estimates” contained in the document “Scientific Data to be provided to the Commission”. The catch estimates for bigeye, yellowfin, blue marlin, black marlin and skipjack in the portion of the WCP-CA east of the 150˚ meridian of west longitude, where is the duplicate area to IATTC, is shown in Appendix Table 1. This is requested by Attachment N of the report of the SC4. Note that there are some catches in the portion of the WCP-CA east of the 150˚ meridian of west longitude only by the distant-water and offshore longline fisheries. The catch estimates for Pacific bluefin, albacore, swordfish and striped marlin in other broad ocean areas are shown in Appendix Table 2. In addition to this, a number of tables which requested by CMMs were given in the Appendix Tables.

2. Data source

The National Research Institute of Far Seas Fisheries (NRIFSF) is responsible for compiling catch and effort statistics for major fisheries (pole-and-line vessels larger than 20 GRT, longliner larger than 10 GRT, and tuna purse seine). The other minor fisheries are referred to the publication of the Statistics Department, Minister's Secretariat, Ministry of Agriculture, Forestry and Fisheries for 2010-2013 data (MAFFJ 2012-2014, MAFFJ 2015), and presented in this paper.

3. Trends in fleet size

Table 1 shows the number of Japanese tuna fishing vessels by fishery and vessel size class, which actually fished in the WCP-CA during the 2010-2014 (coastal longline vessel was not included). As this number of active vessels is estimated basing on logbook submitted, some vessels which actually operated but did not submit logbook were not included. The research and training vessels of longline and pole-and-line are not included.

Japanese commercial longline vessels show a declining trend, from 460 vessels in 2010 to 361 in 2014. Especially, the declining trend for size categories 50-100 GRT are remarkable, the number of vessels of this categories were 17 vessels in 2014 which is 59% of that in 2010. The number of vessels for categories 100-200 GRT and over 200 GRT also shows a declining trend during the 2010-2014.

Total number of pole-and-line vessels (larger than 20 GRT) has decreased during the 2010-2013. Reduction rate was higher for category 50-200 GRT than category over 200 GRT. The number of vessels for category 50-200 GRT decreased from 66 in 2010 to 54 in 2014, corresponding to 18% decrease. The number of vessels for category over 200 GRT slightly decreased from 28 in 2010 to 25 in 2014, corresponding to 11% decrease.

Purse seine vessels can categorize into two classes, one is 50-200 GRT and the other is over 200 GRT. The 50-200 GRT vessels are allowed to operate in the coastal and offshore waters of Japan north of 20˚N in the Pacific Ocean, while some vessels of the over 200 GRT class are allowed to operate in the tropical waters of the western and central Pacific Ocean. Total number of purse seine vessels which engaged in tuna fishery shows no apparent trend in the 5-year period, ranging between 70 and 75 vessels. The number of vessels of 50-200GRT ranged from 31 to 34 without apparent trend during the period. Note that the number of distant water purse seiners which are allowed to operate in the tropical waters in the Pacific Ocean by government regulation was 35 and has been stabilized since 1995.

4. Trends in catch and effort

The total 2014 WCP-CA catch of tunas (Pacific bluefin, albacore, bigeye, yellowfin and skipjack) by the Japanese fishery was still provisional and estimated to be 364,741 mt, and this is corresponding to 94% of 2013 total tunas catch (389,401 mt). In 2014, the total tuna catch by the purse seine fishery was 211,235 mt (58% of the total), with 100,173 mt (28%) by the pole-and-line fishery, 43,402 mt (12%) by the longline, and the remaining (2%) by the other gears, whereas, in 2013, the total tuna catch by the purse seine fishery was 211,762 mt (54% of the total), with 123,714 mt (32%) by the pole-and-line fishery, 44,432 mt (11%) by the longline, and the remaining (3%) by the other gears. The following is the description of each fishery more in detail including tables of their catch and effort in the WCP-CA.

4.1. Longline fishery

Japanese longline vessels are classified into three categories (coastal, offshore and distant water longline fisheries) according to the operation area and vessel size. Coastal longliner, whose size is 1-20 GRT, is allowed to fish only in the Japan's EEZ. Offshore longline vessels are further divided into two categories, small offshore, 10-20 GRT, and offshore, 10-120 GRT, longlines, both of which are able to go beyond the Japan's EEZ in the Pacific Ocean with exceptional area in the eastern Pacific Ocean. Although the vessel size of two offshore categories is duplicated in the range 10-20 GRT, most vessels of latter category are larger than 50 GRT. Distant water longliners are over 120 GRT and basically can fish at all oceans, but need to follow the various domestic regulations that will ensure the management measures in place by the respective tuna RFMO.

Most recent statistics available are 2014 data, though the 2013 and 2014 data are still preliminary. Catch in weight of tuna species (Pacific bluefin, albacore, yellowfin, bigeye and skipjack), swordfish and billfishes (striped marlin, blue marlin, black marlin, sailfish and shortbill spearfish) caught by the Japanese distant water and offshore (not including small offshore) longliners in the WCP-CA from 2010 to 2014 are shown in Table 2A. Historical changes in fishing effort and catch by species are shown in Figs. 1 and 2, respectively, for the years 1971-2014. Total effort (in number of hooks) of distant water and offshore longline fishery in all oceans which was 556 million hooks in 1981 decreased to 495 million in 1983 and increased again to 557 million in 1988 after when it has decreased steadily to less than 400 million since 1999. The ratio of the fishing effort exerted in the Pacific Ocean to that of total fishing effort was about 40-50% in the latest decade. In the WCP-CA, around 60% of the total Pacific effort has been deployed since the middle 1980s. The fishing effort of distant water and offshore longlines in the WCP-CA, which was 106 million hooks in 2004, decreased to less than 100 million, thereafter. In recent years, the fishing effort was 65 million hooks in 2009, which is historical lowest, and recovered in the following years (Table 2A). This recovery seems to be partially caused by the shift of fishing ground from Indian Ocean because of the expanding piracy activity in the western Indian Ocean. Primary species for the longline catch is yellowfin and bigeye historically. Among the species caught, yellowfin catch was around 60,000 mt at a peak during the late 1970s and the early 1980s and has since declined continuously to about 10,000 mt or less in the recent years (Fig. 2). Bigeye catch which had been relatively stable during the 1970s and 1980s ranging between 30,000 and 50,000 mt, but decreased to between 20,000 and 30,000 mt during the mid-1990s to early 2000s. Further, bigeye catch continue to decrease, was less than 20,000 mt after 2005, was less than 10,000 mt after 2009. In recent five years, the yellowfin catch shows a declining trend was 3,743 mt in 2014 which is 32% of that in 2010. The bigeye catch also shows a declining trend, was 7,533 mt in 2014 which is 87% of that in 2010 (Table 2A).

The average quarterly effort distribution for distant water and offshore longline vessels during the 2012-2014 is shown in Fig. 3. The fishing grounds are located in east-west direction off Japan to Hawaii, equatorial area between 10˚S and 15˚N and off Australia. Distribution pattern of the effort does not show remarkable seasonal change, but in overall area, the fishing effort appeared to decrease in the second quarter than in the other quarters. Distribution of the catch by species for this fleet is shown in Fig. 4. They are classified into several clear patterns, swordfish targeting near Japan, albacore targeting in the middle latitudes between 15-30˚N and 25-40˚S, and tropical tuna (mostly bigeye and yellowfin) targeting in the equatorial waters.

As for the small offshore longline fishery, catch in the WCP-CA from 2010 to 2014 are shown in Table 2B. Total number of hooks deployed by small offshore longliner ranged between 60,901 thousand and 80,127 thousand hooks. Bigeye catch for the small offshore longline shows no apparent trend in the 5-year period, was 7,020 mt in 2014, increasing compared with that in 2013. Yellowfin catch for the small offshore longline shows a declining trend, was 2,340 mt in 2014, which is 45% of that in 2010. Geographical distributions of fishing effort and catch by species for the small offshore longliners were shown in Figs. 5 and 6, respectively. At the area between 130˚E and 150˚E and north of 15˚N, albacore is dominant in the catch while bigeye catch is dominant from 140˚E to 160˚E and from 30˚N to 40˚N. At the south of 15˚N, bigeye and yellowfin are primary target species.

4.2. Pole-and-line fishery

The catch and effort statistics in the WCP-CA by the Japanese pole-and-line fishery (larger than 20 GRT in vessel size) are shown in Table 3 during the 2010-2014. In addition to this, historical changes in catch by species and effort are shown in Fig. 7 for the period of 1972-2014. The data for 2013 and 2014 are preliminary. Both the catch and effort which were at a peak around the late 1970s gradually decreased throughout 1980s. After 1991, total catch and effort had been relatively stable until the mid-2000s, though the catch showed some fluctuation. After that the catch decreased though the effort was relatively stable. Total annual catches which ranged from 250,000 to 300,000 mt in 1970s and early 1980s, decreased to around 150,000 mt in 1990s and around 100,000 mt in 2009 and 2010. Skipjack occupied the major part of catches being followed by albacore and yellowfin. Number of fishing days exceeded 60,000 in 1970s but it is about 15,000-17,000 days from 2006 onward.

In recent five years, the number of fishing days (including no catch) for this fishery shows a declining trend, was 11,299 days in 2014 which is 70% of that in 2010 (Table 3). Total catch of tunas (skipjack, bigeye, yellowfin, albacore and bluefin) in 2014 was 84,781 mt, which is 19% decrease of that in 2013. The skipjack catch was 47,703 mt in 2014 which is 33% decrease of that in 2013.

Seasonal distributions of fishing effort (fishing days in 1x1 degree area) of the pole-and-line fishery are shown in Fig 8 as average of 2012-2014. The fishing ground in the temperate waters (north of around 25˚N) moved from southwest of Japan toward northeast as time progresses. In addition to these fishing grounds, in subtropical waters, north of the North Equatorial Current area was also important fishing ground for this fishery in first, second, and fourth quarters of the year. In the third quarter fishing grounds off northern Japan expanded to further east of 170˚E. There were few operations in the tropical waters south of 15˚N in the third quarter.

Typical seasonal fishing grounds by vessel type are as follows. The distant water vessels (larger than 300 GRT) fish skipjack in the tropical waters and the North Equatorial Current area from the late 4th quarter to the early 2nd quarter, and turn to north of around 35˚N, east of 150˚E where they target on albacore during June to October. In the case of the offshore vessels (smaller than 300 GRT), this fleet primarily catches skipjack tuna. Its fishing starts at sub-tropical area east of Northern Mariana Islands in February. This fishing ground gradually moves northward, and then reaches area just nearshore of Japan, south and/or east of Tokyo in May and June. The fishing ground of this fleet moves further northeastward to off northern Japan 35˚N-42˚N, west of 155˚E, so-called Tohoku area. Other than these offshore vessels, some of small sized offshore vessels operate around the Nansei Islands, southwest of Japan, with anchored FADs almost all year around. The other smaller size vessels of the offshore vessel operate at the Izu Islands area, south of Tokyo, almost all year round.

In most of the fishing grounds of pole-and-line fishery, skipjack dominated among species, except for at some region north east Japan, in which albacore dominated (Fig. 9). Most of yellowfin catch was made at the waters around Nansei Islands located in south of Japan.

4.3. Purse seine fishery

The catch and effort statistics in the WCP-CA by the Japanese tuna purse seine fishery (larger than 50 GRT in vessel size) are shown in Table 4 from 2010 to 2014. In addition to this, historical changes in catch by species and effort are shown in Fig. 10 for the period of 1970-2014. The data for 2014 are preliminary. The fishing effort was

less than 5,000 days in the 1970s, rapidly increased early 1980s, after that the effort fluctuated between 7,500 to 9,500 days (Fig. 10). The total catch of this fishery showed rapid increase in early 1980s, after that, still gradually increased until the late 2000s. Skipjack occupied the major part of catches being followed by yellowfin.

In recent five years, he number of fishing days (including only searching) for this fishery shows a declining trend, was 6,487 days in 2014 which is 82% of that in 2010 (Table 4). The total catch of the purse seine fishery shows no apparent trend in this five years, ranging between 212,918 mt and 256,130,mt. Skipjack catch was 167,754 mt in 2014, which is 81% of that in 2010 (206,204 mt). Yellowfin catch shows a declining trend, was 31,972 mt in 2014, which is 82% of that in 2010 (38,984 mt).

Fishing effort (fishing and searching days) for the purse seine distributed two regions, one is in tropical waters and the other is in northern waters, those are clearly separated by border of 20˚N (Fig. 11). The fishing grounds in the tropical waters were developed widely between 10˚N, 130˚E and 10˚S, 180˚ with some seasonal fishing ground shifts. In northern waters, skipjack fishing season starts in April and continue until third quarter at the vicinities of Japan in the Pacific Ocean. Geographical distributions of catches for skipjack, yellowfin and bigeye are shown in Fig. 12. In most regions, skipjack was the largest portion of the catch among three species in each 1˚ x 1˚ block as shown in Fig. 11.

This fishery utilizes tuna schools in association with natural log and FADs mainly in equatorial fishing grounds (Fig. 13). The operations for free swimming schools were dominant both in equatorial waters and northern waters.

According to the reports of the master of a vessel/observer, Japanese tuna purse seine set a net on schools of tuna associated with a cetacean and a whale shark unintentionally 5 times and 115 times. All cetaceans and whale sharks were released alive except 1 whale shark dead.

4.4. Other coastal fisheries

Besides the major tuna fisheries described above, there are miscellaneous coastal fisheries, which also catch tunas and tuna like species such as troll, setnet and gillnet fisheries. The catches for such fisheries during the 2010-2014 is shown in Table 5. The figures in 2014 are preliminary.

There used to be two kinds of large scale gillnet (driftnet) fisheries. One is large-mesh driftnet fishery, which fished billfishes and tunas, and the other is squid driftnet fishery, which fished flying squid. Those fisheries used to operate in the wide area of high seas in the Pacific Ocean, but stopped the operations on the high seas of the North Pacific in January 1993 due to a moratorium on the use of large-scale driftnets on the high seas. After 1993, the gillnet fishery have operated within the Japanese EEZ targeting tunas and billfishes. Swordfish, striped marlin and skipjack are primary target species in the fishing ground. The annual catch of them was less than 1,500 mt since 1993.

The troll fishery takes various pelagic species including tunas. The size of troll vessels are generally small, mostly less than 10 GRT, and make one-day trip. All catches by troll gear are within territorial seas. Skipjack is very important resources for the troll fishermen in the local community and decline and remained at a low level of skipjack catch by troll along the Pacific coast in the western Japan is getting big issue in recent years.

The setnet (also called as “trap net”) fishery also catches pelagic species including tunas.

4.5. Total catch for tropical tunas for all gears combined

Total catch for tropical tunas for all gears combined, including coastal fisheries (longline, pole-and-line, troll and other miscellaneous gears), are shown in Table 6 for 2010-2014. The data in 2013 and 2014 are preliminary. Total catch of skipjack shows no apparent trend ranging between 241,481 mt to 302,306 mt during this period. Total catch of bigeye shows no apparent trend, ranging between 17,832 mt and 22,706 mt. Total catch of yellowfin shows a declining trend from 66,133 mt in 2010 to 45,071 mt in 2014 (68%).

It is apparent that the yellowfin catch shows a declining trend during the 2010-2014 period for 5 fisheries of the distant and offshore longline, the small offshore longline, the distant water and offshore pole-and-line, the tuna purse seine and the troll, which take more than 1,000 mt of yellowfin per year (Fig. 14).

5. Status of tuna fishery data collection systems

5.1. Logbook data collection and verification

Longline

The owners of fishing vessels larger than or equal to 10 GRT are required to submit the log sheet on their operations and catch information to the Japanese government. Coastal, small offshore and offshore vessel have to submit it by each cruise in three months after the cruise was finished while distant water longliners are required to submit it every ten days. In the log sheet of longline, set by set data on catch number and weight in each species, and other information data such as fishing date and location, fishing effort (the number of basket and hooks used), water temperature are included. Catch weight information was not included in the logbook till 1993. The number of hooks per basket is important information as it suggests the depth of the gear and target species. As tuna and tuna-like fishes, six tunas (Pacific bluefin, southern bluefin, albacore, bigeye, yellowfin and skipjack), and six billfishes (swordfish, striped marlin, blue marlin, black marlin, sailfish and shortbill spearfish) are separately recorded in the logsheets. Additionally, information on the cruise (date and port of departure and arrival of the cruise), vessel (name, size, license number and call sign), number of crew and the configurations of the fishing gear (material of main line and branch line) are asked to fill on the top part of the sheet by each cruise.

Submitted logsheets are processed into electronic data files. Various error checks, such as date, location, range of weight, CPUE, are conducted before these data are finalized. Vessel characteristics (call sign, name, license number, etc.) are verified with a register.

Because the coverage rate of logsheets is not 100% for longline fishery, it is necessary to raise the sample values to represent 100 %. For both of the distant water and offshore longline fisheries (20-120 GRT, excluding 10-20 GRT vessels that operate outside of Japanese EEZ), coverage rate has been about 90 - 95% of total operation (Table 7). In the case of distant water longline fishery, information on the total number of operations aggregated by sub-areas and month provided by the fishermen's association (Federation of Japan Tuna Fisheries Co-operative Association) was used to raise the log sheet data to the total catch. For the offshore longline vessels larger than 20 GRT, total number of operation by prefecture (which the vessel belongs to) by year given by MAFFJ has been used for the raising. Since 2008, Vessel Monitoring System (VMS) information is utilized to raise the log sheet data for both fisheries. As for the coastal and small offshore longliners, reliable information of coverage rate is not available. But it is considered to be about 90% or more for small offshore as far as basing on the number of registered vessels.

Catch in weight in logsheet data is in processed weight, so that conversion factors by species are used to convert processed weight to whole weight.

Pole-and-line

The license holders of the distant water pole-and-line or the offshore pole-and-line (mostly vessel larger than 20 GRT) are required to submit a logsheet on their operations and catch information to the Japanese government within 30 days after the cruise. The logsheets submitted to the government are forwarded to the NRIFSF, and are then compiled. Although the logsheet submission is mandate, the submission rate for the pole-and-line is not necessarily 100%. The coverage is likely to be around 80% in the beginning of the history of the pole-and-line logsheet system (1970's), but the submission rate was improved after that, to nearly 100% in 1990s. The coverage rate in Table 7 for the pole-and-line was calculated by

(Number of the vessels which submitted logsheet at least once) / (Number of vessels which actually operated).

Similar error check processes to the longline are also conducted. In case there is significant omission or errors, the NRISFS staff will contact to owner or other relevant person to obtain information to revise.

Purse seine

The logbooks of 50 – 200 GRT class and greater than 200 GRT vessels were reported when fishermen caught tuna species. The coverage of the latter class was 100 % and the reported catch by species could be verified by

comparing with the landing data, which were obtained from market receipts of three major unloading ports (Yaizu, Makurazaki, and Yamagawa).

In 2011, reporting system from fishermen to government was changed for the cruises for which purse seine vessels operates in Sea of Japan or East China Sea. Such fishermen submit single kind of logsheets regardless target species, while fishermen select two kinds of logsheets to fill out for tunas and small pelagic species, such as mackerel sardines and anchovies in the past. As the result, the logbook data which operated in the Sea of Japan or the East China Sea have large quantity of zero tunas catch records, so it is need to interpret the fishing effort for tunas using the data carefully.

5.2. Size data collection and compilation

NRIFSF have collected size data for tuna and tuna like species to use for biological study and to provide to stock assessments. There are several kinds of data source for the size data such as at-sea sampling and port sampling for the fish caught by commercial fisheries and onboard sampling by training and research vessels.

5.2.1. At-sea sampling on commercial fishing vessels

Length data is voluntarily collected for all tunas and billfishes by fishermen who are on board of distant water longline vessels. Fishermen recorded the data in the field note which is provided by NRIFSF, and send the field note back to NRIFSF after end of the cruise. The length data reported by the at-sea sampling is compiled with daily basis as temporal resolution and 1˚x1˚block as geographical resolution and is stored in a specific database for size data for tunas and billfishes. In some case, fishermen take measurement with 2cm or 5cm interval though NRIFSF encourages measurement with 1cm interval.

5.2.2. At-sea sampling on training and research vessels

Size data is collected for not only tunas and billfishes but all animals by the training and research vessels using longline gear. The crew and/or students measured length and weight of the animals landed on board and reports the data to NRIFSF. Size data is collected for skipjack (and the other species sometimes) by the training and research vessel using pole-and-line gear. The crew and/or students measured length and weight of skipjack landed on board and reports the data to NRIFSF. Size data received from training/research vessels is compiled and stored as the same manner to the at-sea sampling on commercial fishing vessels.

5.2.3. Port sampling

Port sampling is important way to collect size data in the view of largeness of sampling size which NRIFSF have been conducted. Measurement is done at a timing between unloading from fishing vessel and starting auction. Sampler randomly takes measurement in general or takes measurement all individual in some case. In general, size data collected by port sampling is compiled with monthly basis as temporal resolution and with specific blocks of 1˚x1˚, 5˚x5˚, 5˚x10˚, 10˚x20˚ as geographical resolution depending on width of the range of fishing position at the cruise. The temporal and geographical resolution is determined by the range of each cruise in which size sampling is done based on the information of the interview to the captain or fishing master of the fishing vessel at unloading site and/or logbook data reported by fishermen.

As a special case, skipjack unloaded as unfrozen fish was recorded in a different way from above. In most case of measurement of such skipjack, since fishing date and position can specify with daily basis and finer than 1˚x1˚ block, the fishing date and position is recorded as it is on the database for skipjack size.

Port sampling for distant water purse seine has been carried out in a different way, which is conducted at three ports (Yaizu, Makurazaki and Yamagawa). The number of annual samplings is about 25 in average, which is more than 10% coverage (25/220) in cruise number basis. Size data is collected for skipjack, yellowfin and bigeye. Fish form a commercial vessel was selected from single well, which is filled up fish caught by single operation. Thus, the fishing date, fishing location and school type (associated school, free school) for these fish are identified by hatch plan (fish unloading plan describing amount of catch by species for each well with fishing date and location)

sent from vessel captain before unloading. In general, only one vessel per one port sampling is selected, and fish from one to three wells of the vessel are measured its individual length and partially its weight. About 1,000 kg fish per well were measured in average.

Followings are species, type of gear/fishery and location of sampling site for port sampling conducted in 2014;

- Size data is collected for albacore and skipjack caught by distant water pole-and-line vessels by NRIFSF staff at Yaizu.
- Size data is collected for albacore caught by offshore pole-and-line vessels by NRIFSF staff at Katsuura a few times one year.
- Size data is collected for skipjack, yellowfin, and bigeye caught by distant-water purse seine vessels at Yaizu, Makurazaki and Yamagawa.
- Size data is collected for skipjack caught by the middle-sized pole-and-line vessels which unload unfrozen fishes at Kesennuma by NRIFSF staff.
- Size data is collected for albacore, swordfish and striped marlin and sharks caught by the offshore longline vessel at Kesennuma by NRIFSF staff.
- Size data is collected for Pacific bluefin caught by the vessels of most of fishing gear at most of prefecture which bluefin is unloaded by nationwide port sampling project. Also size data collected for albacore, yellowfin, bigeye and swordfish and billfishes caught by offshore and small offshore and coastal longline vessels, for skipjack caught by mid-sized pole-and-line at major landing ports by the same project.

6. Research activities related to tuna and tuna-like species in the WCPFC Convention Area

6.1. Observer program

Two kinds of national observer programs have been conducted in the WCP-CA, one for purse seine and the other for longline.

The observer program for purse seine boats has been implemented in the tropical Pacific Ocean since 1995. The detail of time and position at each operation, type of association, and the length frequencies samples were taken by scientific observers in each operation. After 2012, the observer program for tuna purse seine in vicinity of Japan water has been conducted. Six purse seine cruises were observed from May to August 2014 in vicinity of Japan (Table 8). Days spent for these cruises ranged from ranged from 13 to 21 days. They returned their port frequently without filling up their fish wells in one cruise.

The observer program for longline in the WCP-CA started in 2008. The information of fishing vessels, fishing operations and almost all the catches in each operation were identified and measured as much as observer can. Seventeen cruises of distant water and offshore longline vessels and 48 cruises of small offshore longline vessels were observed in the 2014 calendar year. The data from 16 distant water cruises and 43 small offshore cruises were inputted to the database and number of operation and species observed in each fishery was shown in Table 9. The number of operations which was recorded by the observers ranged from 1 to 44 in the small offshore longline vessels and 12 to 128 in the distant water and offshore longlines. The estimated number of released oceanic whitetip shark and silky shark in 2014 were shown in Appendix Tables 9 and 12, following CMM2011-04 and CMM 2013-08, respectively.

6.2. Tagging

Skipjack tagging

We have been conducting skipjack tagging mainly to know migration pattern to the fishing ground off Japan and its mechanism. One offshore pole-and-line vessel was chartered and tagging was conducted in the south off Japan between February and March in 2014. A total of 320 skipjack tuna including 54 fish with archival tag (Lotek LAT2910) were released. To date one fish was recaptured. In addition, skipjack tagging has been being conducted in cooperation with Ajinomoto Co., Inc. in the coastal area of southwestern Japan since 2009. In 2014,

742 skipjack tuna including 94 fish with archival tag were released at around Yonaguni Island (24˚N, 123˚E) in March and May, and so far 16 fish including 5 fish with archival tag were recaptured.

Besides above studies, three research/training pole-and-line vessels conducted skipjack tagging in the area 11-35˚N, 134-148˚E in 2014. Total of 100 skipjack were released with the conventional tag, and 4 were recovered. By one of these vessels, collaborative study of archival tagging with NRIFSF has been being conducted since 2010. In 2014, a total of 50 and 173 archival tags were deployed in the south off Japan in February to March and around Izu Islands (central part of Japan) in May to June, respectively. To date 25 fish were recaptured. Two other collaborative studies were conducted in 2014 using other research vessels. A total of 39 skipjack tuna caught by troll were released with archival tag around Hachijo Island (33˚N, 139˚E) in May, and to date one fish was recaptured. A total of 93 skipjack tuna caught by troll were released around Bohso Peninsula (around 35˚N, 140˚E) in October, and to date one fish was recaptured.

6.3. Research cruise conducted

PBF larval/juvenile sampling

Since 2011, larval surveys have been conducted to estimate current main spawning area and period of PBF. In 2014 research cruises were conducted for ecological study of larval/juvenile PBF by R/Vs Shunyo-Maru, Yoko-Maru, and five prefectural R/Vs. Larval surveys were conducted in the south of Japan around Nansei Islands area, where is a major spawning ground of PBF, from 12 May to 15 July and found that PBF larvae were found in the south of Yaeyama Islands and in the southwest Miyako Island. Larval surveys were conducted also in the Sea of Japan, which is another spawning ground of PBF, from 18 to 30 July, and PBF larvae were captured in the west of the Noto Peninsula and the east of Oki Islands. Compiling the three years cruise data from 2011 to 2013, spawning grounds of PBF were estimated by simulating backward Lagrangian transportation model. The results suggest that PBF start spawning late April in the west of Yaeyama Islands and east if Okinawa Main Island, expanding it ranges around Yaeyama Islands to Okinawa Main Island until late July toward the end in the Nansei Islands area. While in the Sea of Japan, PBF start spawning late June off Wakasa Bay and continue to spawn in around Noto to Oki throughout July.

Tropical tuna species and skipjack larval/juvenile sampling

In order to better understand the relationship between recruitment variability and growth during early life stage of tropical tunas, the aims of the cruise are to (1) describe the variations of early life stage growth among areas and (2) describe the horizontal distribution of skipjack and tropical tunas. The research cruise was from 4 Feb. 2015 to 2 Mar. 2015. Main research area was high seas. During this research cruise, we conducted CTD observations and mid-water trawl samplings, 2-m ring plankton net tows and drift net sampling. Using these sampling gears, we collected larvae and juveniles of tuna species and skipjack.

6.4. Bycatch species related research

Mitigation studies for seabirds

Effectiveness of tori line and weighted branchlines (Lumo lead and light device) to reduce seabird bycatch was examined using Japanese research vessel (Taikei-Maru No.2, 196 GRT) in the North Pacific from April to June 2015. The results showed that both Lumo lead and light device as well as tori line were effective in preventing seabird attacks and incidental catch of seabirds. The results suggest that sole deployment of tori line, Lumo lead or light device reduce albatross bycatch by pelagic longline fisheries in the western North Pacific.

For consideration to develop appropriate mitigation measures for small longline vessels, the effectiveness of 2 designs of tori-lines (A: tori-line without streamer, B: bundled 3 polypropylene bands) and (C) without tori-line was examined using chartered commercial longline vessel (Hanei-Maru No. 188, 19 GRT) in the western North Pacific. The results indicated that both designs of tori-lines deployed in this experiment substantially reduced seabird bait attack and by-catch. Trial implementation of a light streamer tori-line showed entanglement of fishing

gear during line setting.

Mitigation studies for sea turtles

Experiment of large circle hooks (Koshina type 4.5-sun similar to foreign type 18/0) on catch rates of target species and sea turtles are on the way through operations of commercial longline in the North Pacific 2014. The use of circle hooks is effective to reduce incidental catch or deep hooking of sea turtles.

References

MAFFJ 2012-2014. Annual report of catch statistics on fishery and aquaculture, 2010-2012. Statistics Department, Minister's Secretariat, the Ministry of Agriculture, Forestry and Fisheries of Japan.

MAFFJ 2015. Annual report of catch statistics on fishery and aquaculture 2013, on the portal site for governmental statistics "e-Stat" (published in February 17, 2015). https://www.e-stat.go.jp/SG1/estat/GL08020103.do?_toGL08020103_&listID=000001129478&requestSender=estat

Table 1. Number of fishing vessels engaged in tuna fisheries in the WCPFC Convention Area by gear and size of vessel. Figures in parentheses indicate provisional data. NA indicates not available. In the number of longline vessel, coastal longliner and training/research vessels are not included. In the number of pole-and-line vessel, research and training vessels are not included.

Longline					
	10-50 ton	50-100 ton	100-200 ton	200- ton	Total
2010	290	29	28	113	460
2011	272	24	25	111	432
2012	261	21	21	98	401
2013	255	20	25	109	409
2014	(240)	(17)	(21)	(83)	(361)

	Pole-and-line			
	20-50 ton	50-200 ton	200- ton	Total
2010	1	66	28	95
2011	0	63	28	91
2012	0	60	27	87
2013	0	55	25	80
2014	(1)	(54)	(25)	(80)

	Purse Seine			
	50-200 ton	200-500 ton	500- ton	Total
2010	31	35	4	70
2011	33	36	4	73
2012	34	37	4	75
2013	34	37	4	75
2014	(33)	(37)	(3)	(73)

Table 2. Fishing effort (in 1000 hooks) and catch (MT) in the WCPFC Convention Area by species for the Japanese distant and offshore (top table) and small offshore (bottom table) longline fisheries. Figures in the parentheses indicate provisional data.

Distant water (120- GRT) and offshore (10-120 GRT) longlines

	#hooks	PBF	ALB	BET	YFT	SWO	MLS	BUM	BLM	SFA	SSP	SKJ
2010	81,428	12	6,875	8,657	11,721	4,302	325	1,431	71	148	109	82
2011	70,446	20	7,351	8,255	7,033	2,996	442	1,478	29	75	130	125
2012	68,164	14	7,585	8,375	7,065	3,243	425	1,137	20	45	111	199
2013	(61,138)	14	(6,779)	(6,269)	(4,761)	(3,420)	(407)	(990)	(31)	(66)	(169)	(207)
2014	(55,570)	-	(6,362)	(7,535)	(3,743)	(4,312)	(340)	(963)	(26)	(49)	(140)	(163)

	BSH	LMD	POR	SMA	OCS	THR	FAL	SPN	RHN	O-shk	Total
2010	14,103	168	3	764	120	180	-	-	-	108	49,178
2011	6,848	62	3	714	268	192	-	-	-	142	36,162
2012	10,860	467	1	751	46	84	-	-	-	27	40,454
2013	(9,603)	(205)	1	(606)	(0)	(113)	(0)	(0)	(0)	(139)	(33,780)
2014	(11,101)	(884)	(8)	(781)	(0)	(88)	(0)	(0)	(0)	(26)	(36,521)

Small offshore longline (10-20 GRT)

	#hooks	PBF	ALB	BET	YFT	SWO	MLS	BUM	BLM	SFA	SSP	SKJ
2010	80,127	-	-	7,328	5,254	1,086	641	1,482	16	43	0	3
2011	76,397	-	-	8,630	3,909	892	720	1,192	13	34	1	5
2012	71,645	-	-	7,158	2,965	981	780	998	10	31	0	4
2013	(67,441)	-	-	(5,634)	(3,045)	(809)	(850)	(1,155)	(17)	(15)	(0)	(2)
2014	(60,901)	-	-	(7,020)	(2,340)	(937)	(591)	(806)	(12)	(35)	(0)	(4)

	BSH	LMD	POR	SMA	OCS	THR	FAL	SPN	RHN	O-shk	Total
2010	317	44	0	26	0	0	-	-	-	12	16,253
2011	459	12	0	24	0	0	-	-	-	9	15,901
2012	524	78	0	3	0	0	-	-	-	5	13,535
2013	(763)	(169)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(91)	(12,550)
2014	(729)	(268)	(0)	(5)	(0)	(0)	(0)	(0)	(0)	(3)	(12,749)

* The catches for PBF and ALB are appropriate to show hear as the category "small offshore". See also Appendix Tables 2 for PBF and ALB catches by longline.

Table 3. Fishing effort (Days fished and number of poles) and catch by species (mt) for the Japanese offshore and distant water pole-and-line fishery in the WCPFC Convention Area. Figures in parentheses indicate provisional data.

year	#days	#pole	SKJ	YFT	BET	PBF	ALB	Total
2010	16,132	305,017	80,435	2,874	2,250	83	19,426	105,068
2011	14,564	275,484	73,103	2,603	2,239	63	25,656	103,663
2012	14,804	280,356	57,266	1,679	2,036	113	33,665	94,758
2013	(13,288)	(252,667)	(71,309)	(1,150)	(2,340)	8	(33,515)	(108,323)
2014	(11,299)	(216,074)	(47,703)	(1,033)	(2,525)	(5)	(33,515)	(84,781)

* PBF catches for offshore and distant water pole-and-line were not estimated separately. See also Appendix Table 2 to see statistics for PBF catch.

Table 4. Fishing days including searching days and catch (mt) by species for the Japanese tuna purse seine fishery in the WCPFC Convention Area based on logbook data.

	#days	SKJ	YFT	BET	PBF*	ALB	Total
2010	7,879	206,204	38,984	2,758	-	305	256,130
2011	8,036	156,401	33,887	2,675	-	462	201,461
2012	7,370	193,372	28,742	3,493	-	4,121	237,098
2013	7,208	181,605	22,513	2,820	-	1,985	216,132
2014	(6,487)	(167,754)	(31,972)	(4,000)		(1,985)	(212,198)

* PBF catches for tuna purse seine were not estimated separately. See also Appendix Table 2 to see statistics for PBF catch.

Table 5. Japanese catches (mt) for miscellaneous coastal fisheries by species and gear in the WCPFC Convention Area. Figures in parentheses indicate provisional data. SKJ: skipjack tuna, YFT: yellowfin tuna, BET: bigeye tuna, PBF: Pacific bluefin tuna, ALB: albacore. SWO: swordfish, MLS: striped marlin, BLZ: blue marlin, BLM: black marlin. Figures in parentheses indicate provisional data.

Coastal longline

	SKJ	YFT	BET	PBF*	ALB*	SWO	MLS	BUM+BLM	Total
2010	7	1,844	414	-	-	72	191	164	427
2011	7	1,701	525	-	-	81	212	153	446
2012	11	1,289	446	-	-	99	200	148	447
2013	5	1,338	390	-	-	102	242	166	447
2014	(5)	(1,338)	(390)	-	-	(102)	(242)	(166)	(510)

Coastal pole-and-line

	SKJ	YFT	BET	PBF*	ALB	Total
2010	7,632	1,693	124	-	135	9584
2011	9,144	1,815	100	-	57	11,116
2012	9,930	1,994	71	-	92	12,087
2013	13,003	2,182	146	-	61	12,087
2014	(13,003)	(2,182)	(146)	-	(61)	(15,392)

Coastal purse seine

	SKJ	YFT	BET	PBF*	ALB	Total
2010	2,361	50	32	-	25	2470
2011	87	3	0	-	18	90
2012	58	2	0	-	72	73
2013	21	44	0	-	3	73
2014	(21)	(44)	(0)	-	(3)	(68)

Gillnet

	SKJ	YFT	BET	PBF*	ALB	Total
2010	315	22	2	-	24	503
2011	111	6	1	-	12	191
2012	95	6	2	-	26	180
2013	112	8	1	-	14	180
2014	(112)	(8)	(1)	-	(14)	(135)

Troll**

	SKJ	YFT	BET	PBF	ALB	Total
2010	4,729	3,167	157	1,583	588	10454
2011	1,780	2,497	141	1,820	443	7,270
2012	3,487	2,279	118	570	610	7,712
2013	2,514	1,817	116	904	302	7,712
2014	(2,514)	(1,817)	(116)	(1,020)	(302)	(5,769)

Setnet**

	SKJ	YFT	BET	PBF	ALB	Total
2010	333	103	4	1,603	42	2085
2011	625	111	2	1,651	50	2,439
2012	404	113	0	1,932	48	2,497
2013	209	103	5	1,415	36	2,497
2014	(209)	(103)	(5)	(1,903)	(36)	(2,256)

* PBF catches for coastal longline, coastal pole-and-line, coastal purse seine and gillnet were not estimated separately. See also Appendix Table 2 to see statistics for PBF catch. ALB catches for coastal longline was not estimated separately. See also Appendix Table 2 to see statistics for ALB catch.
**All catches by troll and setnet gears are within territorial seas.

Table 6. Japanese catches (mt) for tropical tuna species by gear in the WCPFC Convention Area. Figures in parentheses indicate provisional data. LL: longline, PL: pole-and-line, PS: purse seine.

	2010	2011	2012	2013	2014
Skipjack					
Total	302,306	241,481	265,014	(269,098)	(231,599)
Distant water and Offshore LL	82	125	199	(207)	(163)
Distant water and Offshore PL	80,435	73,103	57,266	(71,309)	(47,703)
Tuna PS	206,204	156,401	193,372	181,605	(167,754)
Small offshore LL	3	5	4	(2)	(4)
Coastal LL	7	7	11	5	(5)
Coastal PL	7,632	9,144	9,930	13,003	(13,003)
Coastal PS	2,361	87	58	21	(21)
Gill net	315	111	95	112	(112)
Troll*	4,729	1,780	3,487	2,514	(2,514)
Set net*	333	625	404	209	(209)
Unclassified	205	93	188	111	(111)
Yellowfin					
Total	66,133	53,904	46,503	(37,452)	(45,071)
Distant water and Offshore LL	11,721	7,033	7,065	(4,761)	(3,743)
Distant water and Offshore PL	2,874	2,603	1,679	(1,150)	(1,033)
Tuna PS	38,984	33,887	28,742	22,513	(31,972)
Small offshore LL	5,254	3,909	2,965	(3,045)	(2,340)
Coastal LL	1,844	1,701	1,289	1,338	(1,338)
Coastal PL	1,693	1,815	1,994	2,182	(2,182)
Coastal PS	50	3	2	44	(44)
Gill net	22	6	6	8	(8)
Troll*	3,167	2,497	2,279	1,817	(1,817)
Set net*	103	111	113	103	(103)
Unclassified	421	339	369	491	(491)
Bigeye					
Total	21,806	22,706	21,845	(17,832)	(21,849)
Distant water and Offshore LL	8,657	8,255	8,375	(6,269)	(7,535)
Distant water and Offshore PL	2,250	2,239	2,036	(2,340)	(2,525)
Tuna PS	2,758	2,675	3,493	2,820	(4,000)
Small offshore LL	7,328	8,630	7,158	(5,634)	(7,020)
Coastal LL	414	525	446	390	(390)
Coastal PL	124	100	71	146	(146)
Coastal PS	32	0	0	0	(0)
Gill net	2	1	2	1	(1)
Troll*	157	141	118	116	(116)
Set net*	4	2	0	5	(5)
Unclassified	80	138	146	111	(111)

*All catches by troll and setnet gears are within territorial seas.

Table 7. Coverage rate of logbook for longline, pole-and-line and Purse seine fisheries. The calculation methods among fishery are not the same. NA indicates not available.

Type of fishery	2010	2011	2012	2013	2014
Distant water longline	100%	100%	100%	100%	98%
Offshore longline	92%	100%	94%	96%	81%
Small offshore longline	N/A	N/A	81%	86%	81%
Coastal longline	N/A	N/A	N/A	N/A	N/A
Offshore pole-and-line (20-120 GRT)	100%	100%	100%	100%	100%
Distant water pole-and-line (over 120 GRT)	100%	100%	100%	100%	100%
Purse seine (>200GRT)	100%	100%	100%	100%	100%

Table 9. Number of operations and catch number for longline observer program in the western central Pacific in 2014.

Fishery	Small offshore longline	Distant water and offshore longline
Number of Cruises	43	16
Number of Operation	673	696
Number of Catch Observed	28225	61777
Albacore	9742	17370
Yellowfin tuna	1485	6874
Southern bluefin tuna	0	2955
Bigeye tuna	5680	5017
Bluefin tuna	7	3
Skipjack tuna	384	789
Sailfish	20	106
Black marlin	6	29
Blue marlin	430	438
Shortbill spearfish	91	258
Striped marlin	271	256
Swordfish	436	1483
Lancetfishes	2302	2621
Opah	699	831
Pomfrets	671	1222
Dolphin fish	275	950
Escoler	843	1451
Other fishes	580	1936
Thresher sharks	129	182
Shortfin mako	87	802
Blue shark	3175	12378
Other Sharks	68	937
Sting ray	659	2318
Other Rays	29	12
Sea Birds	99	473
Sea Turtles	47	85
Mammals	6	0
Unidentified	4	0

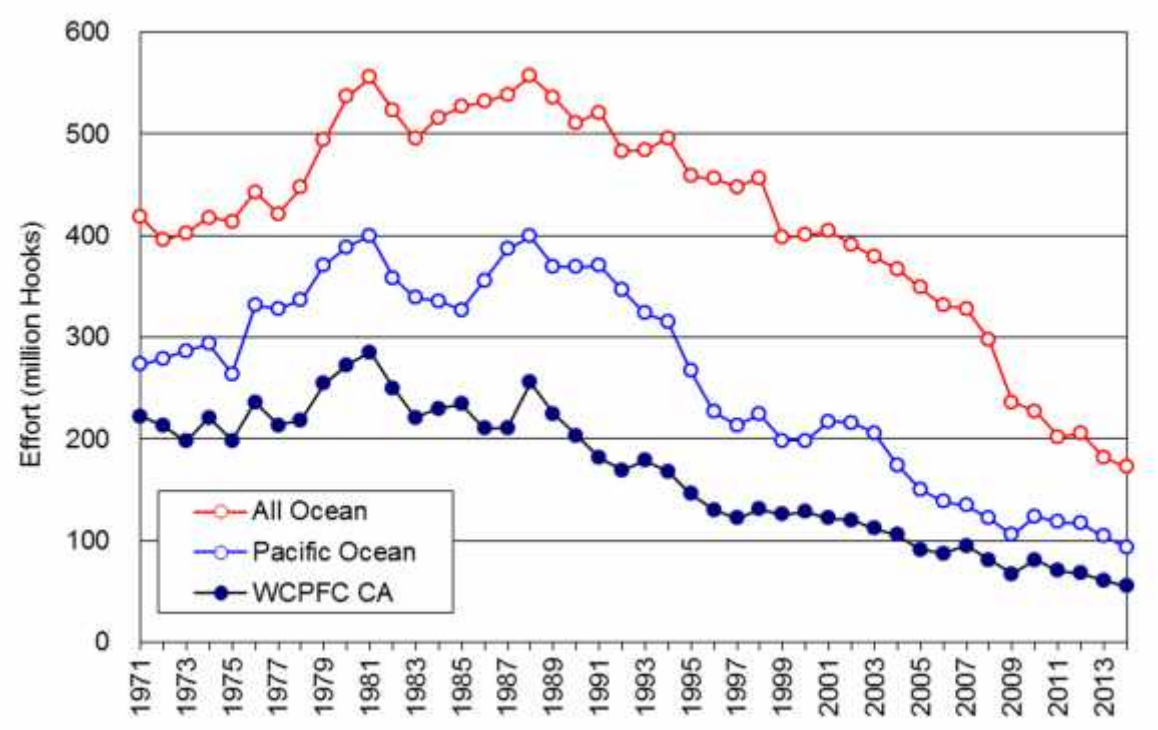

Fig. 1. Historical change in fishing effort of the Japanese distant water and offshore longline fishery (not including small offshore) in the WCPFC Convention Area. Values in 2013 and 2014 are provisional.

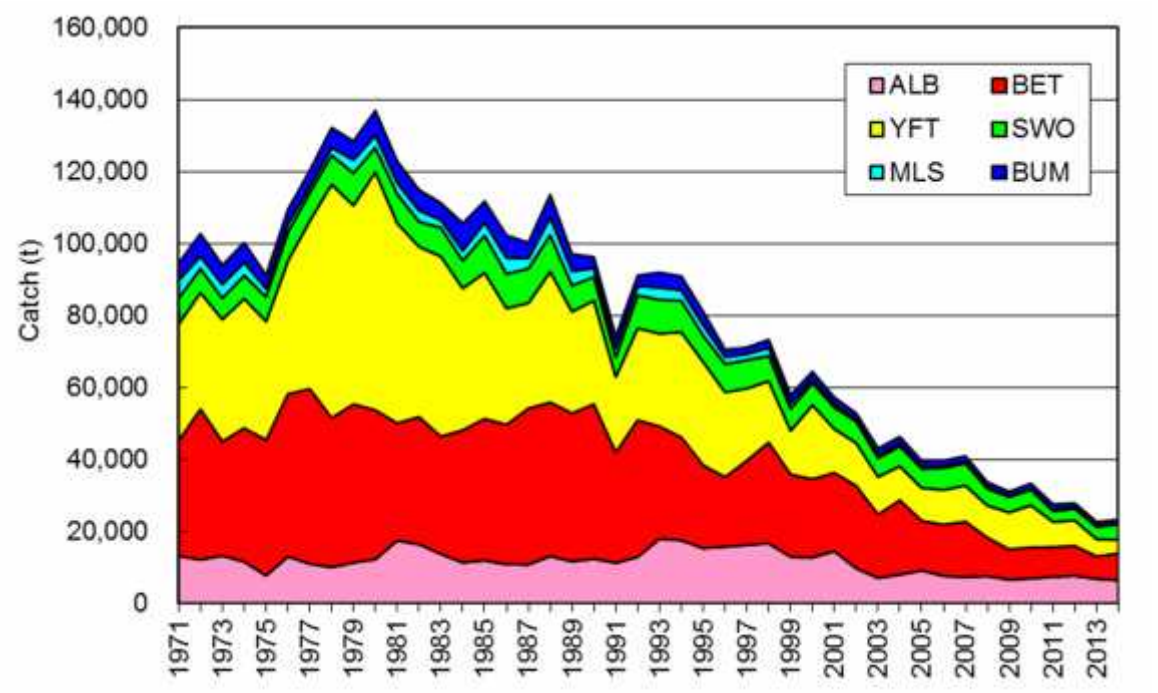

Fig. 2. Historical change of catches for major species for the Japanese distant water and offshore longline fishery (not including small offshore) in the WCPFC Convention Area. ALB: albacore, BET: bigeye, YFT: yellowfin, SWO: sword fish, MLS: striped marlin, BUM: blue marlin. Values in 2013 and 2014 are provisional.

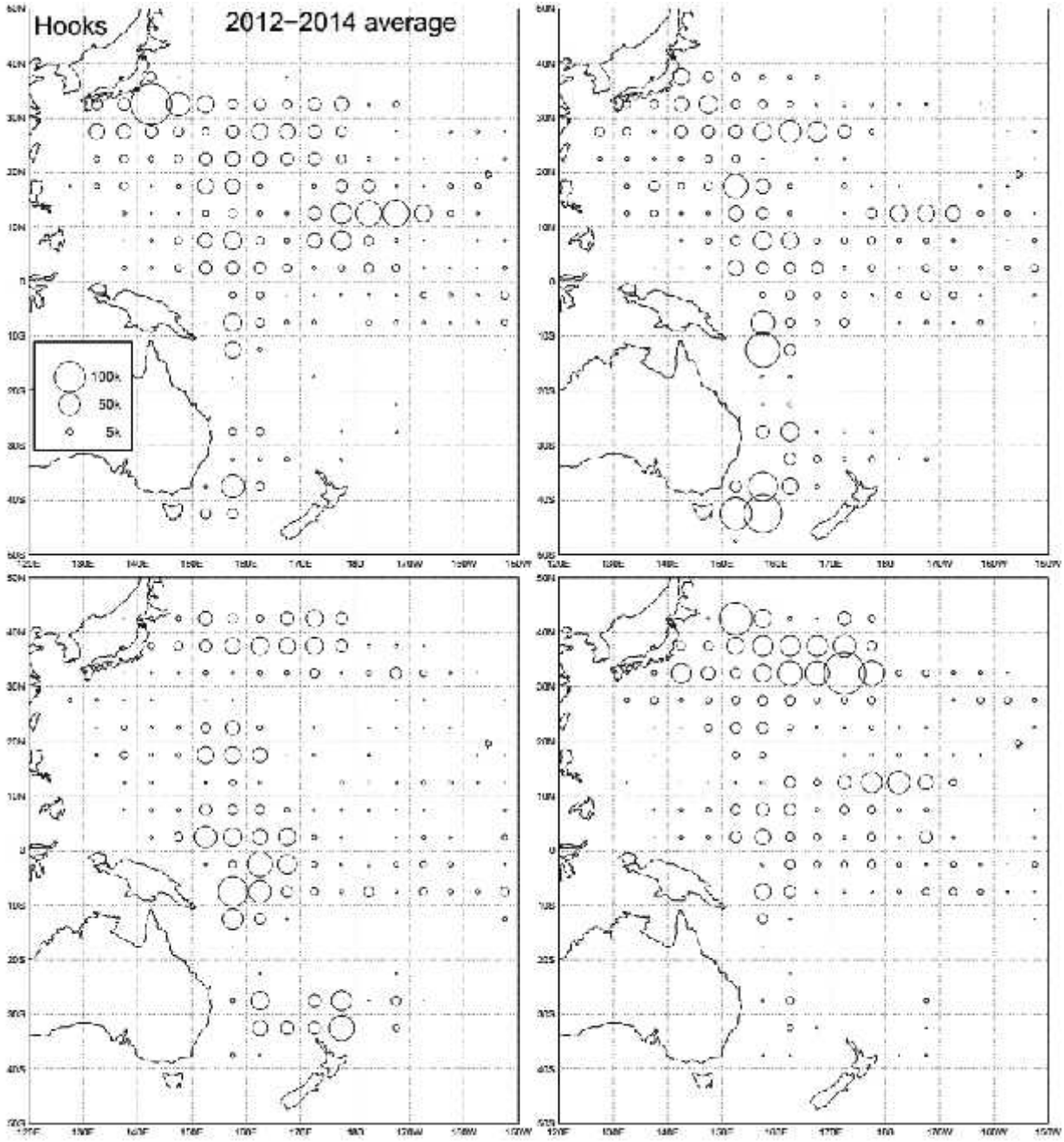

Fig. 3. Quarterly distribution of fishing effort for the Japanese offshore and distant water longline fisheries in the western and central Pacific Ocean in average of 2012-2014.

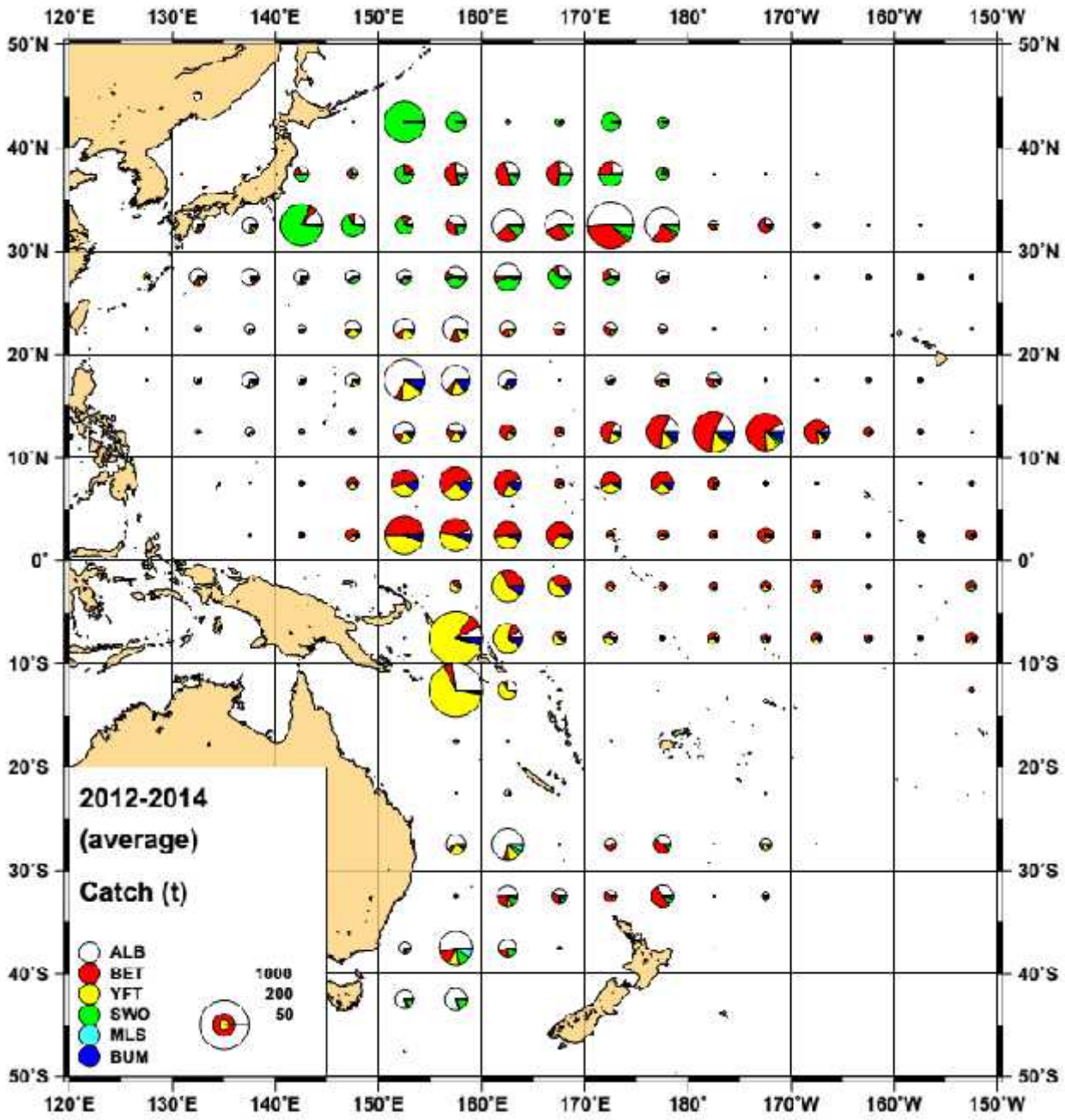

Fig. 4. Distributions of offshore and distant water longline catch (in weight) by species in average of 2012-2014 for six main species (ALB: albacore, BET: bigeye tuna, YFT: yellowfin tuna, SWO: swordfish, MLS: striped marlin and BUM: blue marlin).

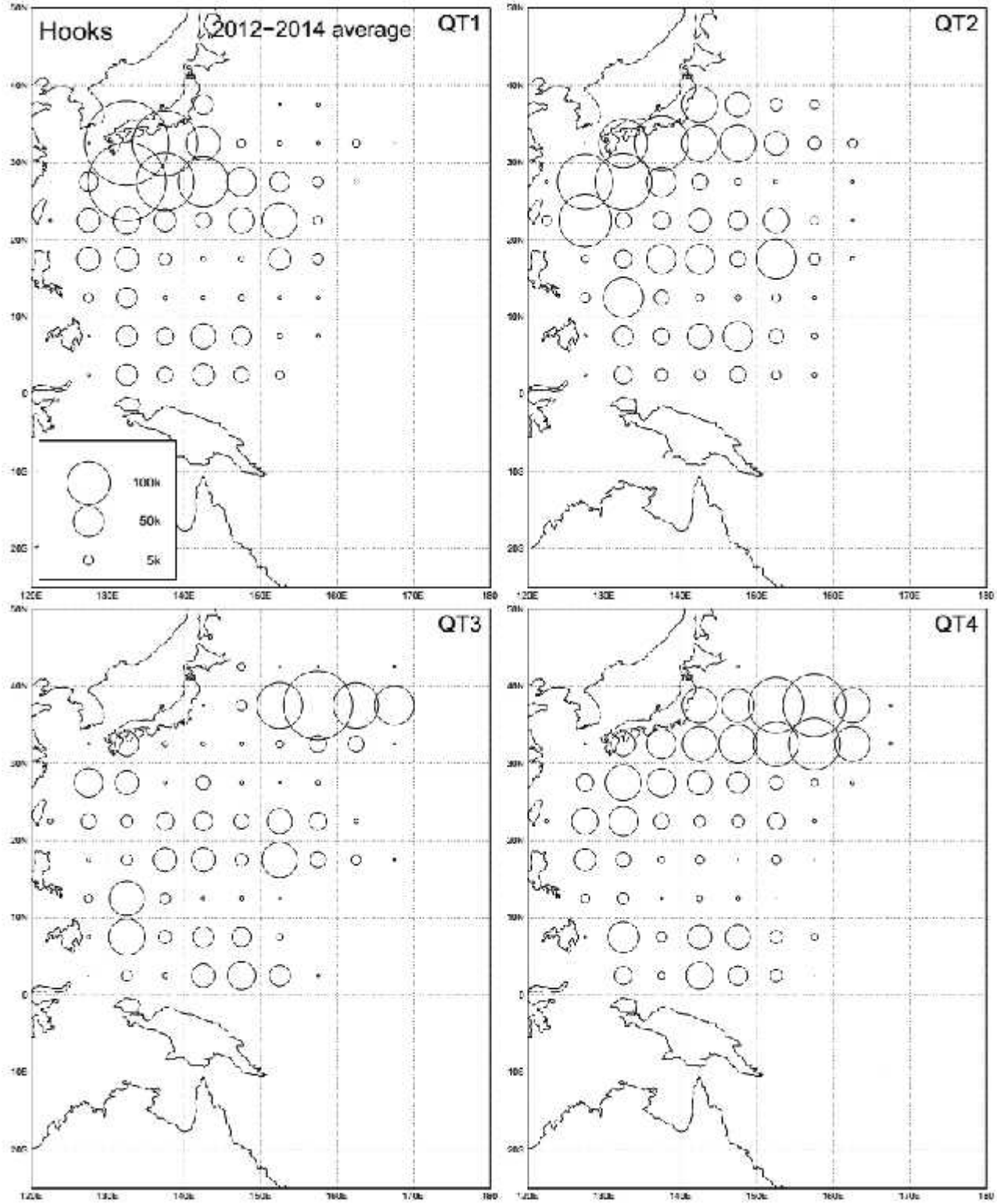

Fig. 5. Quarterly distribution of fishing effort for the Japanese small offshore longline fisheries (10- 20 GRT) in the western and central Pacific Ocean in average of 2012-2014.

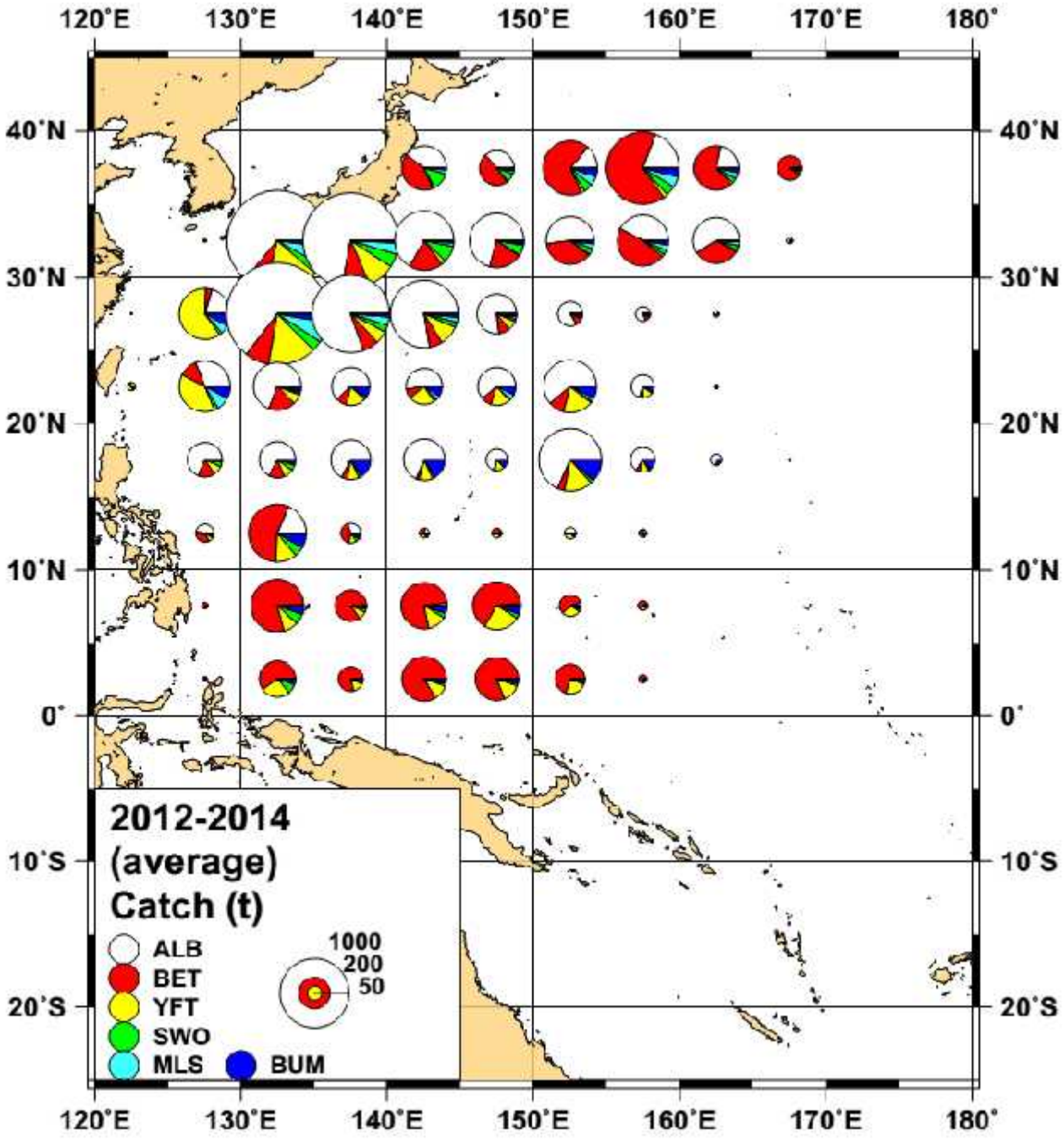

Fig. 6. Distributions of small offshore longline catch (in weight) by species in average of 2012-2014 for six main species (ALB: albacore, BET: bigeye tuna, YFT: yellowfin tuna, SWO: swordfish, MLS: striped marlin and BUM: blue marlin).

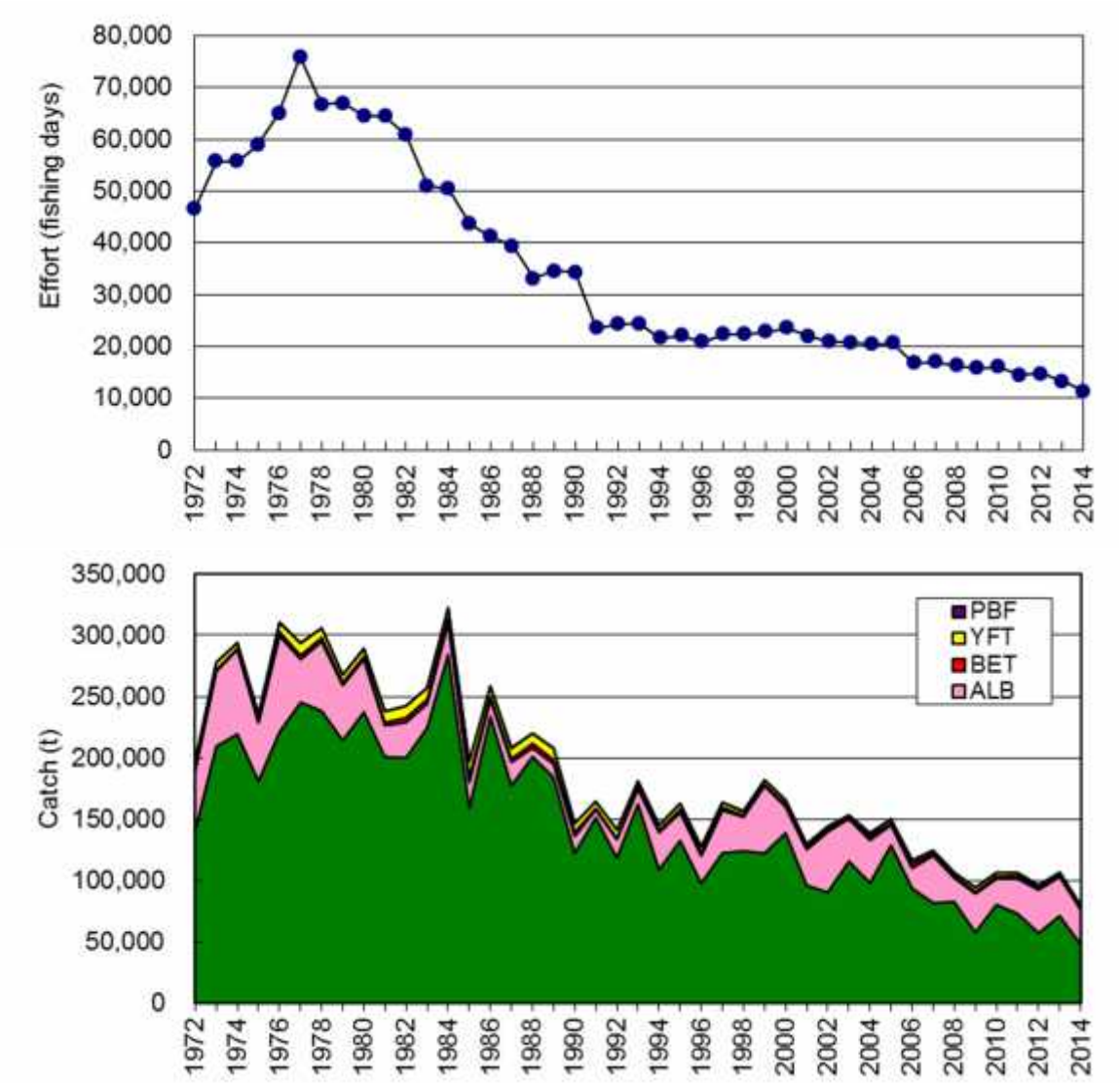

Fig. 7. Historical change of fishing effort and catches by species for the Japanese pole-and-line fishery (>20GRT) in the WCPFC Convention Area. Values in 2013 and 2014 are provisional.

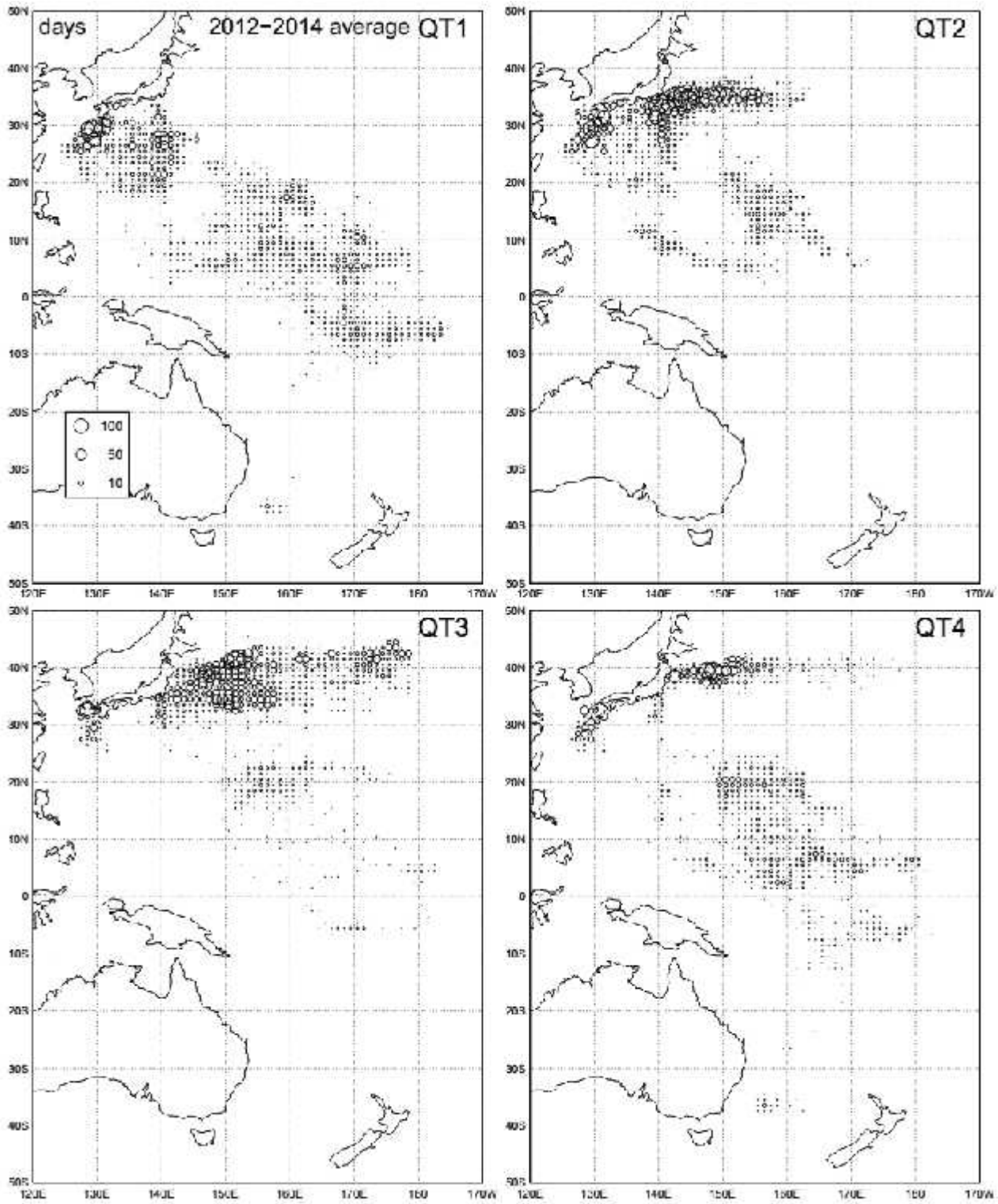

Fig. 8. Quarterly distribution of fishing effort (days) for the Japanese pole-and-line fishery (offshore and distant water licenses) in the Pacific Ocean in average of 2012-2014.

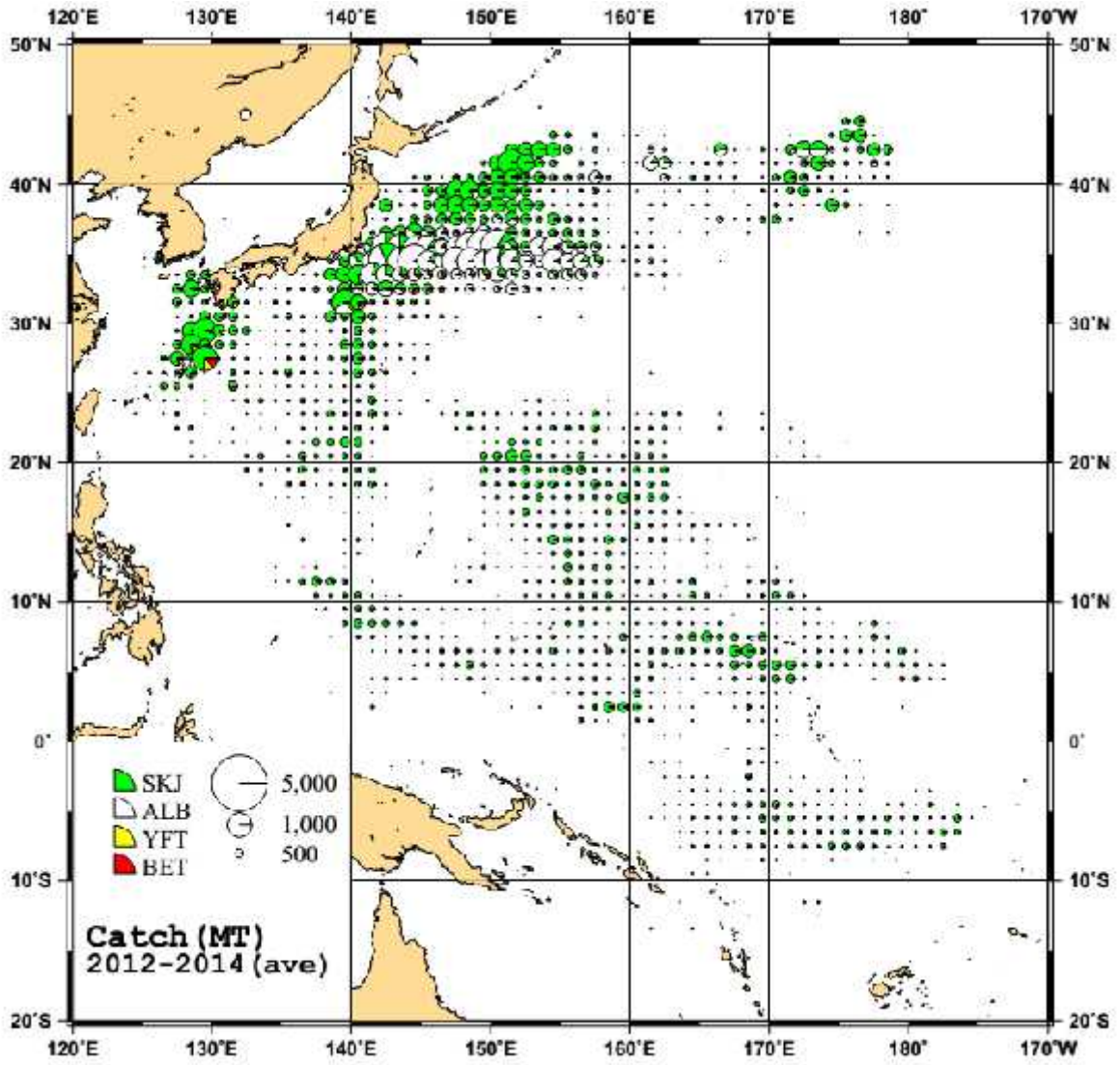

Fig. 9. Distribution of catch and its species composition for the Japanese offshore and distant water pole-and-line fishery in average of 2012-2014.

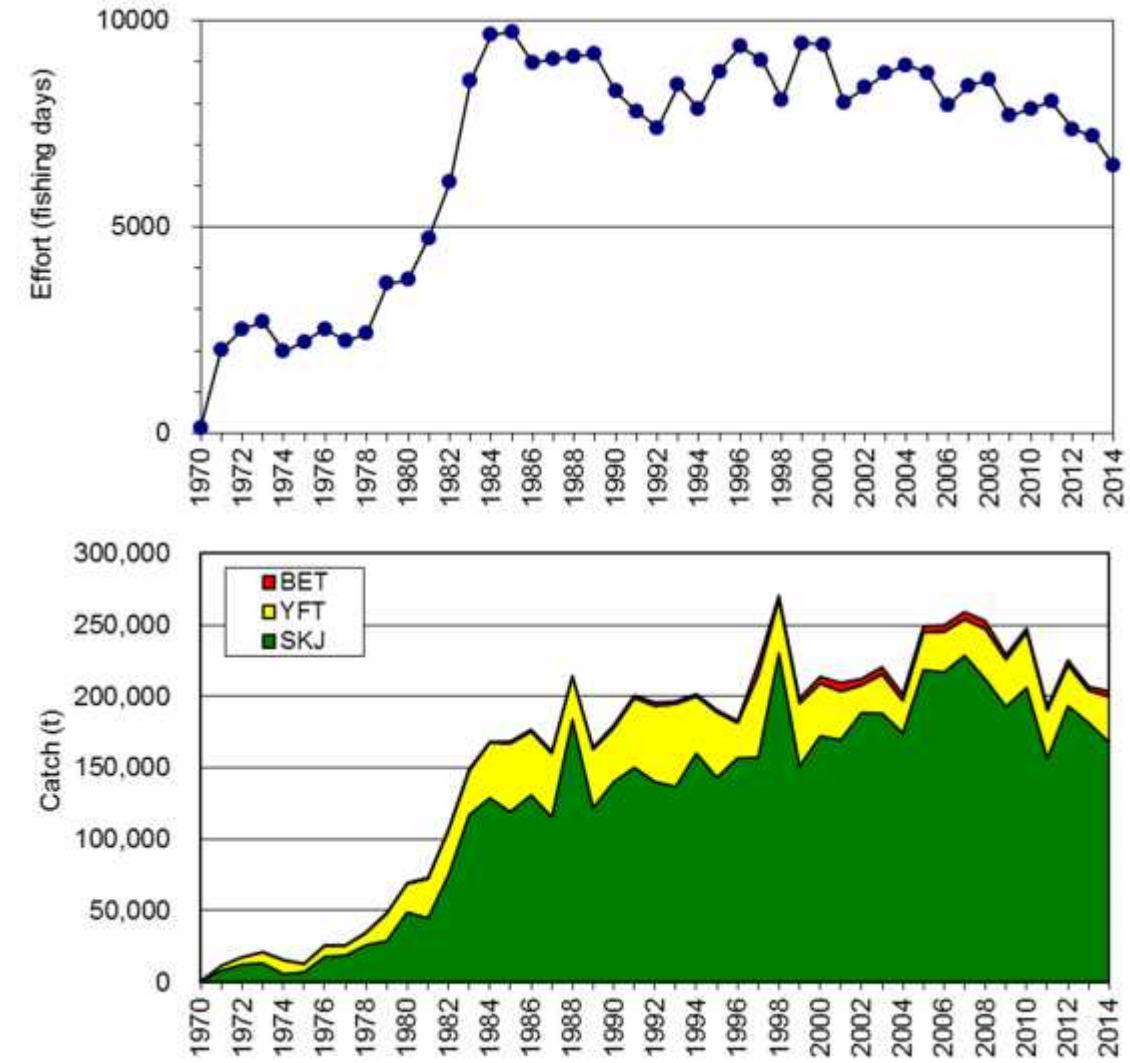

Fig. 10. Trends of fishing effort and catches by species for the Japanese tuna purse seine fishery in the WCPFC Convention Area. Values in 2013 and 2014 are provisional.

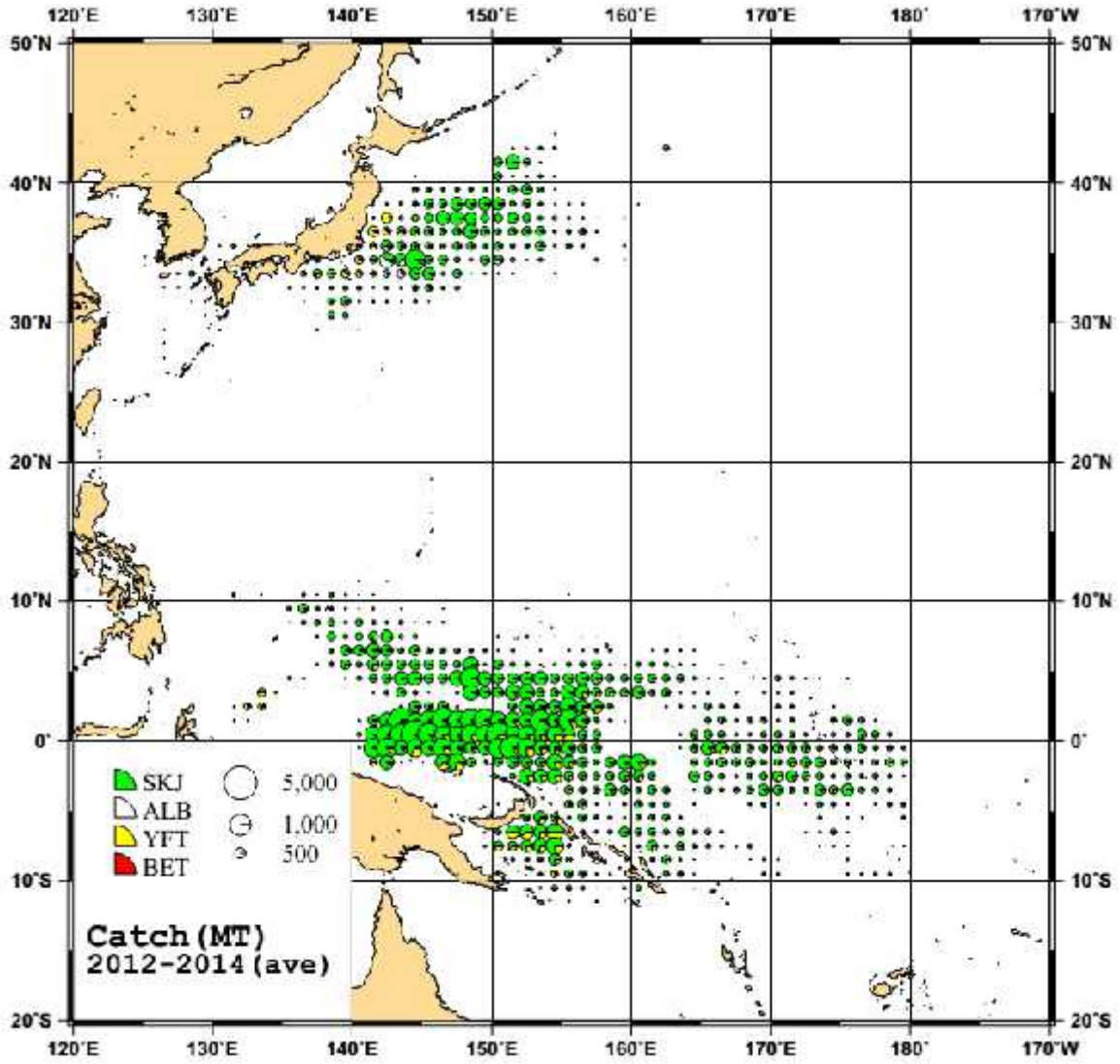

Fig. 11. Distribution of tuna purse seine catch (t) by species (skipjack, yellowfin and bigeye) combined for 2012-2014.

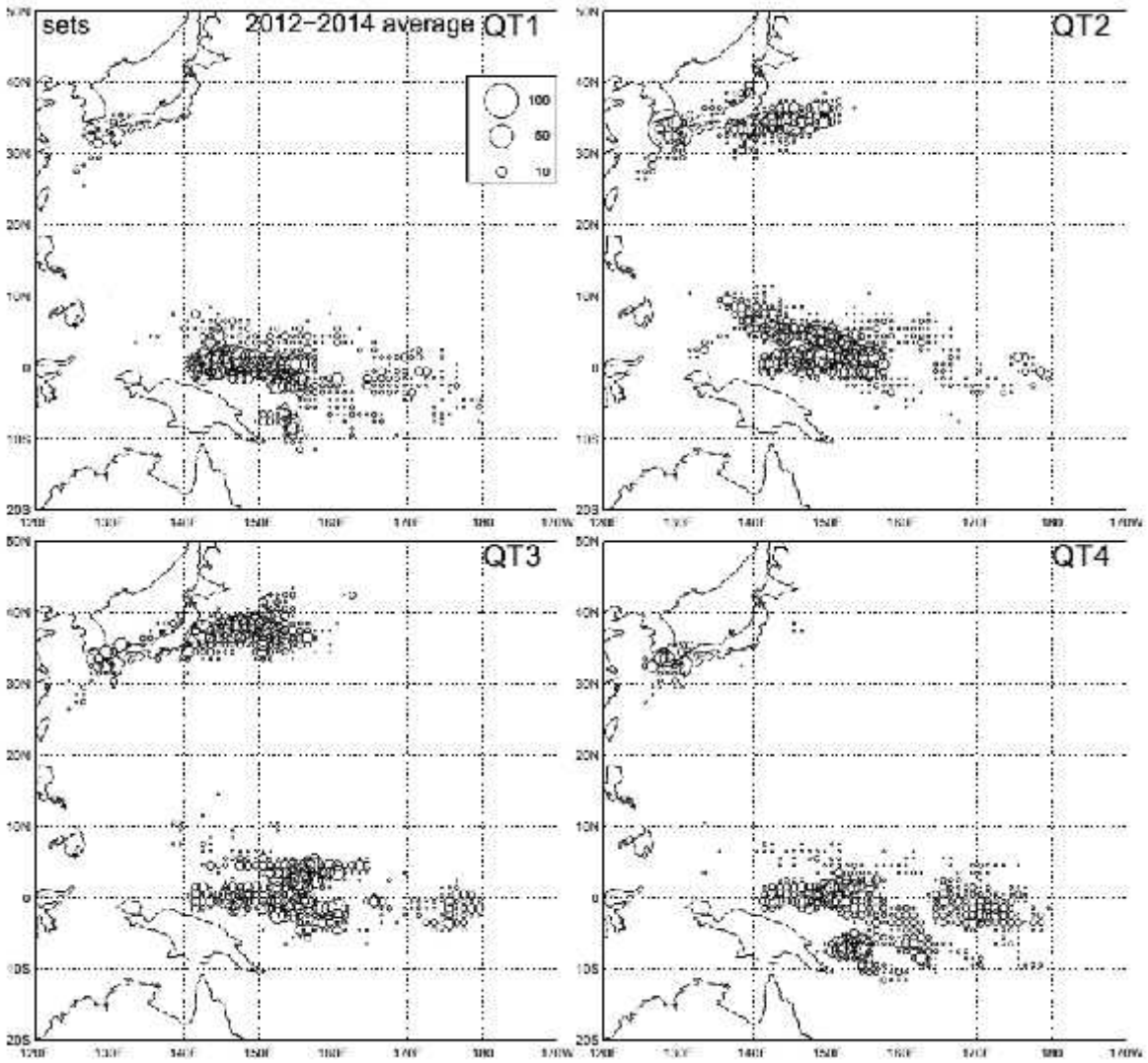

Fig. 12. Quarterly distributions of fishing effort (number of set) for the Japanese tuna purse seine fishery in the Pacific Ocean in 2012-2014.

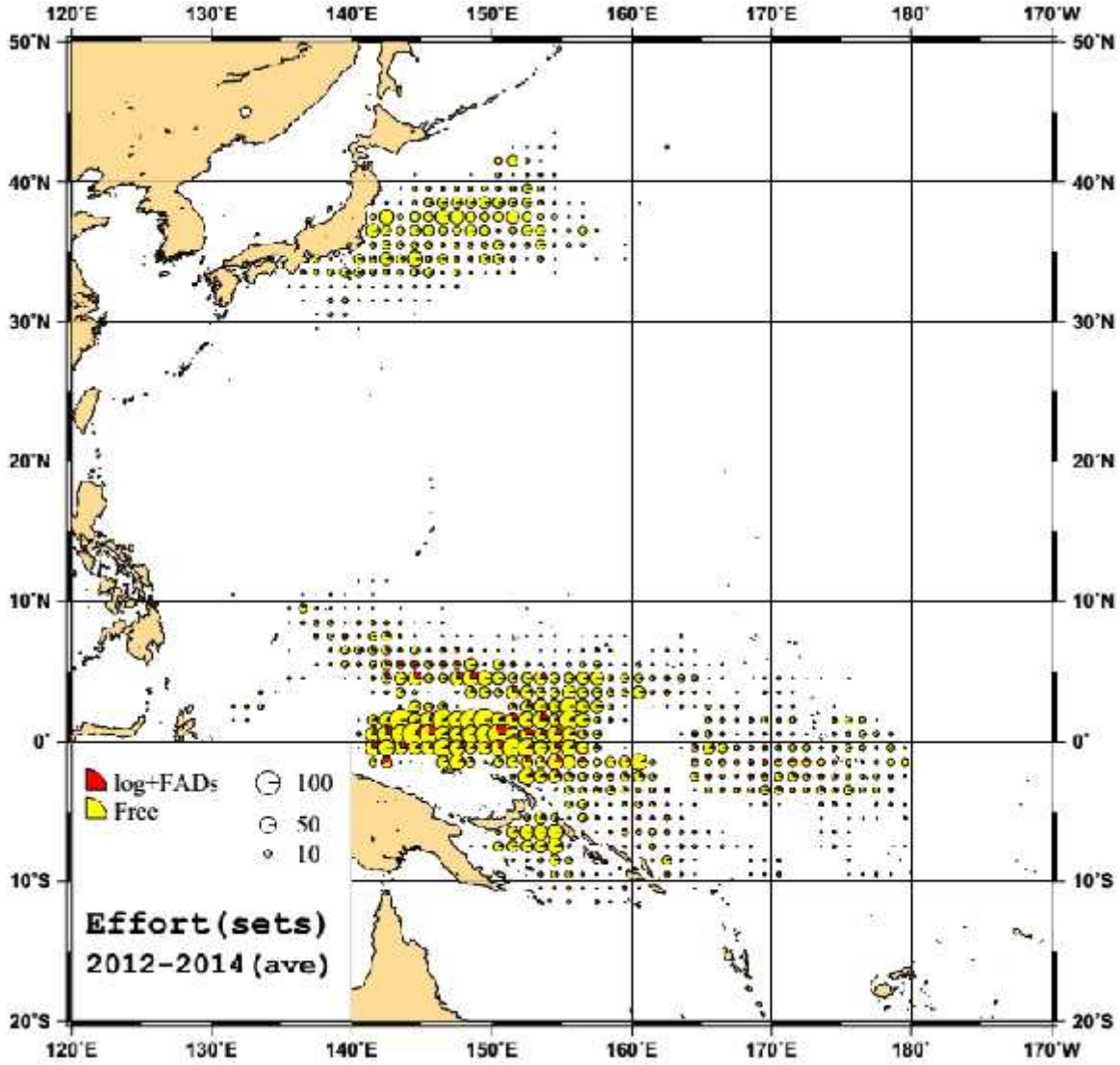

Fig. 13. Distribution of sets by type of school for 2012-2014 deployed by the tuna purse seine fishery by Japan.

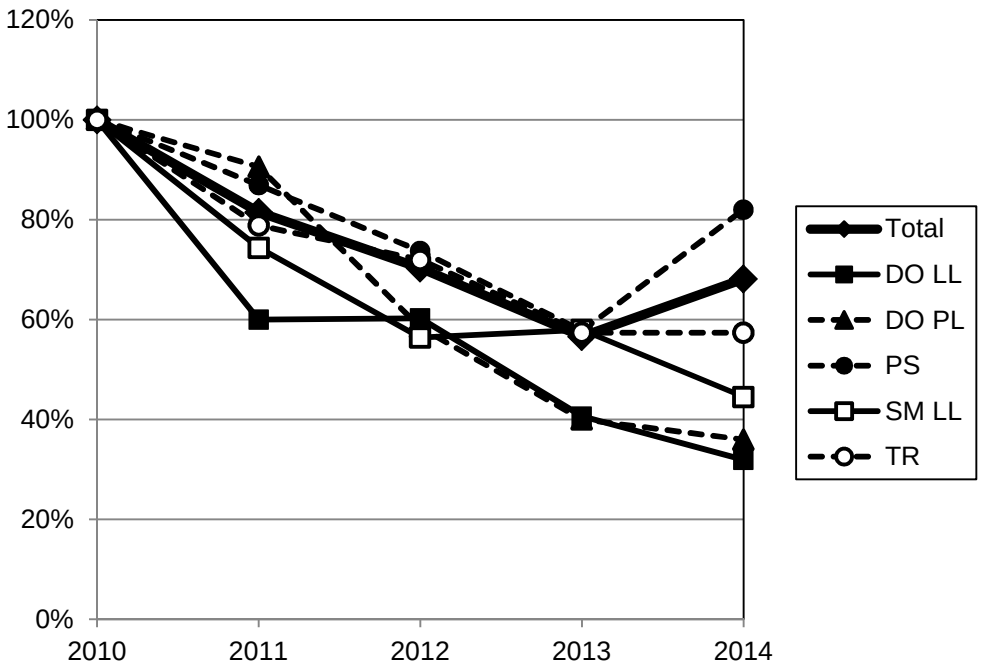

Fig. 14. Ratios of yellowfin catch for relatively large Japanese fisheries. The ratio was given as 100% of the catch in 2010. "Total" is sum of catches of the five fisheries and the other miscellaneous fisheries. See also Table 6.
DO LL = Distant water and Offshore LL
DO PL = Distant water and Offshore PL
PS = Tuna PS
SM LL = Small offshore LL
TR = Troll

Appendix Table 1. Catches (mt) for tunas, billfishes and sharks in the portion of the WCPFC Convention Area east of the 150˚ meridian of west longitude caught by distant-water and offshore longline fisheries.

Year	BET	YFT	SKJ	BUM	BLM	BSH	LMD	POR	SMA	OCS	THR	O-shk
2010	1,778	290	7	64	5	25	0	2	4	2	4	4
2011	1,144	244	4	45	1	87	0	1	22	9	2	11
2012	1,836	387	7	86	2	128	0	1	18	0	2	1
2013	(1,436)	(332)	(8)	(120)	(2)	(50)	(0)	(1)	(5)	(0)	(3)	(1)
2014	(790)	(209)	(2)	(66)	(1)	(30)	(0)	(0)	(1)	(0)	(0)	(0)

Appendix Table 2. Catches (mt) for Pacific bluefin, albacore, swordfish and striped marlin in the Pacific Ocean north of the Equator, the Pacific Ocean south of the Equator, the WCPFC Convention Area north of the Equator and the WCPFC Convention Area south of the Equator. Parenthesis represents provisional. In this table, definition of "Coastal longline" is vessel size less than 20 GRT, which is different from that in Table 5. All catches by troll and setnet gears are within territorial seas. Values in 2013 and 2014 are provisional.

Pacific bluefin tuna (1) in the Pacific Ocean north of the Equator

Year	LL	LL	PL	PS	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	(unspecified)	(unspecified)			
2010	885	5	83	3742	1583	1603	918
2011	828	9	63	8340	1820	1651	654
2012	667	6	113	2462	570	1932	779
2013	777	7	8	2771	904	1415	1012
2014	715	-	5	5456	1020	1903	847

Pacific bluefin tuna (2) in the Pacific Ocean south of the Equator

Year	LL	LL	PL	PS	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	(unspecified)	(unspecified)			
2010	0	6	0	0	0	0	0
2011	0	11	0	0	0	0	0
2012	0	8	0	0	0	0	0
2013	0	7	0	0	0	0	0
2014	0	-	0	0	0	0	0

Pacific bluefin tuna (3) in the WCPFC Statistical Area north of the Equator

Year	LL	LL	PL	PS	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	(unspecified)	(unspecified)			
2010	885	5	83	3742	1583	1603	918
2011	828	9	63	8340	1820	1651	654
2012	667	6	113	2462	570	1932	779
2013	777	7	8	2771	904	1415	1012
2014	715	-	5	5456	1020	1903	847

Pacific bluefin tuna (4) in the WCPFC Statistical Area south of the Equator

Year	LL	LL	PL	PS	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	(unspecified)	(unspecified)			
2010	0	6	0	0	0	0	0
2011	0	11	0	0	0	0	0
2012	0	8	0	0	0	0	0
2013	0	7	0	0	0	0	0
2014	0	-	0	0	0	0	0

Pacific bluefin tuna (5) in the portion of the WCPFC Statistical Area east of the 150°meridian of west longitude

Year	LL	LL	PL	PS	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	(unspecified)	(unspecified)			
2010	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0
2014	0	-	0	0	0	0	0

Appendix Table 2. (Continued)

Albacore (1) the Pacific Ocean north of the Equator

Year	LL	LL	PL	PL	PS	PS	Gillnet	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	Coastal	Offshore and distant-water	Coastal	Offshore and distant-water				
2010	17224	3943	135	19426	25	305	24	588	42	37
2011	16098	4858	57	25647	18	462	12	443	50	78
2012	17668	5160	92	33650	72	4121	26	610	48	129
2013	15110	4729	61	33507	3	1985	14	302	36	211
2014	14502	4853	61	33515	3	1985	14	302	36	211

Albacore (2) the Pacific Ocean south of the Equator

Year	LL	LL	PL	PL	PS	PS	Gillnet	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	Coastal	Offshore and distant-water	Coastal	Offshore and distant-water				
2010	0	4252	0	0	0	0	0	0	0	0
2011	0	5355	0	9	0	0	0	0	0	0
2012	0	4583	0	15	0	0	0	0	0	0
2013	0	3667	0	8	0	0	0	0	0	0
2014	0	2398	0	0	0	0	0	0	0	0

Albacore (3) the WCPFC Statistical Area north of the Equator

Year	LL	LL	PL	PL	PS	PS	Gillnet	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	Coastal	Offshore and distant-water	Coastal	Offshore and distant-water				
2010	17224	3955	135	19426	25	305	24	588	42	37
2011	16098	4721	57	25647	18	462	12	443	50	78
2012	17668	5004	92	33650	72	4121	26	610	48	129
2013	15110	4622	61	33507	3	1985	14	302	36	211
2014	14502	4794	61	33515	3	1985	14	302	36	211

Albacore (4) the WCPFC Statistical Area south of the Equator

Year	LL	LL	PL	PL	PS	PS	Gillnet	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	Coastal	Offshore and distant-water	Coastal	Offshore and distant-water				
2010	0	2920	0	0	0	0	0	0	0	0
2011	0	2630	0	9	0	0	0	0	0	0
2012	0	2581	0	15	0	0	0	0	0	0
2013	0	2157	0	8	0	0	0	0	0	0
2014	0	1567	0	0	0	0	0	0	0	0

Albacore (5) the portion of the WCPFC Statistical Area east of the 150°meridian of west longitude

Year	LL	LL	PL	PL	PS	PS	Gillnet	Troll	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water	Coastal	Offshore and distant-water	Coastal	Offshore and distant-water				
2010	0	136	0	0	0	0	0	0	0	0
2011	0	104	0	0	0	0	0	0	0	0
2012	0	213	0	0	0	0	0	0	0	0
2013	0	141	0	0	0	0	0	0	0	0
2014	0	58	0	0	0	0	0	0	0	0

Appendix Table 2. (Continued)

Swordfish (1) the Pacific Ocean north of the Equator

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	1158	4240	494	8	342
2011	973	3046	193	2	245
2012	1080	2946	371	8	351
2013	911	3319	290	13	459
2014	1039	4368	290	13	459

Swordfish (2) the Pacific Ocean south of the Equator

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	0	2835	0	0	0
2011	0	3437	0	0	0
2012	0	3915	0	0	0
2013	0	3528	0	0	0
2014	0	3624	0	0	0

Swordfish (3) the WCPFC Statistical Area north of the Equator

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	1158	3742	494	8	342
2011	973	2356	193	2	245
2012	1080	2568	371	8	351
2013	911	2883	290	13	459
2014	1039	3916	290	13	459

Swordfish (4) the WCPFC Statistical Area south of the Equator

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	0	560	0	0	0
2011	0	641	0	0	0
2012	0	675	0	0	0
2013	0	538	0	0	0
2014	0	396	0	0	0

Swordfish (5) the portion of the WCPFC Statistical Area east of the 150°meridian of west longitude

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	0	220	0	0	0
2011	0	250	0	0	0
2012	0	266	0	0	0
2013	0	227	0	0	0
2014	0	125	0	0	0

Appendix Table 2. (Continued)

striped marlin (1) the Pacific Ocean north of the Equator

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	832	187	913	20	104
2011	932	319	347	30	113
2012	980	326	597	52	96
2013	1092	358	336	39	86
2014	832	292	336	39	86

striped marlin (2) the Pacific Ocean south of the Equator

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	0	567	0	0	0
2011	0	764	0	0	0
2012	0	759	0	0	0
2013	0	600	0	0	0
2014	0	546	0	0	0

striped marlin (3) the WCPFC Statistical Area north of the Equator

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	832	128	913	20	104
2011	932	205	347	30	113
2012	980	261	597	52	96
2013	1092	249	336	39	86
2014	832	220	336	39	86

striped marlin (4) the WCPFC Statistical Area south of the Equator

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	0	197	0	0	0
2011	0	237	0	0	0
2012	0	164	0	0	0
2013	0	157	0	0	0
2014	0	121	0	0	0

striped marlin (5) the portion of the WCPFC Statistical Area east of the 150°meridian of west longitude

Year	LL	LL	Gillnet	Setnet	Others
	Coastal less than 20 GRT	Offshore and distant-water			
2010	0	14	0	0	0
2011	0	21	0	0	0
2012	0	29	0	0	0
2013	0	23	0	0	0
2014	0	18	0	0	0

Appendix Table 3. Albacore catch in mt and fishing effort in fishing days in the WCPCA north of the Equator. Figures in parentheses indicate provisional data. All catches by troll and setnet gears are within territorial seas. That was request written in **paragraph 4 of CMM-2005-03**.

(a) Catch

Year	LL Coastal	LL Offshore & distant-water	PL Coastal	PL Offshore & distant-water	PS Coastal	PS Offshore & distant-water	Gillnet	Troll	Setnet	Others
2010	17224	3800	135	19426	25	305	24	588	42	37
2011	16098	4721	57	25647	18	462	12	443	50	78
2012	17668	5004	92	33650	72	4121	26	610	48	129
2013	15110	4622	61	33507	2	1985	14	302	36	211
2014	14502	4794	61	33515	2	1985	14	302	36	211

(b)Effort

Year	LL Coastal	LL Offshore & distant-water	PL Coastal	PL Offshore & distant-water	PS Coastal	PS Offshore & distant-water	Gillnet	Troll	Setnet	Others
2010	45877	13084	NA	15541	NA	3304	NA	NA	NA	NA
2011	42996	12683	NA	13433	NA	7596	NA	NA	NA	NA
2012	38977	13818	NA	14646	NA	8449	NA	NA	NA	NA
2013	37216	13406	NA	12781	NA	7518	NA	NA	NA	NA
2014	33532	14941	NA	10805	NA	6995	NA	NA	NA	NA

Appendix Table 4. Striped marlin catch for the Japanese offshore and distant water longline fishery in the WCPCA south of 15˚S. This table was request written in **paragraph 4 of CMM-2006-04.**

Year	Striped marlin catch (t)
2010	158
2011	203
2012	134
2013	124
2014	100

Appendix Table 5. Catch in weight, of swordfish at south of 20° South of WCPFC statistical area by year with vessel statistics. "Vessel number" means number of vessels who caught at least one fish in this area in each year. There was no Japanese vessel that primarily fished swordfish. Figures in parentheses indicate provisional data. That was request written in **paragraph 8 of CMM-2009-03**.

Year	Japan-flagged vessels south of 20S		Chartered vessels		Other vessels fishing within the Japan's waters south of 20S		
	Catch (mt)	Vessel numbers	Catch (mt)	Vessel numbers	Flag	Catch (mt)	Vessel numbers
2010	192	26	0	0	--	--	--
2011	267	34	0	0	--	--	--
2012	297	29	0	0	--	--	--
2013	235	28	0	0	--	--	--
2014	238	26	0	0	--	--	--

Appendix Table 6-1. The total quantity (mt) of highly migratory fish stocks transshipped by fishing vessels in 2014. That was request written in **paragraph 8 of CMM-2009-06**.

1. Offloaded by Japanese longliners

1.1. By species

1.1.1 Catch inside the CA

	Port inside the CA	HS inside the CA	Port outside the CA	HS outside the CA
Bigeye	65	622	0	200
Yellowfin	21	109	0	80
Swordfish	3	66	0	26
Striped Marlin	1	3	0	7
Albacore	3	33	0	6
Others	44	156	0	56
Total	137	990	0	374

1.1.2. Catch outside the CA

	HS inside the CA	HS outside the CA
Bigeye	11	473
Yellowfin	14	139
Swordfish	8	65
Striped Marlin	0	32
Albacore	0	43
Others	1	103
Total	33	854

1.2. by product form

1.2.1. Catch inside the CA

	Port inside the CA	HS inside the CA	Port outside the CA	HS outside the CA
Gilled and Gutted	87	766	0	296
Gutted and Headed	25	98	0	21
Whole	25	104	0	3
Fillets	0	6	0	10
Others	0	16	0	44
Total	137	990	0	374

1.2.2. Catch outside the CA

	HS inside the CA	HS outside the CA
Gilled and Gutted	24	630
Gutted and Headed	9	109
Whole	0	36
Fillets	0	31
Others	0	48
Total	33	854

Appendix Table 6-1. (Continued)

2. Received by Japanese carriers from longliners.
2.1. By species
2.1.1 Catch inside the CA

	HS inside the CA	HS outside the CA
Bigeye	0	0
Yellowfin	0	0
Swordfish	0	0
Striped Marlin	0	0
Albacore	0	0
Others	0	0
Total	0	0

2.1.2. Catch outside the CA

	HS inside the CA	Port inside the CA
Bigeye	0	0
Yellowfin	0	0
Swordfish	0	0
Striped Marlin	0	0
Albacore	0	0
Others	0	0
Total	0	0

Appendix Table 6-2. The number of transshipments involving highly migratory fish stocks in 2014. That was request written in **paragraph 8 of CMM-2009-06**.

1. Offloaded by Japanese longliners
1.2. The number of transshipment

	Port inside the CA	HS inside the CA	Port outside the CA	HS outside the CA
Caught inside the CA	1	8	0	0
Caught both inside and outside the CA	0	7	0	12
Caught outside the CA	0	0	0	0
Total	1	15	0	12

2. Received by Japanese carriers from longliners.
2.2 The number of transshipment

	HS inside the CA	HS outside the CA
Caught inside the CA	0	0
Caught both inside and outside the CA	0	0
Caught outside the CA	0	0
Total	0	0

Appendix Table 7. Fishing effort and albacore catch for the Japanese offshore and distant water longline fishery in the south of 20S in the WCPCA. This table was request written in **paragraph 4 of CMM-2010-05**.

(a) Offshore and distant water longline

Year	Albacore catch (mt)
2010	1,111
2011	896
2012	1,803
2013	(1,321)
2014	(1,564)

(b) Offshore and distant water pole-and-line

Year	Vessels	Albacore catch (mt)
2010	0	0
2011	2	9
2012	3	15
2013	(2)	(8)
2014	(1)	(0)

Appendix Table 8. Catch (mt) for shark species in the WCPFC Convention Area by species for the Japanese distant and offshore (top table) and small offshore (bottom table) longline fisheries. Figures in the parentheses indicate provisional data. The catch for POR (porbeagle) in this table was the result of counting the value of field of "salmon shark or porbeagle" in the longline logbook only in south of 20° south. By 2012, catches of silky shark, hammerhead sharks and whale shark are included in other shark. This table was request written in **paragraph 4 of CMM-2010-07**.
BSH: Blue shark, LMD: Salmon shark, POR: Porbeagle shark, SMA: Shortfin mako shark,
OCS: Oceanic white-chip shark, THR: Thresher sharks nei, FAL: Silky sharks,
SPN: Hammerhead sharks nei, RHN: Whale shark, O-shk: other sharks

Distant water and offshore longlines

Year	BSH	LMD	POR	SMA	OCS	THR	FAL	SPN	RHN	O-shk
2010	14,103	168	3	764	120	180	-	-	-	108
2011	6,848	62	3	714	268	192	-	-	-	142
2012	10,860	467	1	751	46	84	-	-	-	27
2013	(9,603)	(205)	1	(606)	(0)	(113)	(0)	(0)	(0)	(139)
2014	(11,101)	(884)	(8)	(781)	(0)	(88)	(0)	(0)	(0)	(26)

Small offshore longline

Year	BSH	LMD	POR	SMA	OCS	THR	FAL	SPN	RHN	O-shk
2010	317	44	0	26	0	0	-	-	-	12
2011	459	12	0	24	0	0	-	-	-	9
2012	524	78	0	3	0	0	-	-	-	5
2013	(763)	(169)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(91)
2014	(729)	(268)	(0)	(5)	(0)	(0)	(0)	(0)	(0)	(3)

Appendix Table 9. The estimated and observed number of released oceanic whitetip shark on longline vessels in 2014. The estimated number of release was calculated by raising observed number to total number based on the observer coverage ratio in 2014 (see Appendix Table 13). This table was request written in **paragraph 3 of CMM-2011-04**.

Estimated (number)	Observed (number)	Estimated (number)
Alive	620	19
Dead	246	11

Appendix Table 10-1. Effort, observed and estimated seabird captures by the longliner larger than 20 GRT (approximately >=24m) by fishing year [South of 30˚S; 25˚S - 30˚S, 23˚N - 25˚S, or North of 23˚N]. For each year, the table gives the total number of hooks; the number of observed hooks; observer coverage (the percentage of hooks that were observed); the number of observed captures (both dead and alive); the capture rate (captures per thousand hooks). Figures in parenthesis indicate provisional data. This table was request written in **paragraph 9 in the part of seabirds of CMM-2012-07**.

South of 30S

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2014	26	5,928,860	694,532	11.7%	410	0.590

25S - 30S

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2014	16	1,955,199	195,056	10.0%	16	0.082

23N - 25S

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2014	98	23,623,439	569,045	2.4%	0	0.000

North of 23N

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2014	54	18,767,409	325,801	1.7%	47	0.144

Appendix Table 10-2. Effort, observed and estimated seabird captures by the longliner less than 20 GRT (approximately <24m) by fishing year [South of 30˚S; 25˚S - 30˚S, 23˚N - 25˚S, or North of 23˚N]. For each year, the table gives the total number of hooks; the number of observed hooks; observer coverage (the percentage of hooks that were observed); the number of observed captures (both dead and alive); the capture rate (captures per thousand hooks). Figures in parenthesis indicate provisional data. This table was request written in **paragraph 9 in the part of seabirds of CMM-2012-07**.

23N - 25S

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2014	130	23,009,487	634,417	2.8%	1	0.002

North of 23N

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2014	214	58,110,071	592,253	1.0%	98	0.165

Appendix Table 11-1. Number of observed seabird captures in the longliner larger than 20 GRT (approximately >=24m), 2014, by species and area. This table was request written in **paragraph 9 in the part of seabirds of CMM-2012-07**.

Species	South of 30˚S	25˚S-30˚S	23˚N-25˚S	North of 23˚N	Total
Wandering albatross	12	3	0	0	15
Gibson's albatross	5	0	0	0	5
Wandering albatross group	44	7	0	0	51
Royal albatross group	1	0	0	0	1
Black-browed albatross	3	0	0	0	3
Campbell albatross	18	0	0	0	18
Black-browed albatross group	31	2	0	0	33
Buller's albatross group	142	0	0	0	142
Shy-type albatrosses	66	0	0	0	66
Laysan albatross	0	0	0	26	26
Black-footed albatross	0	0	0	7	7
Unidentified albatrosses	22	0	0	1	23
Northern giant petrel	1	0	0	0	1
White-chinned petrel	20	0	0	0	20
Grey petrel	1	1	0	0	2
Parkinson's petrel	1	0	0	0	1
Flesh-footed shearwater	9	2	0	0	11
Unidentified petrels	5	0	0	0	5
Southern skua	3	0	0	0	3
Unidentified birds	26	1	0	13	40
Total	410	16	0	47	473

Appendix Table 11-2. Number of observed seabird captures in the longliner less than 20 GRT (approximately <24m), 2014, by species and area. This table was request written in **paragraph 9 in the part of seabirds of CMM-2012-07**.

Species	South of 30˚S	25˚S-30˚S	23˚N-25˚S	North of 23˚N	Total
Laysan albatross	-	-	0	39	39
Black-footed albatross	-	-	0	48	48
Unidentified albatrosses	-	-	0	1	1
Streaked shearwater	-	-	1	8	9
Unidentified birds	-	-	0	2	2
Total	-	-	1	98	99

Appendix Table 12. The estimated and observed number of released silky shark on longline vessels in 2014. The estimated number of release was calculated by raising observed number to total number based on the observer coverage ratio in 2014 (see Appendix Table 13). This table was request written in **paragraph 3 of CMM-2013-08**.

Estimated (number)	Observed (number)	Estimated (number)
Alive	2,977	130
Dead	2,855	120

Appendix Table 13. Tentative observer coverage for the Japanese longline fishery for 2014 as of July 1, 2015. This table was request written in **paragraph 4 of CMM-2007-01**.

CCM Fleet	Fishery	No. of Hooks			Days Fished			Days at Sea			No. of Trips		
		Total estimated	Observer	%	Total estimated	Observer	%	Total estimated	Observer	%	Total estimated	Observer	%
Japan	Ice/Fresh, short-trip				29,254	825	2.82%						
	Frozen, long-trip				9,528	544	5.71%						