Japan National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2020

Fisheries Resources Institute, Japan Fisheries Research and Education Agency
(Matsumoto, Inoue, Nishida and Semba)
and
Fisheries Agency, Government of Japan (FAJ)

INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

In accordance with IOTC Resolution 15/02, final scientific data for the previous year was provided to the IOTC Secretariat by 30 June of the current year, **for all fleets other than longline** [e.g. for a National Report submitted to the IOTC Secretariat in 2020, final data for the 2019 calendar year must be provided to the Secretariat by 30 June 2020)	YES 23/June/2020
In accordance with IOTC Resolution 15/02, provisional **longline data** for the previous year was provided to the IOTC Secretariat by 30 June of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2020, preliminary data for the 2019 calendar year was provided to the IOTC Secretariat by 30 June 2020). **REMINDER:** Final longline data for the previous year is due to the IOTC Secretariat by 30 Dec of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2020, final data for the 2019 calendar year must be provided to the Secretariat by 30 December 2020).	YES 23/June/2020
If no, please indicate the reason(s) and intended actions:	

Executive Summary

This Japanese national report describes following eight relevant topics stipulated in the 2020 national report guideline mainly in recent five years (2015-2019) (2019 is provisional) , i.e. (1) Fishery information (longline and purse seine fishery), (2) fleet information, (3) catch and effort by species and gear, (4) ecosystem and bycatch (sharks, seabirds, marine turtles), (5) national data collection and processing systems including "logbook data collection and verification", "vessel monitoring system", "observer scheme", "port sampling programs" and "unloading and transshipment", "Monitoring billfish catch", and sampling plans for mobulid rays", (6) national research programs, (7) Implementation of Scientific Committee recommendations and resolutions of the IOTC relevant to the Scientific Committee", and (8) "literature cited". Highlights from the eight topics are described as follows: Japan is currently operating longline and purse seine fisheries in the Indian Ocean. Catch and effort data are collected mainly through logbooks. Bigeye, yellowfin, albacore, southern bluefin tuna are main components of the catch by longliners, while three species (skipjack, yellowfin and bigeye tuna) are exploited by purse seiners. In recent years, catch and effort by longliners are in a low level mainly because of piracy activities off Somalia. Japan has been dispatching scientific observers in accordance with the Resolution 11/04, whose coverage has been more than the 5% compliance level in recent years. A number of information including bycatch and biological data, has been collected through the observer program. Japan has been conducting several research activities.

Contents

1. BACKGROUND/GENERAL FISHERY INFORMATION

Longline and purse seine fisheries are two types of Japanese tuna fisheries currently operating in the Indian Ocean. Longline fishery started its operation in 1952 when the limitation of operational area imposed by the GHQ*[1], was removed. Commercial purse seine fleet commenced fishing operations in the Indian Ocean in 1991 after several years of experimental fisheries.

The total fishing effort (the number of hooks) of Japanese longliners in the Indian Ocean sharply increased from 2 million (1952) to 129 million hooks (1967) (the historically highest level), and then there was no clear increasing or decreasing trend with large fluctuation (52-128 million hooks) until 2007. Thereafter, it decreased down to about 28 million hooks in 2011 due to piracy activities off Somalia. It has been kept at the low level with slight decrease and 20 million hooks in 2019. The percentage compositions of fishing effort (number of hooks) in this Ocean against the total effort in all Oceans fluctuated around 20% until 2003, afterwards it increased to 35% in 2006 and 2007. Thereafter it has drastically decreased to 16% in 2010 and kept at a low level (10-19%) to now, mainly because of piracy activities.

As for the purse seine fisheries, operations took place mainly in the tropical western Indian Ocean until 1993. Afterwards operations shifted almost completely to the eastern Indian Ocean mainly because of economic

* *GHQ (General Headquarters) of the occupying forces of the Allies after the World War II*

problem derived from the rise of Japanese Yen during that time, in addition to the extra cost imposed due to the long geographical distances from Japan.

2. FLEET STRUCTURE

All Japanese longline vessels operating in the Indian Ocean have been the distant water category (120-500GRT) with some exceptional offshore vessels (10-120GRT). Historical change in the number of longline vessels from 1987 to 2019 is shown in Table 1. In the last 20 years, the number of vessels operated in this Ocean was around 172-228 per year until 2008. Although the number of operating vessels was relatively large in number (223-251) during 1995-1999, after that it decreased to less than 200 except for 228 in 2002. It decreased rapidly year by year until 2011 because of piracy activities off Somalia, and kept in a low level (41-57) after 2013. The number of longline vessels operated in 2019 was 50.

Japanese purse seine vessels operating in the Indian Ocean are the 350-700 GRT class (700-1,000 carrying capacity). Historical change in the number of purse seine vessels from 1987 to 2019 is shown in Table 1. Although 11-12 Japanese purse seiners operated during 1991-1994, it decreased year by year and commercial purse seiner retreated from the Indian Ocean in 2001 leaving only one vessel "Nippon-Maru", the research vessel of Fisheries Research Agency (FRA) with a few commercial vessels. This vessel was replaced by another research vessel "No.1 Taikei-Maru" in 2013. Since 2015 commercial vessels have resumed their operations and the number of total vessels in each year operated during 2015-2019 was 3.

Table 1: Number of vessels operating in the IOTC area of competence

Fleet/Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Longliners	272	235	245	216	184	181	206	206	224	251	243	242	223	192
Purse seiners	1	1	3	4	11	12	11	11	8	5	3	4	3	2

Fleet/Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Longliners	199	228	172	189	184	188	178	173	130	84	72	75	57	53
Purse seiners	2	1	1	1	1	3	3	3	2	1	1	1	1	1

Fleet/Year	2015	2016	2017	2018	2019
Longliners	52	45	41	46	50
Purse seiners	3	3	3	3	3

3. CATCH AND EFFORT (BY SPECIES AND GEAR)

3.1 Longline fishery

The latest available longline data is that of 2019 (data for 2019 are preliminary).

Fishing effort

The longline fishery commenced in 1952 in the eastern equatorial waters in the Indian Ocean. In the late 1960s, the effort covered entire fishing ground of the longline in the Indian Ocean. The annual amount of the effort had increased until the late 1960s and fluctuated after that. However, fishing effort had been dramatically decreasing since 2008 and then kept at a low level (Table 2a) because of the effects of piracy activities off Somalia. Fishing effort in 2019 (20,000 thousand hooks) was only about 19% of that in 2007 during the recent highest level.

Table 2a. Annual catch and fishing effort and primary species in the IOTC area of competence (longline fishery, 2015-2019) as of October 2020 (2019 is provisional)

Include a 'not elsewhere indicated – NEI' category for all other catches combined. [Note: Multiple tables may be required e.g. **Table 2a, 2b, 2c).**

(catch in mt, set in number and hooks in thousand)

Year	Set	Hooks	SBT	ALB	BET	YFT	SWO	MLS	BLZ	BLM	SFA	SPF	SKJ
2015	9,181	28,959	1,864	2,917	4,875	3,138	706	23	137	49	60	109	14
2016	8,583	27,050	1,616	2,367	4,039	2,967	722	98	122	48	33	61	8
2017	7,346	23,378	1,250	1,668	3,739	3,290	566	61	139	48	56	66	8
2018	6,975	22,207	2,097	1,807	3,398	2,975	500	34	111	27	63	47	11
2019	6,338	19,972	2,480	1,916	3,844	2,529	452	17	80	26	51	25	15

(Note) SBT (Southern bluefin tuna), ALB (albacore), BET (bigeye tuna), YFT (yellowfin tuna), SWO (swordfish), MLS(striped marlin), BLZ(blue marlin), BLM(black marlin), SFA(sailfish), SPF(longbill spearfish), and SKJ (skipjack tuna).

Geographical distributions of longline fishing efforts for 2019 and average of 2015-2019 are shown in Fig. 2a. In 2019, the efforts were mainly in African offshore area (from the waters off Cape of Good Hope to Mozambique) and in the eastern part of the Indian Ocean off Australia and Indonesia, which is similar to that for 2015-2019. The effort in the northwestern area has dramatically decreased since 2008 and the efforts for 2015-2019 is still almost nothing because the threats of piracy remains off Somalia.

Catch

Historical catch in weight by species and catch statistics for 2015-2019 by Japanese tuna longliners in the Indian Ocean are shown in Fig. 1a and Table 2a, respectively, and geographical distributions of catch in 2019 and average of 2015-2019 for major tuna and billfish species are shown in Fig. 3a. Catch of albacore, yellowfin and southern bluefin tunas were very high during 1950s and 1960s, and then sharply decreased. After mid 1990s bigeye and yellowfin tunas have been main components of the catch.

Total catch (the catch of southern bluefin tuna, albacore, bigeye, yellowfin, swordfish, striped marlin, blue marlin, black marlin, sailfish, shortbill spearfish, and skipjack) in 2018 and 2019 was 11,074MT and 11,440MT, respectively. It should be noted that the catch of yellowfin and bigeye drastically decreased during 2007-2010, although the catch of albacore was roughly at the same level during this period. Furthermore, bigeye catch in 2018 and yellowfin catch in 2019 were the lowest after 1980s, and this decrease was mainly derived from decrease in fishing effort especially in the tropical area especially in the piracy area (northwestern Indian Ocean).

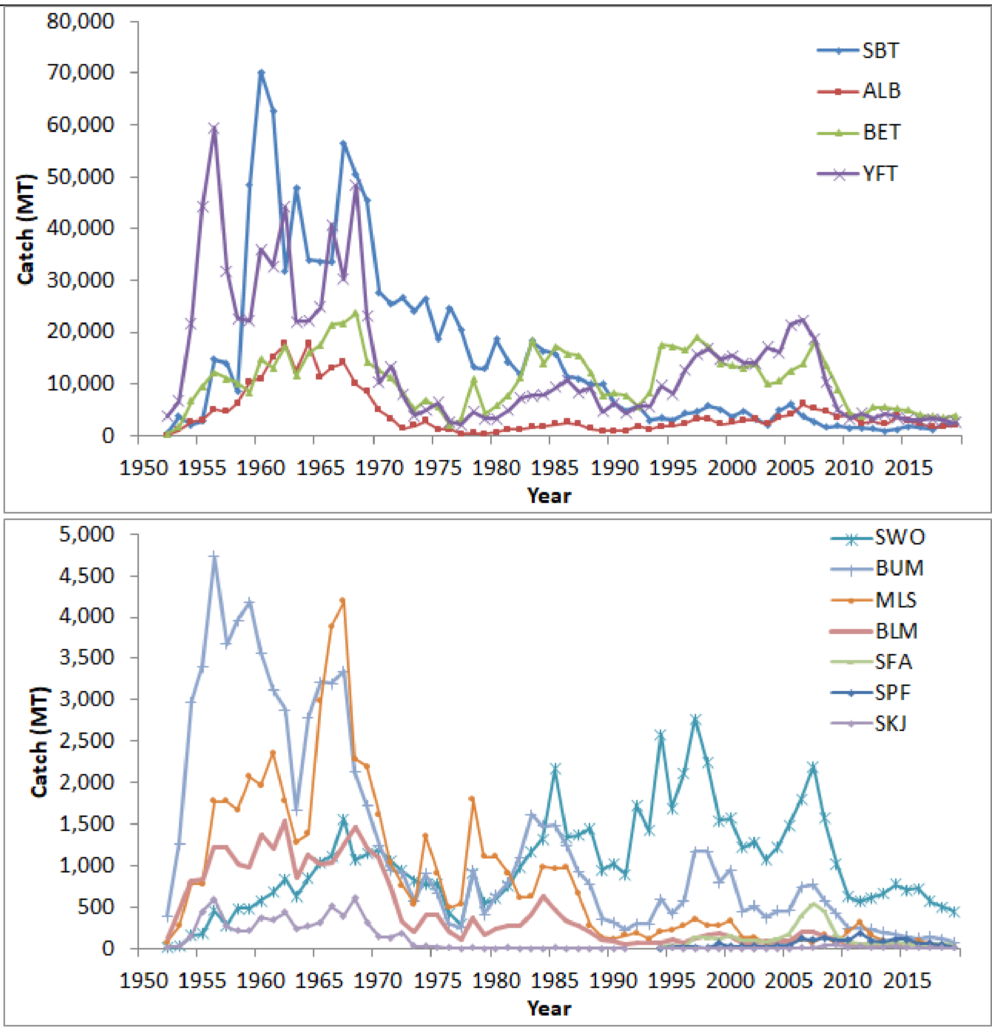

Fig. 1a. Catch trends of tuna and tuna-like species exploited by Japanese longliners

(2019 is provisional).

Upper: tuna species, lower: billfish species and skipjack tuna

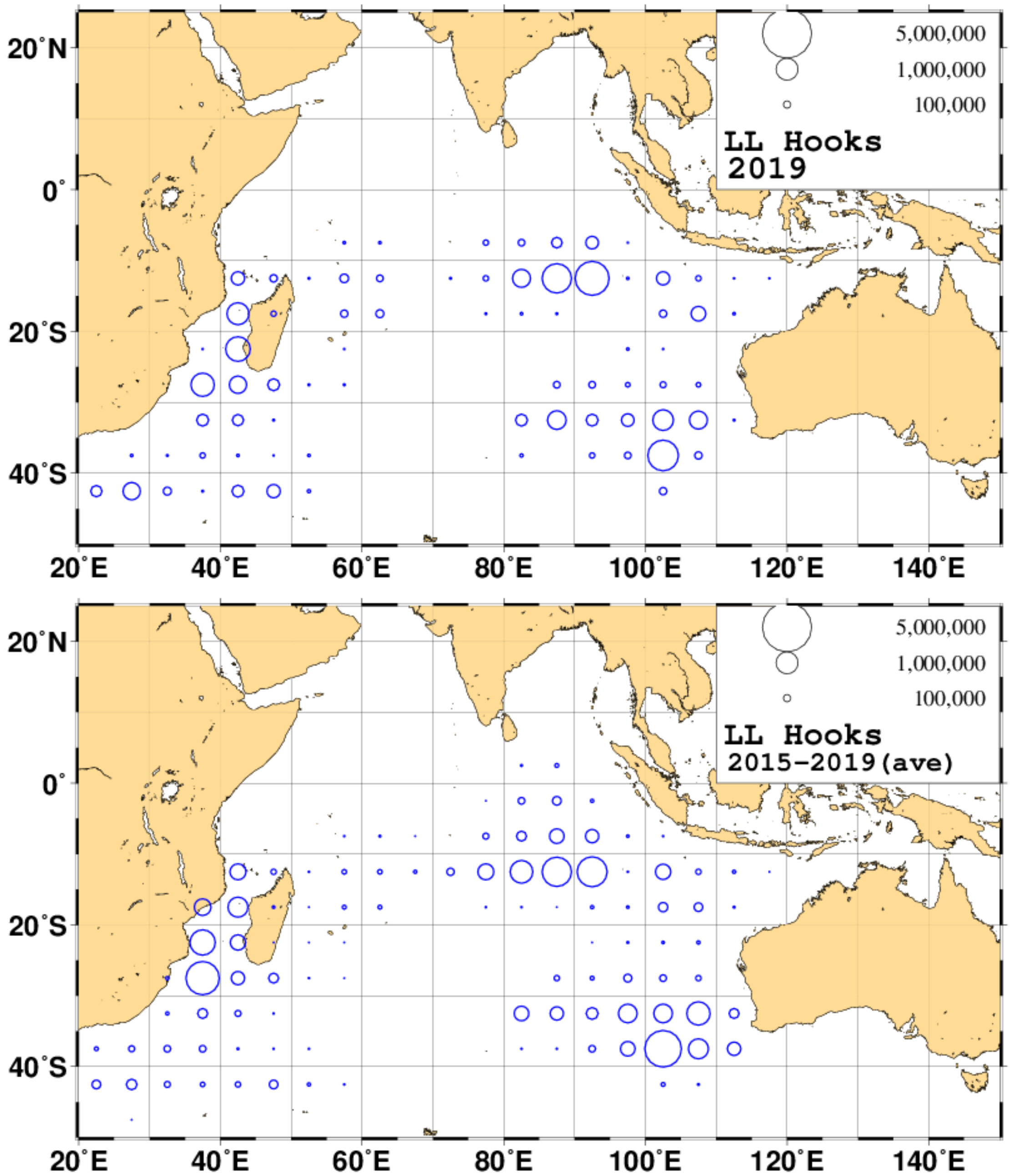

Fig 2a. Geographical distributions of longline fishing effort (in hooks) for 2019 (above) and average of 2015-2019 (below) *(2019 is provisional).*

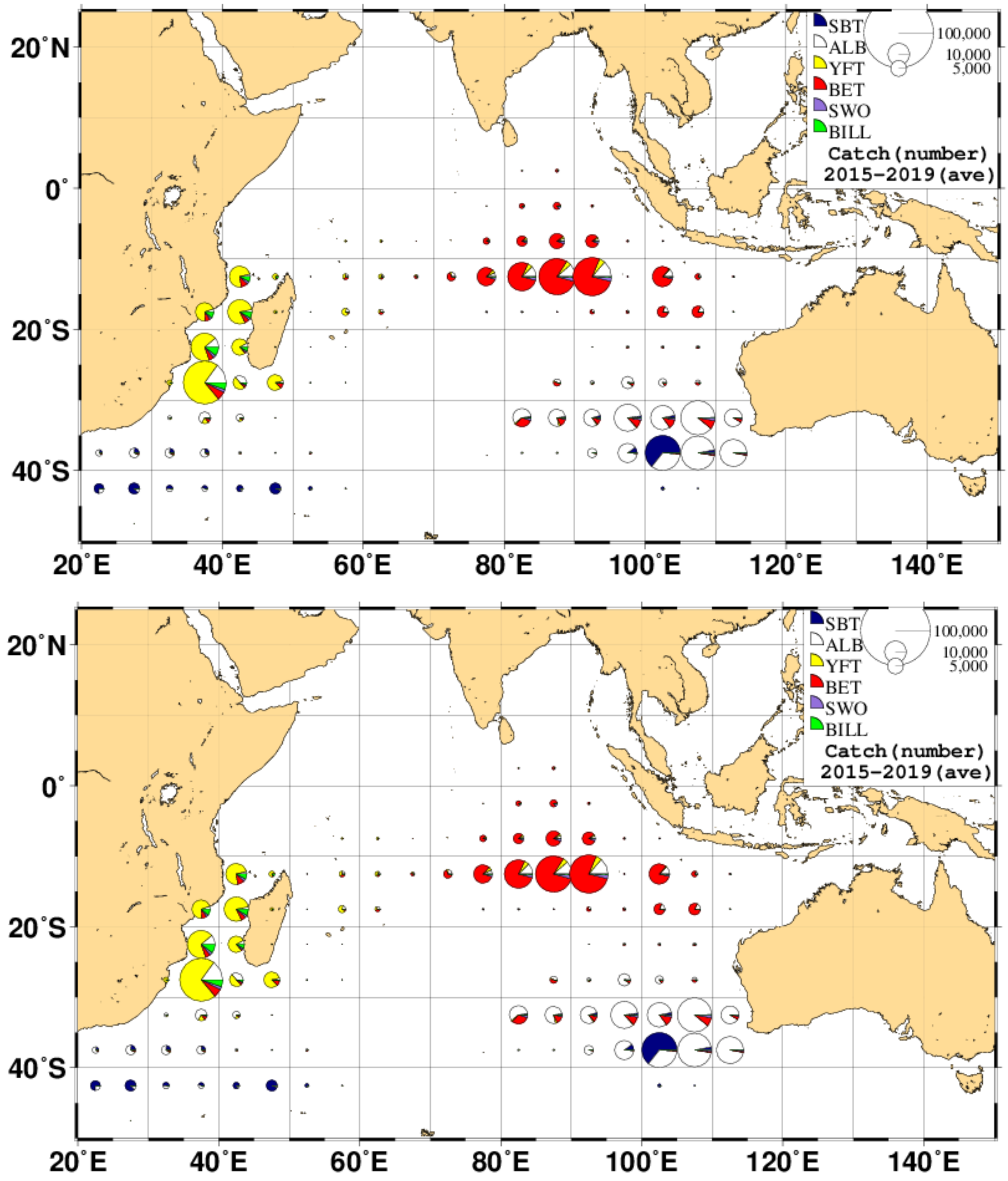

Fig. 3a Geographical distributions of longline catch (in number) of major species in 2019 (upper) and in average of 2015-2019 (lower) *(2019 is provisional)***.**

Based on the geographical distribution of the catch (Fig. 3a), yellowfin and bigeye tunas are mainly caught off Mozambique and the central-eastern tropical waters, respectively. Albacore is mainly caught in the temperate area off Australia. During 2015-2019, there was almost no efforts in the northwestern area (good yellowfin fishing grounds), which has been similar situation since 2011 when the piracy activities started. Hence, longliners shifted their operations to the other waters especially off Mozambique and the southeastern Indian Ocean.

3.2 Purse seine fishery

The latest available data for Japanese purse seine fishery is for 2019 (provisional).

Fishing Effort

Total fishing effort (number of set) was 201 in 2017 and 147 in 2018 (Table 2b). These are larger than those in the early 2010s due to the increase in the number of vessels (from 1 to 3). Fishing effort (number of set) in 2019 sharply decreased to 9 because the fishing conditions were extremely poor thus fishing operations ended very quickly in a very short time then purse seine vessels shifted to the Pacific Ocean. Geographical distributions of effort for 2019 and the average of 2015-2019 are shown in Fig. 2b. Operations were conducted almost only in the eastern part in recent years.

Table 2b. Annual catch and effort and primary species in the IOTC area of competence (2015-2019) (purse seine fisheries).

		Catch (MT)				
Year	Number of set	SKJ	YFT	BET	others	Total
2015	154	2,140	338	294	0	2,772
2016	146	2,357	422	258	0	3,037
2017	201	3,129	712	424	0	4,265
2018	147	2,076	407	287	0	2,770
2019	9	187	24	24	0	235

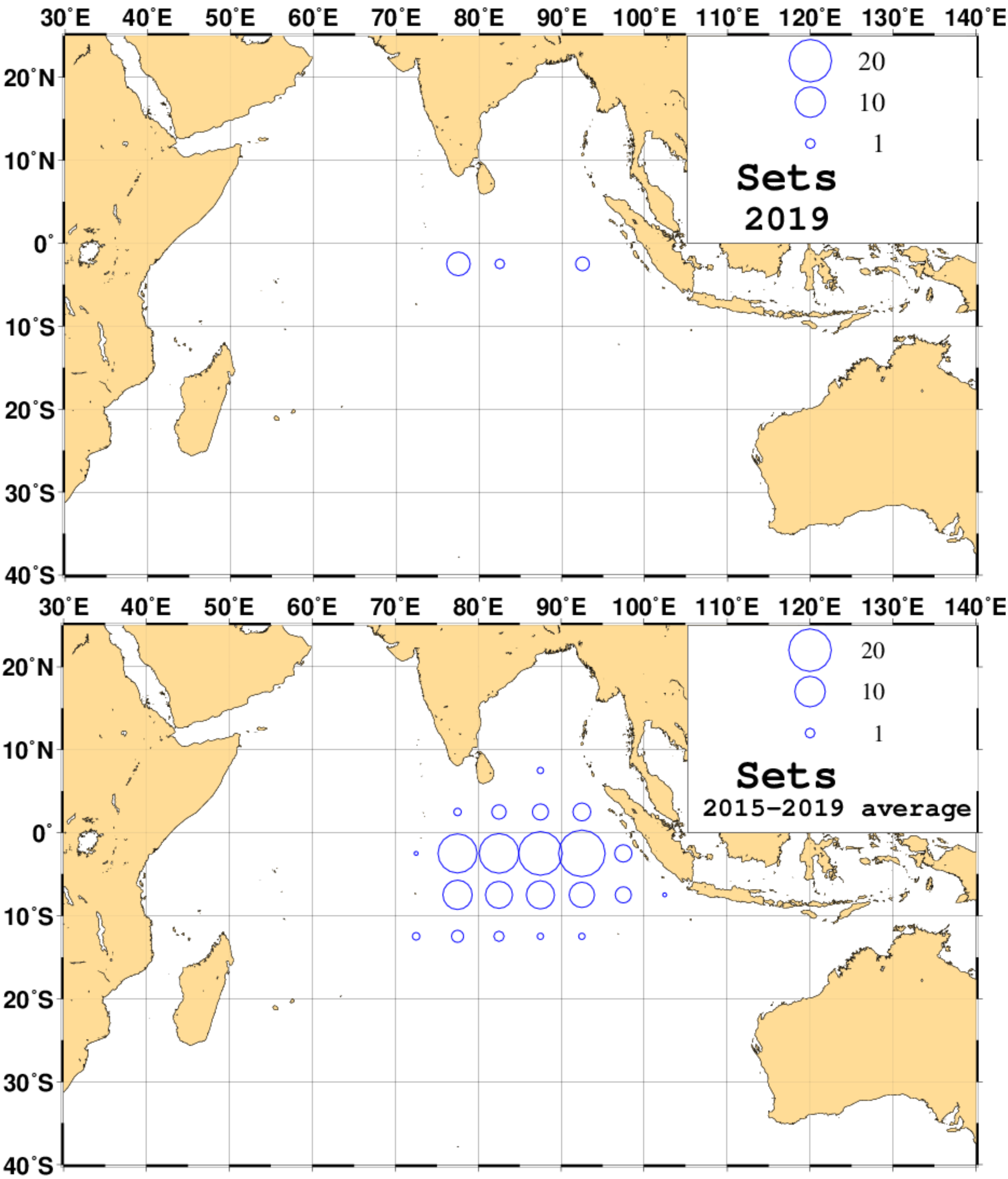

Fig. 2b. Distributions of purse seine fishing effort in the Indian Ocean in 2019 (upper) and average of 2015-2019 (lower) *(2019 is provisional).*

Catch

During 1972-1987, the total catch was low (< 1,000 MT except 3 years), afterwards increased rapidly to about 45 thousand MT in 1992 and 1993 (the highest record), then decreased sharply to 10 thousand MT in 1997 and 7 thousand MT in 1999 (Fig. 1b). Thereafter it had fluctuated between 2.2 and 6.2 thousand MT until 2012 and the total catch in 2013 and 2014 decreased to approximately 1 thousand MT. Total catch in 2015 increased to 2.8 thousand MT because of increase in the number of vessels operated, and further increased until 2017 (4.3 thousand MT in 2017). The catch drastically decreased in 2019 due to decrease in fishing effort as explained. Catch in weight of skipjack, yellowfin and bigeye in 2019 (2018) was 187 (2,076) MT, 24 (407) MT and 24 (287) MT, respectively.

Geographical distributions of catch in 2019 and average of 2015-2019 for major tuna species are shown in Fig. 3b. The main component of the catch was usually skipjack tuna in all the areas then yellowfin and/or bigeye tuna followed.

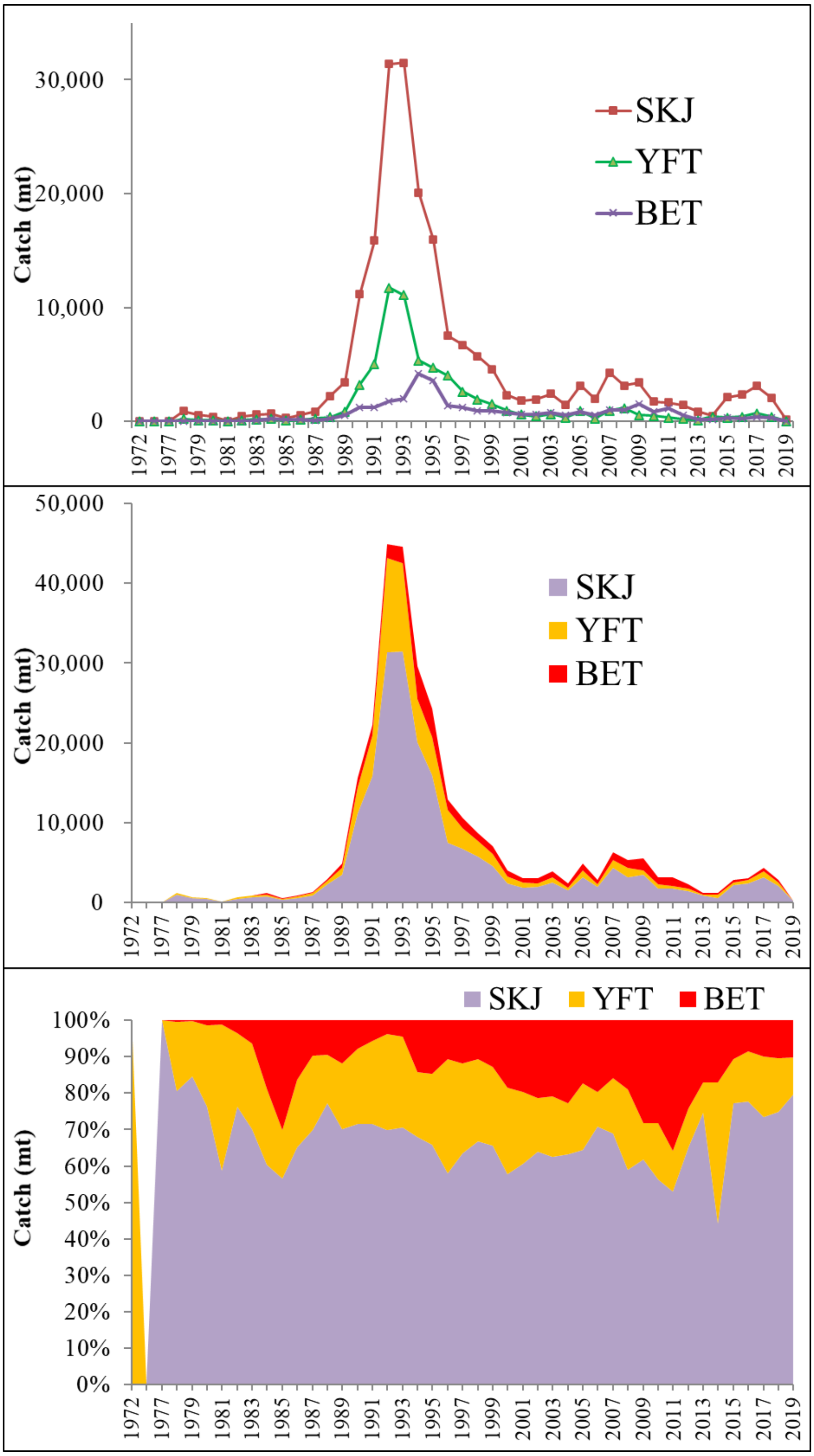

Fig1b. Trends of SKJ, YFT and BET catch *(top: actual and middle: cumulative)*
and trends of species compositions of catch *(bottom)* **exploited by Japanese purse seiners (1972-2019)**
(2019: provisional)

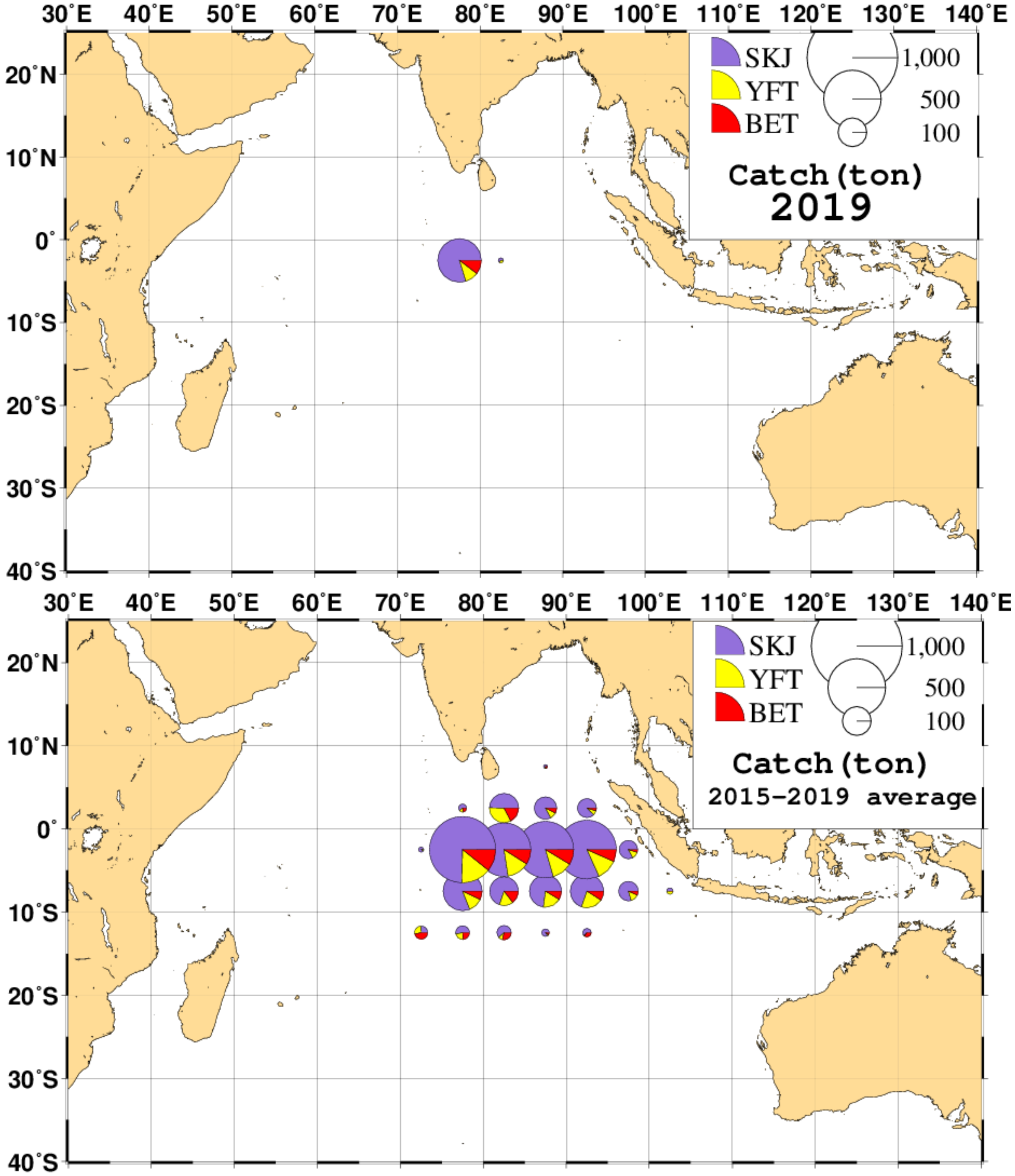

Fig. 3b. Geographical distributions of purse seine catch of SKJ, YFT and BET in 2019 *(upper)* **and average of 2015-2019** *(lower) (2019 is provisional)*

4. RECREATIONAL FISHERY

No recreational fishery in the Indian Ocean.

5. ECOSYSTEM AND BYCATCH ISSUES

In accordance with FAO International Action Plans on sharks and seabirds, Japan established the National Action Plans on sharks and seabirds in 2001 then revised in 2009 and 2016. In addition, Japan has been taking actions in accordance with the FAO Guidelines on sea turtle by-catch and also taking actions in accordance with IOTC conservation and management measures on by-catch of sharks, sea turtles and seabirds.

5.1 Sharks

5.1.1. NPOA sharks

Japan's National Plan of Action for Conservation and Management of Sharks was established in February 2001 and then revised in 2009 and 2016.

5.1.2. Sharks finning regulation

Japan complies with Resolution 17/05 (IOTC) including the ban of shark finning for Japanese fleet operating in the Indian Ocean under ministerial ordinance of Fisheries Act since 2008.

5.1.3. Blue shark

The Japanese longline fishery in the Indian Ocean catches blue shark. Catch data (in number and weight) of blue shark has been collected since 1994. Details of logbook data collection and verification is described in 6.1. Historical catches of three major shark species including blue shark in weight (MT) between 2015 and 2019 are shown in Table3.

As described in 6.3., scientific observers deployed to the Japanese tuna longliners have collected catch (in number and weight), biological and other information including body size, sex, fate of blue shark caught in the Indian Ocean since 2010.

Table 3 **Annual catch in weight (MT) of three major shark species caught by Japanese tuna longliners in the Indian Ocean (2015-2019)** *(2019 is provisional).*

Year	Blue shark	Porbeagle	Shortfin mako
2015	974	4	111
2016	495	4	99
2017	592	12	102
2018	455	2	102
2019	450	2	55

5.2 Seabirds

National strategies, NPOA-seabirds and recovery plan

In order to reduce incidental catches of seabirds, in 2001, Japan instituted the effective and practical National Plan of Action for reducing incidental catch of seabirds in Japanese longline fishing operations to suit the NPOA-Seabirds adopted in 1999. Japan's NPOA was developed based on (a) impact analyses based on the information from the Japanese longline operations and (b) consideration of the effective and practical methods to reduce incidental catch of seabirds. After instituting NPOA-Seabirds, Japan has revised it with the aim to effectively coping with the changes of the situation surrounding this issue. The newest revision was made in 2016.

Furthermore, FAJ has been mandating fishers to comply the domestic laws on relevant measures to reduce incidental catch of seabirds, which are based on various resolutions adopted by RFMOs.

Current seabird mitigation measures used by the national longline fleet

Seabird bycatch mitigation measures stipulated in accordance with the IOTC Resolution 12/06 have been in force under a national notice on bycatch mitigation measures.

Data collection

Japan has been collecting relevant scientific information for analyses (especially ecology and population status of seabirds) by sources such as observers onboard and logbook.

The interaction of seabirds was examined by the Japanese observer data from 2015 to 2019. The data for 2019 is a provisional. Results are described as below:

Eastern Indian Ocean

The Bycatch Per Unit of Effort (BPUE) were zero in the first and the fourth quarters (January to March and October to December), i.e. no seabirds bycatch by the Japanese longliners during first and fourth quarters. The BPUE was relatively higher in the second quarter (April to June) than that in the third quarter (July to September) in those 5 years.

Western Indian Ocean

The BPUE was relatively higher during the second quarter and the lower during the fourth quarter. The BPUE of the first and third quarters indicated the middle of the value in those 5 years.

5.3 Marine Turtles

National Strategies and recovery plan

FAJ has developed guidelines for fishers to reduce sea turtle mortality in accordance with the FAO voluntary guidelines to reduce sea turtle mortality in fishing operations.

Interaction

The interaction of sea turtles was examined by the Japanese observer data from 2015 to 2019 (2019 is provisional) and results are as follows:

Eastern Indian Ocean

The BPUE (number of sea turtle bycatch/1000 hooks) were zero in the second quarters (April to June) (2015-2019), i.e. no sea turtle bycatch by the Japanese longliners. The BPUE in three other quarters was very low (less than 0.02).

Western Indian Ocean

The BPUE were zero in the second quarters (2015-2019), i.e. no sea turtle bycatch by Japanese longliners. The BPUE in three other quarters was very low (less than 0.02).

Table 4. Observed annual catches (number of individuals) of species of special interest by species by longliner for the Japanese fleet, in the IOTC area of competence in 2015-2019 (Data in 2019 is provisional value).

FAO code	English name	2015	2016	2017	2018	2019
Seabirds						
	Unidentified birds	2	0	0	2	0
	Large albatrosses	0	0	1	0	0
	Other albatrosses	0	0	0	0	4
	Black-browed albatross	14	0	0	11	4
TQW	Campbell albatross	3	1	0	0	0
TQH	Indian yellow-nosed albatross	43	25	1	4	25
DIX	Wandering albatross	11	6	1	4	17
DBN	Tristan albatross	1	1	0	0	0
DIW	Gibson's albatross	1	0	0	0	0
	Wandering albatross group1	1	0	0	0	0
DIP	Southern royal albatross	1	0	0	0	1
DIQ	Northern royal albatross	1	0	0	0	0
ALZ	Unidentified albatrosses	36	7	4	2	41
	Royal albatross group	1	0	0	0	0
	Black-browed albatross group	11	7	0	2	2
	Shy-type albatrosses	5	30	0	5	13
	Yellow-nosed albatross group	0	1	0	0	0
DIC	Grey-headed albatross	9	3	3	8	10
PHU	Sooty albatross	0	14	0	0	17
PHE	Light-mantled albatross	0	13	0	0	8
MBX	Unidentified giant petrels	1	0	0	0	0
MAH	Northern giant petrel	3	0	1	2	9
MAI	Southern giant petrel	3	1	0	1	3
PRX	Unidentified petrels	7	0	0	0	11
PCI	Grey petrel	4	0	0	0	1
PRO	White-chinned petrel	6	6	0	1	49
	Spectacled petrel	0	0	0	0	1
PFC	Flesh-footed shearwater	8	5	0	1	5
PUG	Great shearwater	0	0	0	1	0
Sea Turtle						
	Unidentified sea turtles	4	3	7	1	0
TTL	Loggerhead turtle	2	1	0	2	2
TUG	Green sea turtle	0	0	0	0	1
LKV	Olive ridley turtle	5	6	27	3	5
DKK	Leatherback turtle	0	2	3	2	3
Mammals						
	Unidentified pinnipeds	1	0	0	0	4
ODN	Unidentified tooth whales	1	3	0	5	2

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

6.1. Logsheet data collection and verification (including date commenced and status of implementation)

Longline

The logbook of longline, which started in 1952 and the format has changed several times afterwards, includes set by set data on catch number and weight in each species, and other information such as fishing date and location, fishing effort (the number of basket and hooks used), water temperature and starting/setting time of the gear. The number of hooks per basket is the important information as it is the proxy of the depth of the gear and target species. As for tuna and tuna-like fishes, six tunas (bluefin, southern bluefin, albacore, bigeye, yellowfin and skipjack), and six billfishes (swordfish, striped marlin, blue marlin, black marlin, sailfish and shortbill spearfish) are recorded by species in the logbook. In addition, information on the cruise (departure/arrival date and port names), vessel (name, size, license number and call sign), the number of crew and the configurations of the fishing gear (material of main and branch lines) are required to fill in the top part of the logbook sheet for each cruise. Japan revised the logbook format for distant water fishing vessels in accordance with IOTC Resolution 12/03,13/03 and 15/01.

Submitted logbooks are processed into electronic data files in the Fisheries Resources Institute (FRI) (former National Research Institute of Far Seas Fisheries (NRIFSF)). Various error checks such as date, location, fish weight, CPUE are also conducted by FRI before these data are finalized. Vessel characteristics (call sign, name, license number, etc.) are verified with registered persons.

Purse seine

The logbooks of purse seiners, which started in 1967, are required to be submitted to the Japanese government every month. The reported catch by species could be verified by comparing with the landing data, which are obtained from market receipts of three major unloading ports (Yaizu, Makurazaki, and Yamagawa).

6.2. Vessel Monitoring System (including date commenced and status of implementation)

VMS installation on all distant water and offshore longline and distant water purse seine vessels is obligated since 1st August in 2007.

6.3. Observer scheme (including date commenced and status; number of observer, include percentage coverage by gear type)

In accordance with the Resolution 11/04 (Regional Observer Scheme), Japan started to deploy observers from July 2010. Number of the trained observers onboard deployed in the IOTC area (2015-2019) was 10, 9,11, 12, and 12 respectively. Table 5 and Figure 1 show the observer coverages based on hooks (2015-2019) (2019 is provisional). The observer coverages are more than 5%, which satisfy the compliance level (5%) stipulated in the Resolution (11/04).

Figure 5 shows the map of the areas of the observers deployed in Japanese longline fisheries which is represented by different colours. The grey indicates the areas where there were no observer deployments, and green to red indicate levels of observer coverages (low to high). Observers are consistently deployed in the western and eastern area, while in the central area, observers are not consistently deployed.

Table 5. Annual observer coverage by longline hooks from 2015 to 2019. The data of year 2019 is provisional value.

Based on number of hooks			
Year	**[A]Total hooks**	**[B] Observed hooks**	**coverage (%) = [B]*100/[A]**
2015	**28,958,872**	**2,403,021**	**8.3%**
2016	**27,049,581**	**1,610,030**	**6.0%**
2017	**23,377,667**	**2,248,967**	**9.6%**
2018	**22,207,349**	**2,462,475**	**11.1%**
2019	**19,972,084**	**2,560,408**	**12.8%**

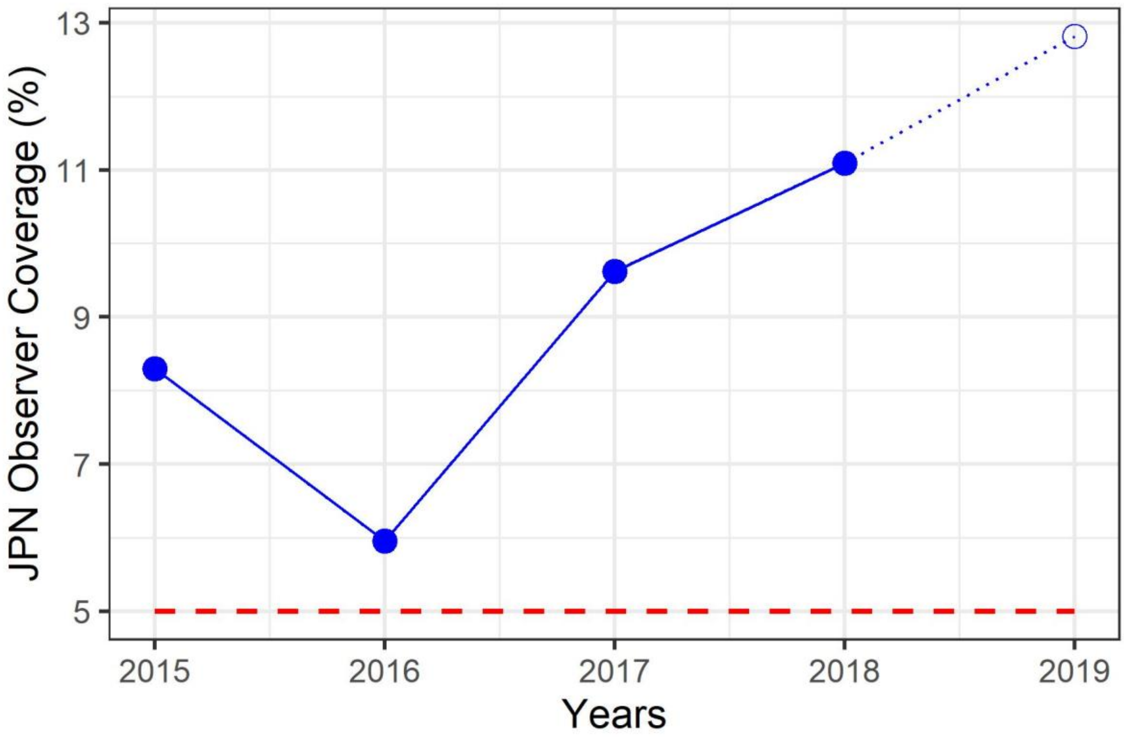

Figure 4 Blue line indicates observer coverage of the Japanese tuna longline fisheries from 2015 to 2019. Red line indicates 5% coverage line. 2019 is the provisional.

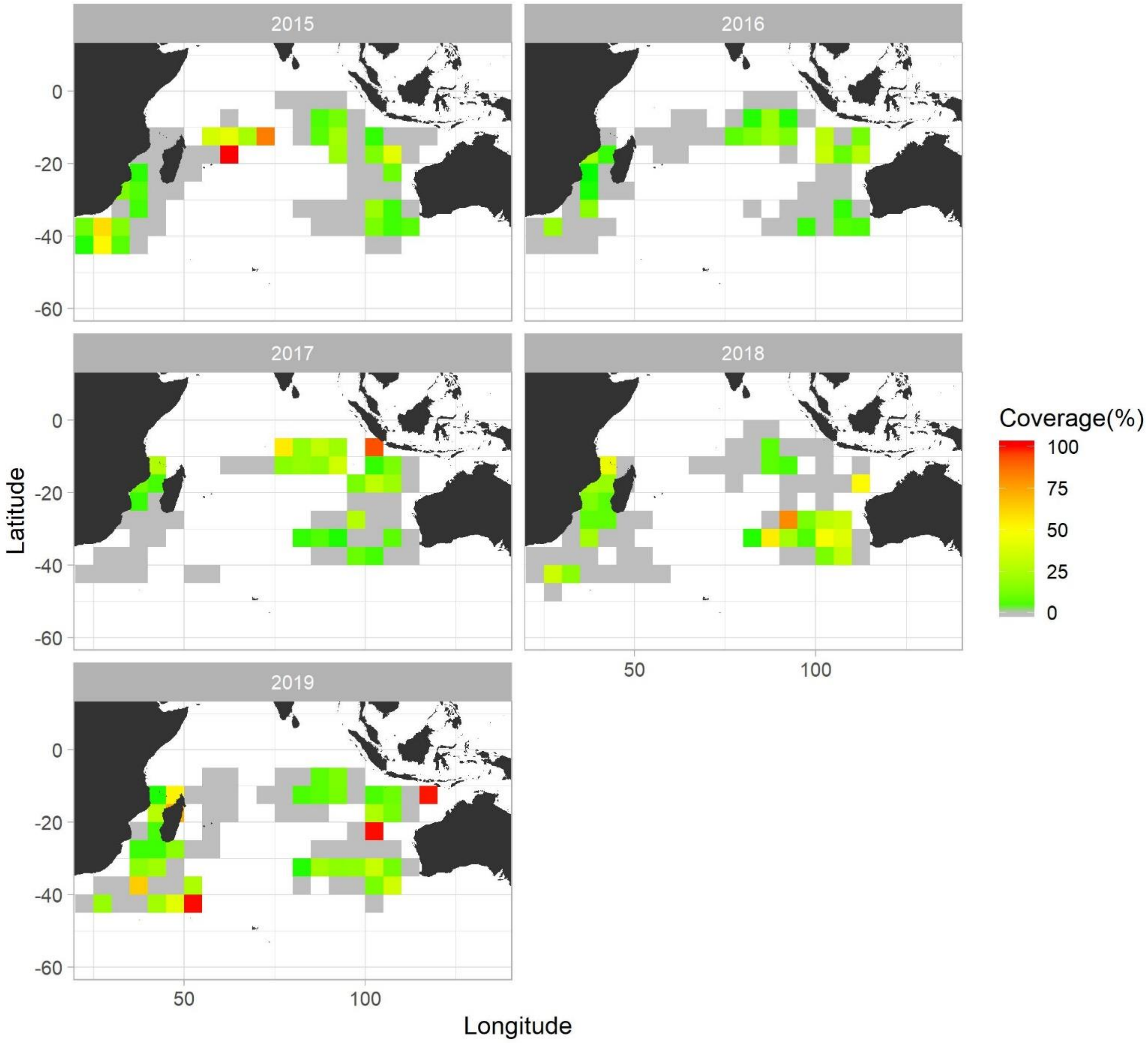

Figure 5 Map showing the spatial distribution of observer coverage from 2015 to 2019 in Japanese longline. The data of year 2019 is provisional value.

6.4. Port sampling programme

Longline

Port samplings for longline catch was only occasionally conducted (mainly at Tokyo, Shimizu and Yaizu). The date commenced is not known because there is no information in the database.

Purse seine

Japan has been conducting purse seine catch port sampling program since 1995 in the major Japanese landing ports. Because the catch in the Indian Ocean is mainly unloaded abroad, port samplings at Japanese ports has been conducted only nine years during 1995-2019 at Makurazaki port as shown Table 6. There are more sampling frequencies for the catch from the equatorial area of Pacific Ocean.

Table 6. Number of vessel trips or vessels active monitored, by species and gear]

Longline
(Not available by trip or vessel number base)

Purse seine

Year	Number of trips
1995	1
1996	1
1997	1
1998	1
1999	3
2000	2
2001	2
2002	1
2006	1

Table 7. Number of individuals measured, by species and gear

Longline

Year	SBT	ALB	BET	YFT	BLM	BLZ	SFA	SPF
1986	15	6	284	215	130	107	89	5
1987	93	20	130	116	35	53	31	21
1988	102	22	455	198	41	133	60	0
1989	59	9	532	364	83	86	71	0
1990	0	0	0	87	8	12	6	0
1991	0	0	21	47	0	0	0	0
1993	0	0	47	21	0	0	0	0
1994	0	0	0	0	2	4	1	0

Purse seine

Year	SKJ	YFT	BET
1995	1,842	1,571	2,181
1996	1,255	1,129	3,159
1997	1,093	968	460
1998	1,122	793	370
1999	2,474	1,235	848
2000	1,547	924	655
2001	1,648	787	713
2002	894	359	506
2006	896	472	783

6.5. Unloading/Transhipment of flag vessels [including date commenced and status of implementation]

Unloading

The fishers are required to submit relevant documents to FAJ 10 days before the planned landing date including unloading abroad. When unloading abroad the owner of fishing vessels are required to obtain approval from FAJ in advance.

Transshipment

Japan controls at sea transshipments by its vessels in accordance with the Resolution 19/06 on Establishing a Programme for Transhipment by Large-Scale Fishing Vessels. The fishers are required to obtain approval from FAJ in advance for at port transshipments. To apply for at port transshipment, owners must submit relevant documents to FAJ 10 days before the planned transshipment date. Fishers shall complete the IOTC transshipment declaration and inform to the FAJ no later than 15 days after the transshipment.

Table 8. Quantities by species and gear landed in ports located in the IOTC area of competence

(in tonnes)

Year	Gear	SBT	ALB	BET	YFT	SWO	MLS	BLZ	Others	Total
2019	LL	0	0	0	0	0	0	0	7.5	7.5
2019	PS	0	0	0	0	0	0	0	0	0

(Note) SBT (Southern bluefin tuna), ALB (albacore), BET (bigeye tuna), YFT (yellowfin tuna), SWO (swordfish), MLS (striped marlin), BLZ (blue marlin)

Table 9. Quantities by species and gear transhipped in ports located in the IOTC area of competence

(in tonnes)

Year	Gear	SBT	ALB	BET	YFT	SWO	MLS	BLZ	Others	Total
2019	LL	0	0	30.5	74.4	2.8	0	0	27.2	134.9
2019	PS	0	0	0	0	0	0	0	0	0

(Note) SBT (Southern bluefin tuna), ALB (albacore), BET (bigeye tuna), YFT (yellowfin tuna), SWO (swordfish), MLS (striped marlin), BLZ (blue marlin)

6.6. Actions taken to monitor catches & manage fisheries for Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish

Japan has been monitoring marlin catch by logbooks and observer program. As marlins are not main target species by Japanese fisheries, the catch level is low especially in recent years (see table 2a).

6.7. Gillnet observer coverage and monitoring

Not applicable. Japan is not operating gillnet fishery in the Indian Ocean.

6.8 Sampling plans for mobulid rays

Japan has been monitoring incidental catch of mobulid rays through the observer program.

7. NATIONAL RESEARCH PROGRAMS

7.1. National research programs on blue shark

7.2. National research programs on Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish

7.3. National research programs on sharks

7.4. National research programs on oceanic whitetip sharks

7.5. National research programs on marine turtles

7.6. National research programs on thresher sharks

No information is prepared for 7.1-7.6

7.7. Others

(1) Plan of trilateral collaborative study among Japan, Korea and Taiwan for producing joint abundance index with longline fisheries data for the tropical tuna species in the Indian Ocean (Kitakado, Satoh, Matsumoto and et al)

The summary quoted from IOTC-2020-WPTT22(AS)-09: Three distant-water tuna longline countries, Japan, Korea and Taiwan, have started a collaborative study for improving the joint abundance index using integrated fishery data of these fleets for tropical tuna species in the Indian and Atlantic Oceans. In addition to some preliminary steps to confirm similarity and dissimilarity of fishery operation, nominal CPUE, length frequency and spatio-temporal coverage, we planned three tasks to produce the joint CPUE; 1) investigation of better approaches to account for changes in target within each country; 2) analyses using conventional regression models with geographical, environmental and fishery (including target) information; and 3) analysis using an advanced spatio-temporal model (e.g. VAST) for developing abundance indices with additional consideration of spatio-temporal correlations. Although we have started with some coding work for bigeye tuna in the Atlantic Ocean, we will also apply the methods to yellowfin tuna in the Indian Ocean in a parallel way. A final set of results on the IO yellowfin tuna will be submitted to the Working Party on Methods and Working Party on Tropical Tuna next year for use as inputs for the update of its stock assessment. The work can also be extended for the IO albacore for its future stock assessment.

(2) Development of the SCAS (Statistical-Catch-At-Size) (Nishida, Kitakado and Odaira)

The summary quoted from IOTC-2020-WPTT22(AS)-INF03: We have been developing Statistical-Catch-At-Size (SCAS) software to improve our previous Age-Structured Production Model (ASPM)/Statistical-Catch-At-Age (SCAA). The SCAS is the integrated age-structured stock assessment model based on size, similar to Stock Synthesis (SS3). SCAS is the AD Model Builder implemented application like our ASPM/SCAA software and SS3. SCAS aggregates season, area and spatial component (movement) as ASPM/SCASS, thus it is the simpler and more robust model. This software is driven by the four menus (applications) without any programming, including (a) batch job (grid search), (b) graphical evaluation of the initial results, (c) MCMC and (d) final graphics. Therefore, this software is suitable for the beginners and the non-stock assessment scientists who wish to run the simpler integrated stock assessments easily in a shorter time. This document describes the progress to date on (a)-(b). We plan to complete the remaining (c)-(d) in 2021. For the further development, a diagnosis component (e.g. hindcasting) is planned to be incorporated in the future.

(3) IOTC-OFCF projects (2002-2019)

The IOTC-OFCF joint project to improve tuna fisheries statistics in the developing countries in the IOTC waters have been implemented for last 18 years in five phases, i.e., 1st phase (5 years: 2002-2006), 2nd phase(3 years: 2007-2009), 3rd phase (3 years: 2010-2012), 4th phase(1st 3 years :2013-2015 and last 1 year: follow up activities in 2016) and 5th phase (3 years: 2017-2019). The IOTC and OFCF have signed for new joint project to start new step as a 6th phase. The objective of the Project is to contribute to the sustainable utilization of tuna resources, by improving the systems of collecting and processing data on resources related to tuna fisheries in the Indian Ocean. The project will be providing technical guidance and assistance for strengthening data collection and the production of statistics in target countries.

(4) Research cruises by Marine Fisheries Research and Development Center (JAMARC), Japan Fisheries Research and Education Agency (2015-2019)

In last 5 years, JAMARC has been conducting the experimental purse seine fishing in the eastern Indian Ocean. RV Taikei Maru No.1 were used for the study. The main objective of the research program is to mitigate bycatch of juvenile yellowfin and bigeye tunas in purse seining with FADs. Two kinds of study have been conducted; (a) Study on how large mesh size affect the catch size distribution of skipjack, yellowfin and bigeye tunas, and (b) Study on preset estimation of species and size composition of schools associated with FADs using wide band echo sounder. With the more accurate estimation, sets on FADs with larger concentration of juvenile tunas could be avoided and would lead to the protection of juveniles.

8. Implementation of Scientific Committee Recommendations and Resolutions of the IOTC relevant to the SC.

Table 10. Scientific requirements contained in Resolutions of the Commission, adopted between 2012 and 2019.

Res. No.	Resolution	Scientific requirement	CPC progress
11/04	On a regional observer scheme	**Paragraph 9**. CPCs shall **report** of the number of vessels monitored and the coverage achieved by gear type in accordance with the provisions of this Resolution.	Japan has complied with requirement.
12/04	On the conservation of marine turtles	**Paragraphs 3-10**. CPCs shall collect and provide all data on interactions including estimation of **total mortality**, to report successful mitigation measures, deterioration of nesting sites and swallowing of marine	Japan has complied with the requirements under the Resolution except

Res. No.	Resolution	Scientific requirement	CPC progress
		debris, for fishermen to foster its recovery and use de-hooking technique. All LL shall carry line cutters and de-hookers, use of whole **finfish** bait. PS shall avoid encirclement, conduct safely release, to encourage to adopt FAD designs that reduce the incidental catch. CPCs undertake research trials of **circle hooks**, whole finfish for bait, alternative FAD design.	for estimation of total mortality. With regard to data on interaction with marine turtles, additional data (Form1DI) has been submitted on 28 September 2020.
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	**Paragraphs 3-7.** CPCs shall provide the information on how they are implementing this measure and achieve reductions in levels of seabird bycatch across through the use of effective mitigation measure. In the south of 25ºS, CPCs shall ensure that all LL use at least **two of the three mitigation measures.** The design and deployment for **bird scaring lines** should meet the specifications.	Japan has complied with the requirements.
12/09	On the conservation of thresher sharks (family alopiidae) caught in association with fisheries in the IOTC area of competence	**Paragraphs 4-8.** CPCs shall encourage their fishers to record and report incidental catches as well as **live release** and implement research to identify potential nursery areas. Scientific observers shall be allowed to collect biological samples.	Japan has complied with the requirements under the Resolution.
13/04	On the conservation of cetaceans	**Paragraphs 7-9.** CPCs shall report the information and data collected through logbooks, or observer programs. CPCs shall report, in which cetaceans have been encircled by PS. For CPCs having national and state legislation for protecting these species shall be exempt from reporting.	Japan has submitted by-catch information in the national report. Additional data (Form1DI) has been submitted on Sep 28 2020.
13/05	On the conservation of whale sharks (*Rhincodon typus*)	**Paragraphs 7-9.** CPCs shall report the relevant information through logbooks, or observer programs. CPCs shall report any instances in which whale sharks have been **encircled by PS.**	No catch or encirclement was reported in 2019.
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	**Paragraph 5-6.** CPCs shall encourage their fishers to record incidental catches and live releases of **oceanic whitetip sharks.** CPCs shall implement research on oceanic whitetip sharks.	Japan has complied with the requirements.
15/01	On the recording of catch and effort by fishing vessels in the IOTC area of competence	**Paragraphs 1–10** Record **minimum information** on vessel, trip, gear configuration, operations, catch & effort then provide by June 30th of the following year.	Japan has complied with the requirements.
15/02	Mandatory statistical reporting requirements for	**Paragraphs 1–7.** CPCs shall provide Total catch, Catch and effort data, bycatch, **Size (1 fish/ton),** FADs data (PS) and others.	Japan has complied with the requirements except

Res. No.	Resolution	Scientific requirement	CPC progress
	IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)		size data for some past years
17/05	On the conservation of sharks caught in association with fisheries managed by IOTC	**Paragraphs 6, 9 and 11** CPCs shall report data for catches of sharks including all available historical data, estimates and life status of discards & size. CPCs shall undertake research to: a) effectiveness of prohibiting **wire leaders**; b) improve knowledge on key biological/ecological parameters, c) identify key shark mating….	Japan has complied with the Resolutions. The number of measured Shortfin mako individuals did not reach the IOTC standard in 2017, but the sampling rate has been improved and achieved the IOTC standard in 2018.
18/02	On management measures for the conservation of blue shark caught in association with IOTC fisheries	**Paragraphs 2-5.** CPC shall record catch, effort, **size** and discard data. CPCs are encouraged to undertake scientific research.	Japan has complied except for numbers of size for some past years.
18/05	On management measures for the conservation of the Billfishes: Striped marlin, black marlin, blue marlin and Indo-Pacific sailfish	**Paragraphs 7-11**. CPCs shall collect and report information of **5 billfish species** (*Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish)*, i.e. catches, released alive and/or discarded, together with effort, size and discard.	Japan has complied with the requirements.
18/07	On measures applicable in case of non-fulfilment of reporting obligations in the IOTC	**Paragraphs 1 and 4.** CPCs shall include information in their Annual Reports on actions taken to implement their reporting **obligations** including shark species in particular steps taken to improve their data collection for direct and incidental catches.	Japan has complied with the requirements.
19/01	On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence	**Paragraph 22.** CPCs shall set their gillnets at 2m depth from the surface in **gillnet** fisheries by 2023 to mitigate ecological impacts.	*Not applicable. Japan has no gillnet fisheries.*
19/03	On the Conservation of Mobulid Rays Caught in Association with Fisheries in the IOTC Area of Competence	**Paragraph 11.** CPCs shall develop sampling plans for the monitoring of the mobulid rays catches. The sampling plans, including their scientific and operational rationale, shall be reported in the national scientific reports to the SC **starting in 2020.**	*Not applicable. Requirement in paragraph 11 is limited to mobuild ray catches by the subsistence and artisanal fisheries. Japan has no such fisheries.*

9. LITERATURE CITED (TOTAL:18)

WPTT22(DP) (Tropical tuna：data preparation) (Online) (June 2020) (3)

IOTC-2020 -WPTT22(DP) -INF02 Review of Japanese fisheries and tropical tuna catch in the Indian Ocean (Takayuki Matsumoto)

IOTC-2020 -WPTT22(DP) -INF03 Japanese longline CPUE for bigeye tuna in the Indian Ocean standardized by GLM (Takayuki Matsumoto)

IOTC-2020 -WPTT22(DP) -INF04 Japanese longline CPUE for yellowfin tuna in the Indian Ocean standardized by generalized linear model (Takayuki Matsumoto)

WPNT10 (Neritic tuna) (Online) (July 2020) (2)

IOTC-2020-WPNT10-09 IDENTIFICATION OF REGIONS IN THE IOTC CONVENTION AREA TO INFORM THE IMPLEMENTATION OF THE ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT (Maria-José Juan Jordá, Anne-Elise Nieblas, Hilario Murua, Paul De Bruyn, Sylvain Bonhommeau, Mark Dickey Collas, Mayeul Dalleau, Fabio Fiorellato, Donna Hayes, Irwan Jatmiko, Philippe Koubbi, Mohammed Koya, Marcel Kroese, Francis Marsac, Pierre Pepin, Umair Shahid, Pascal Thoya, Sachiko Tsuji, Anton Wolfaardt)

IOTC–2020–WPNT10–12 Application of Bayesian biomass dynamic models to neritic tuna species in the Indian Ocean (Manel Gharsalli, Yuki Ueda, Kanta Amano, Daiki Kaneko, Kazuya Sugimoto, Nanako Sekiguchi, Ren Tamura and Toshihide Kitakado)

WPB18 (Billfish) (Online) (September 2020) (1)

IOTC-2020-WPEB18-14 Japanese Longline CPUE Standardization (1970-2018) for Swordfish (*Xiphias gladius*) in the Indian Ocean use in zero-inflated Bayesian hierarchical spatial model (Kenji Taki, Hirotaka Ijima and Yasuko Semba)

WPEB16 (Ecosystem and Bycatch) (Online) (September 2020) (3)

IOTC-2020-WPEB16-20 Updated CPUE of blue shark (*Prionace glauca*) in the Indian Ocean estimated from Japanese observer data between 1992 and 2019 (Mikihiko Kai and Yasuko Semba)

IOTC-2020-WPEB16-23 Species Estimation of Unidentified Bycatch Sea Turtles in the Indian Ocean using Random Forest (Yu Sato, Takahito Masubuchi, Atsuya Yamamoto, Ayumi Shibano, Miyuki Kanaiwa, Kei Okamoto, Daisuke Ochi and Minoru Kanaiwa)

IOTC-2020-WPEB16-INF07 Estimate of intrinsic rate of natural increase (r) of shortfin mako (*Isurus oxyrinchus*) based on life history parameters from Indian Ocean. (Yasuko Semba, Hiroki Yokoi, and Mikihiko Kai)

WPTT22 (AS) (Working Party on Tropical Tunas)（stock assessment）(Online) (October 2020) (3)

IOTC–2020-WPTT22(AS)-09 Plan of trilateral collaborative study among Japan, Korea and Taiwan for producing joint abundance index with longline fisheries data for the tropical tuna species in the Indian Ocean (Toshihide Kitakado, Keisuke Satoh, Takayuki Matsumoto, Hiroki Yokoi, Kei Okamoto, Sung Il Lee, Mi Kyung Lee, Jung-Hyun Lim, Sheng-Ping Wang, Nan-Jay Su, Wen-Pei Tsai and Su-Ting Chang)

IOTC-2020-WPTT22(AS)-21 TOWARDS PROVIDING SCIENTIFC ADVICE FOR INDIAN OCEAN YELLOWFIN IN 2020 (Agurtzane Urtizberea, Massimiliano Cardinale, Henning Winker, Richard Methot, Dan Fu, Toshi Kitakado, Carmen Fernández and Gorka Merino)

IOTC-2020-WPTT22(AS)-INF03 DEVELOPMENT OF THE SCAS (STATISTICAL-CATCH-AT-SIZE) SOFTWARE (Tom Nishida, Toshihide Kitakado and Yoshinobu Odaira)

WPDCS16 (Data collection and statistics) (Online) (November 2020) (0)

SC23 (Scientific Committee) (Online/Virtual) (December 2020) (1)

IOTC-2019-SC22_NR_ National Report of Japan (Matsumoto, Inoue, Nishida and Semba)