National Report of Japan

Overview of Researches on Ecologically Related Species in Japanese SBT Longline Fishery, 2011-2012

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1. Introduction

Japanese fleet is using only longline gear to catch southern bluefin tuna. Since 1952, Japanese longline operation has started in the Indian Ocean, although southern bluefin tuna was sub-target species for the longline fishery targeting yellowfin and bigeye tuna during the early stage of fishery. This is because of the fact that southern bluefin tuna in the tropical region were mostly spent with low meat quality so fishermen did not target it. Further south fishing grounds in the temperate waters for this species were developed in the late 1950s and 1960s. In addition, the innovation of super cold freezer has accelerated demand of “sashimi” grade southern bluefin tuna meat to the Japanese market. Recently the number of fishing vessels targeting southern bluefin tuna is decreasing continuously due to the strong regulation for stock management and government policy to reduce number of longline vessels several times done in the past.

Regarding the incidental catch of seabirds, tori line was used voluntarily by the fishermen in the early 1990s, and the Government of Japan has introduced a mandatory measure for SBT longliners to use tori line since 1997. Research effort to modify tori line and develop alternative methods possibly avoiding incidental catch of seabirds continued. According to the international plans of action for reducing incidental catch of seabirds in longline fisheries and for the conservation and management of sharks, Japan established National Plans of Action in 2001 and has promoting mitigation of incidental take of seabirds and management of pelagic sharks.

2. Review of SBT Fisheries

Fleet size and distribution

The number of fishing vessels has been decreasing since the peak of about 300 in 1985. Fisheries Agency of Japan had reduced number of vessels by 69 in 1981, 100 in 1982 and 132 in 1998. Vessel reduction policy in 1998 would influence further decline of number of vessels after then. The number of vessels was less than 200 recently. Recent fishing grounds were off Cape of Good Hope (Area 9), southern Indian Ocean (Area 8) and water near Tasmania Island (Area 4, 7). The vessels were operating at Area 4, 7 in the second and third quarters, at Area 8, 9 in the all season.

Distribution of Catch and Effort

General distribution of southern bluefin tuna and effort in 1998-2005 was almost same as the distribution of major fishing grounds mentioned above. Since 2006, however, annual operational pattern and schedule of Japanese longline vessels was affected by a lot of factors for example the introduction of individual quota (IQ) system, the abolish of seasonal area closure, the drastic/temporal increase of fuel price, and the market price slump of SBT. Due to the introduction of IQ system and abolish of seasonal area closure, a fishing vessel did have its own catch limit but did not have limitation regarding areas, which allowed the fishing vessel to use its entire catch limit in one area (i.e. Area 8).

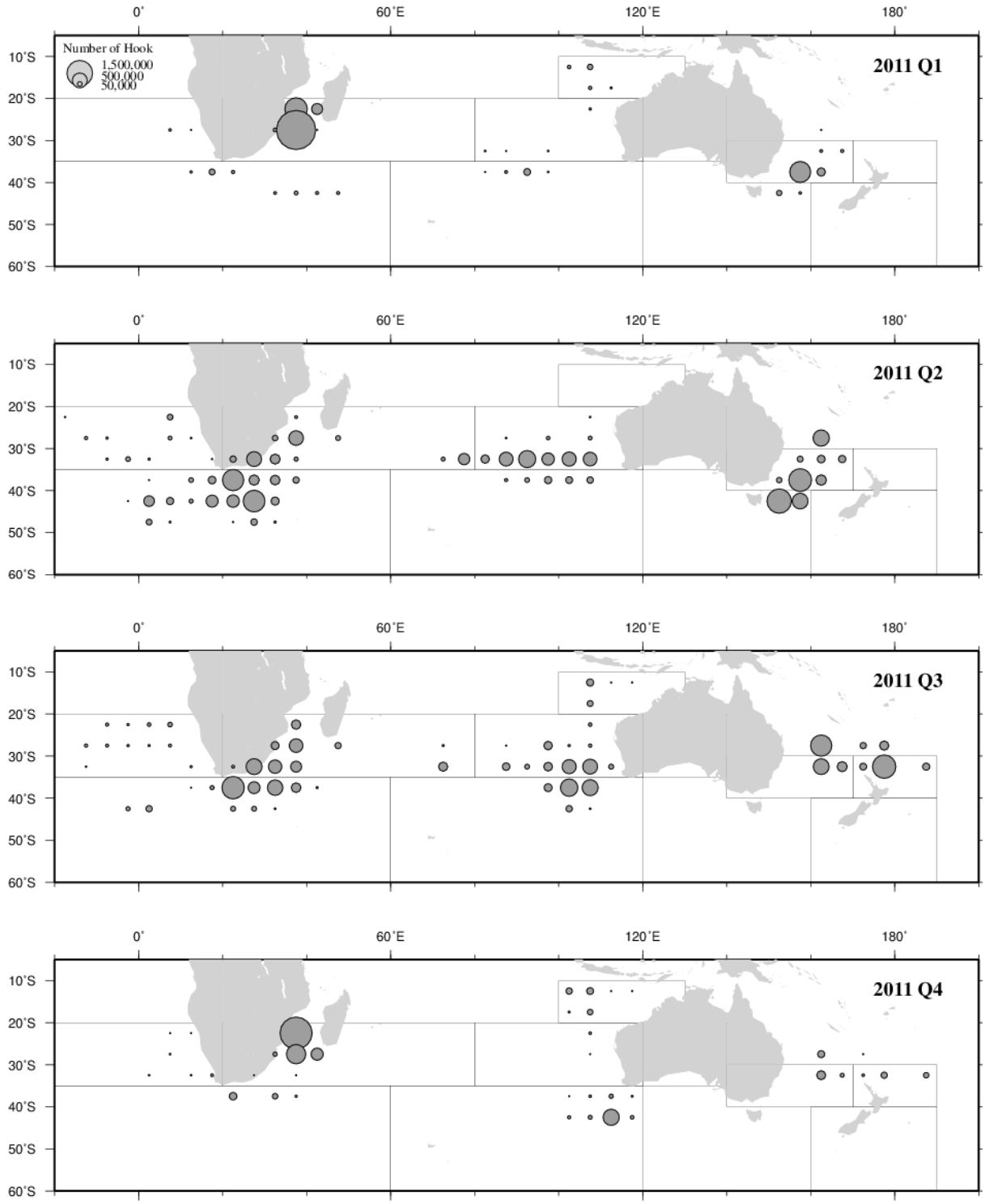

Fig.1. Number of fishing hooks used Japanese RTMP vessels by quarter and 5x5 degrees square in 2011.

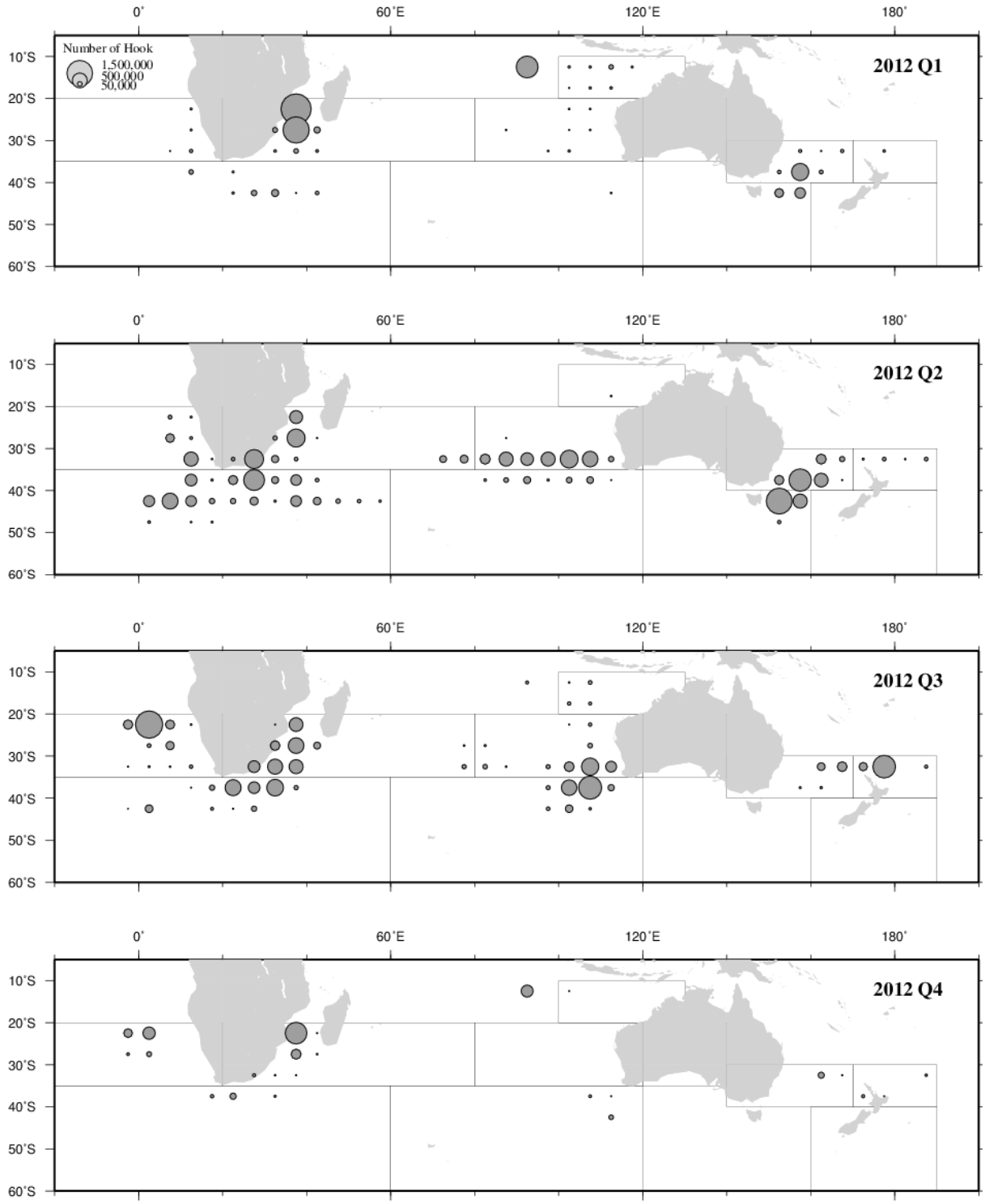

Fig.2. Number of fishing hooks used Japanese RTMP vessels by quarter and 5x5 degrees square in 2012.

3. Fisheries Monitoring for Each Fleet

Since 1991, Fisheries Agency of Japan has carried out Real Time Monitoring Program (RTMP) to monitor the catch of southern bluefin tuna. The number of vessels monitored by the program was 12-15 during 1991-1994, and all the vessels operating southern bluefin tuna fishing ground have been monitored by the RTMP since 1995. Each vessel sends daily reports including fishing position, effort, and catch by species in number and weight to the Fisheries Agency. The information is entered into the database in a short time.

Since 1992, Japan has conducted scientific observer program on southern bluefin tuna fishery and collected information including fishing position, effort, catch of target and non-target species, biological information, incidental catch of seabirds, etc. In 2011 and 2012, Japan deployed scientific observers to 12 and 10 fishing vessels, respectively. While the observers was onboard the vessels, the vessels used 1,961,167 and 1,260,608 hooks in 2011 and 2012, respectively. Coverage of observation was 14.5 and 10.4 % for vessels and 11.0 and 7.9 % for hooks in 2011 and 2012, respectively (Table 1). The observation effort was tried to be distributed in proportion to the fishing effort for each area and season (CCSBT-ERS/1308/Info03).

Table 1. Number and coverage of fishing vessels and hooks in the Japanese RTMP observer program in 2011-2012.

Area	Calendar year	Number of all vessels	Number of vessels observed	Cover rate for the number of vessel	Number of hooks used by all vessels (x1000)	Number of hooks used by observed vessels (x1000)	Cover rate for the number of hook
Area 4	2011	28	2	7.1%	4077	160	3.9%
	2012	27	2	7.4%	3347	267	8.0%
Area 5	2011	12	1	8.3%	1637	81	4.9%
	2012	10	1	10.0%	1490	21	1.4%
Area 7	2011	26	2	7.7%	1986	147	7.4%
	2012	28	2	7.1%	2451	110	4.5%
Area 8	2011	15	4	26.7%	2801	589	21.0%
	2012	19	2	10.5%	2519	280	11.1%
Area 9	2011	40	5	12.5%	7252	985	13.6%
	2012	49	6	12.2%	6151	583	9.5%
Total	2011	83	12	14.5%	17754	1961	11.0%
	2012	96	10	10.4%	15957	1261	7.9%

4. Seabird

The captures and mortalities of seabirds in CCSBT fisheries are summarized in Table 1.

Estimates of annual incidental catch of seabirds in the Japanese southern bluefin tuna longline fishery in 2010-2012 were updated based on the data collected through the scientific observer programs. Annual seabird catch were 4,054 (95% CI: 754-8,445) in 2010, 2,755 (95% CI: 1,528-4,001) in 2011 and 1,067 (95% CI: 484-1,888) in 2012, respectively. As a whole, estimates of seabird catch have been showing decreasing trends since 2000. Recent estimates of seabird catch by the Japanese high-sea SBT longline fishery was approximately 1,000-4,000 birds/year (Fig. 3, CCSBT-ERS/1308/12).

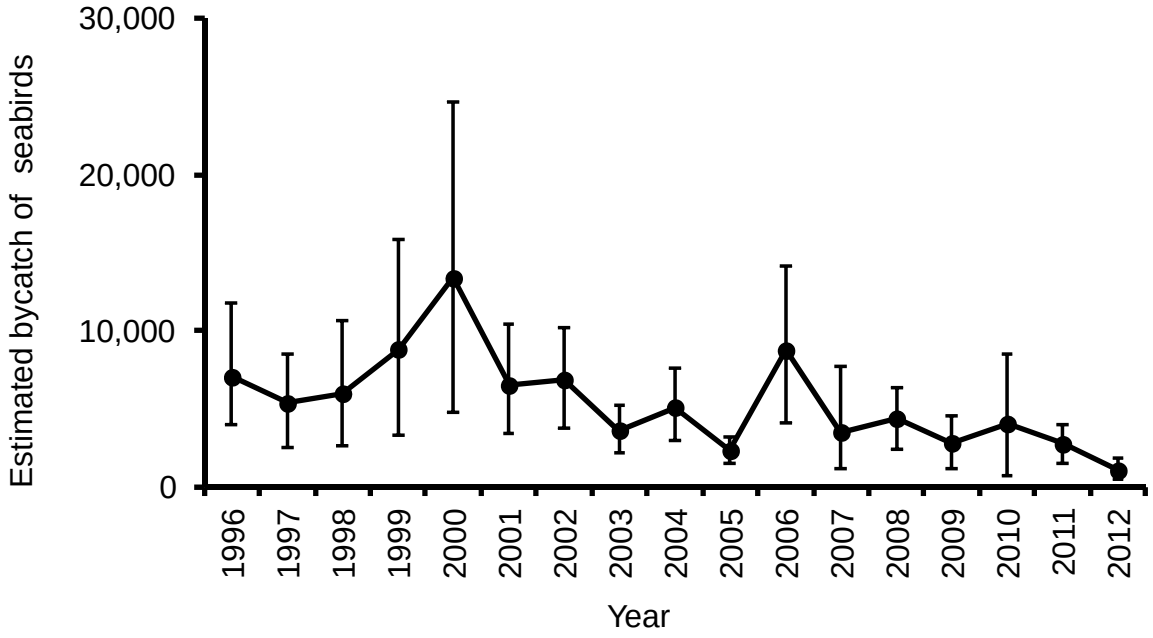

Fig.3. Annual trends of incidental catch of seabirds in the Japanese SBT fisheries. Vertical bars indicate 95% confidence intervals.

Habitat modeling of black-browed albatross and wandering albatross were examined by MaxEnt, and then modeling selection was done with zero-inflated model including these factors. Both the seabird probability distribution and the number of seabird around longliners in setting were affected to bycatch rate; the former had negative effect while the latter had positive effect. The result suggested that bycatch rates were not directly related to the species distribution in our study, that there are other factors that cause albatrosses to gather around fishing boats locally and that the bycatch rates become high only when the albatrosses are in high densities during setting (CCSBT-ERS/1308/13).

5. Other Non-target Fish

The captures and mortalities of sharks in CCSBT fisheries are summarized in Table 1.

Eleven species of elasmobranchs were reported by the RTMP observers in 2011-2012. Blue shark was most dominant of elasmobranch catch observed, followed by porbeagle, shortfin mako shark and pelagic stingray.

Japan has collected the catch and effort data of porbeagle (*Lamna nasus*) caught by Japanese distant-water longliners since 1994. For the basic information on the stock assessment of the porbeagle caught in the SBT fishery, log-book data of porbeagle caught in the southern hemisphere as well as the size data collected in the scientific observer program for SBT was summarized. Considering distribution area of porbeagle in the southern hemisphere, the calculation of logbook data was conducted for the area south of 30°S. Total of 300,000 operation, 900,000,000 hooks and 30,000 porbeagles were recorded in the logbook data between 1994 and 2012. Total of 13,550 porbeagles were recorded in the observer program between 1992 and 2012 and size data from 11,047 individuals were available. This distribution of catch and size data on spatial and temporal scale is described in this document (Fig.4, CCSBT-ERS/1308/14).

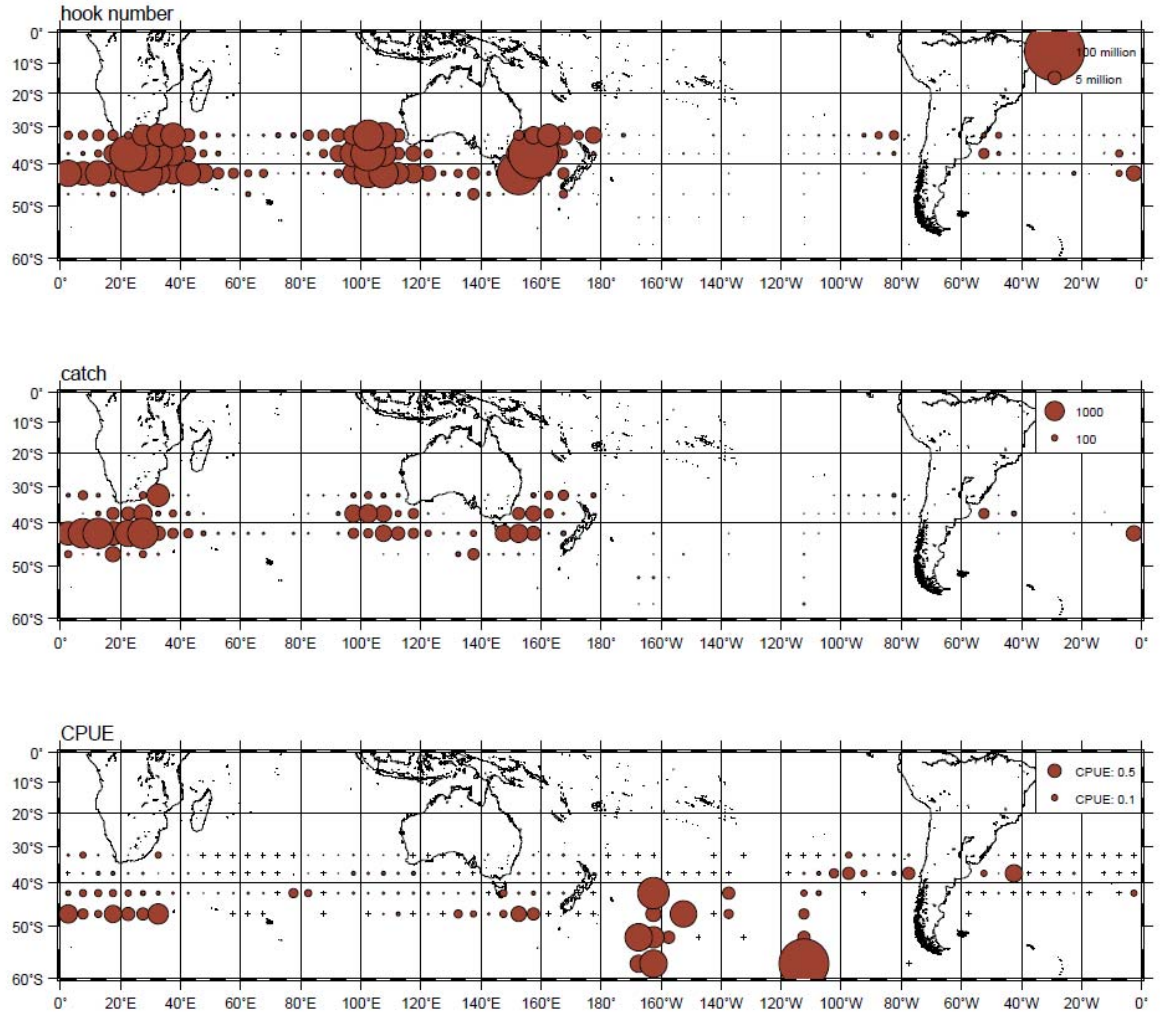

Fig.4. Distributions of hook number, porbeagle catch and CPUE.

Many teleosts were caught by longline fishery other than tunas and billfishes in the SBT fishing ground. Forty-three species of teleost fish including tuna and billfish were identified in the RTMP observer data in 2011-2012. Butterfly tuna, escoler, oilfish, opah, lancetfishe, sunfish and pomfrets were the major components of teleost catch (other than tuna and billfish) recorded in the in the high sea longline fishery (CCSBT-ERS/1308/Info03).

6. Marine Mammal and Marine Reptile

The captures and mortalities of marine reptile in CCSBT fisheries are summarized in Table 1.

One Pinnipedia species and one leatherback turtle was recorded through the Japanese scientific observer program in 2011-2012 (CCSBT-ERS/1308/Info03). Incidental catch of marine mammal and marine reptile occurred at a negligible level in the Japanese high-sea SBT longline fishery. There is not enough number of observations for the appropriate statistical estimation of the total incidental catch for these animals.

7. Mitigation Measures to Minimize Seabird and Other Species Bycatch

Current Measures

Mandatory Measures:

The Government of Japan has introduced a mandatory measure for tuna longliners to use tori line while targeting southern bluefin tuna as the terms of conditions of license to avoid incidental catch

of seabirds since 1997. The Government of Japan makes this mandatory measure known to every fisherman by specifying in the license.

Longline fishing vessels operating to catch southern bluefin tuna are obliged to use tori line, and when operating in the Convention areas of WCPFC, IOTC and ICCAT, they are obliged to comply with respective rules.

Effectiveness of hybrid tori-lines with and without weighted branch lines to a control of no mitigation was compared in the North Pacific from December 2011 to June 2012. The results suggest that sole deployment of well-designed tori-lines dramatically reduce incidental catch of albatrosses by pelagic longline fisheries in the western North Pacific, and therefore are recommended as best-practice seabird mitigation for these fisheries.

Effectiveness of aerial extent of tori line (long aerial extent: 85m, middle: 70m and short: 50m) to reduce incidental catch of seabirds using Japanese research vessel was examined in the North Pacific from April to June 2013. The results showed that long and middle aerial extent of tori line was more effective in preventing seabird attacks and incidental catch of seabirds than short aerial extent. The further research on the design of tori-line should be useful to reduce incidental catch of seabirds in the north Pacific.

Monitoring System and the situation of deployment:

The Government of Japan is taking necessary measures to enforce and monitor the level of compliance for mandatory use of tori lines including dispatch of enforcement vessels to the fishing areas, and deployment of observers on board of operating vessels. The observers boarding are changed annually.

Voluntary Measures, including information on proportion of fleet using the voluntary measures:

In February 2001, in accordance with “International Plan of Action for reducing incidental catch of seabirds in longline fisheries” of FAO, the Government of Japan developed “Japan’s National Plan of Action for reducing incidental catch of seabirds in longline fisheries”, in which Fisheries Agency of Japan instructed every fishermen to voluntarily carry out night line-setting, use of weighted branch line or cone to ensure speedy precipitation of bait, use of automatic bait casting machines and use of properly defrozen bait in addition to the mandatory requirement for fishing vessel to use tori lines.

Most vessels conduct the night setting partially by starting line setting before sunrise.

Most of Japanese tuna longline vessels use automatic bait casting machines (BCMs), which have an effect to decrease the incidental catch of seabirds by avoiding propeller turbulence, increasing sinking rates of baited hooks, and casting baited hooks constantly below the tori line. In 2011-2012, at least 62-71% of observed fishing vessels were equipped with BCMs.

Improvement of sinking rates of baited hooks is achieved by the use of weighted branch lines and of thawed bait. Branch lines can be weighted either by attaching lead weights to the nylon leader or by inserting heavy nylon cord in the branch line. It is difficult to assess the detail of fishing gear because gear information is subject to intellectual property right of fishermen. Some observed vessels used lead-cored branch lines in 2011-2012.

Performance of weighted and un-weighted branchlines deployed with revised “hybrid” tori lines on two Japanese vessels participating in the 2010 tuna joint venture fishery in the South Africa EEZ was compared in collaboration with the Washington Sea Grant, University of Washington and Japan. This study showed that branchline weighting was highly effective at preventing seabird attacks within the aerial extent of streamer lines and allowing none between the two hybrid streamer lines in diving seabirds dominated system. The higher rate of tangling of weighted branchlines relative to un-weighted branchlines is the only remaining barrier to making branchline weighting practical.

<u>Measures under Development/Testing</u>

1) Mitigation Measures:

Mitigation measures to reduce incidental catch of sea turtles in longline fishery have been developed and experimented in Japan according to the FAO guidelines to reduce sea turtle mortality in fishing operations. FRA is conducting surveys on the effects of circle hooks on catch rates of sea turtles, tuna and shark.

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 2012. The use of circle hooks is effective to reduce incidental catch or deep hooking of sea turtles. Most of sea turtles caught by shallow longlines were retrieved alive. The result indicates that careful live retrieval and release is effective in improving the post-hooking survival of hooked sea turtles.

De-hooking devices and sea turtle handling manuals are developed to improve post-hooking survival of sea turtles.

2) Conservation and Management

Large number of leatherback turtles is known to nest in Jamursba-medi and Wermon, West Papua, Indonesia. Nest counts, assessment of hatching success, and improvement of nesting environments for leatherbacks have been conducted since 1999 in Indonesia with the collaboration of the Indonesia Sea Turtle Research Center and Everlasting Nature of Asia, which is a Non-Profit Organization (NPO) in Japan. The nesting survey revealed that Indonesian population of leatherback turtles were suffering from poor reproductive success due to beach erosion, egg predation and low hatching rates. The Everlasting Nature constructed electric fences in the highest-density nesting area to prevent pig predation on leatherback eggs. The electric fence drastically reduced the predation rates of eggs. Sea turtle populations have been affected by many factors on land and at sea (disappearance of nesting beaches, hatchling production, predation of eggs and turtles, interaction with fisheries such as trawl, gillnet, set-net, trap, purse-seine, and longline). Therefore, holistic management is necessary for the conservation of sea turtles, especially leatherback turtles.

8. Public Relations and Education Activities

Public Relations Activities

1) Educational materials, including booklets pamphlets, video program (DVD/VHS), cartoons were prepared by FRA, the Global Guardian Trust (GGT), and the Organization for the Promotion of Responsible Tuna Fisheries (OPRT), and were distributed to fishermen and other parties related to fishing industry to explain the importance of reducing incidental catch of seabirds and sea turtles.

-Identification guide for sharks, seabirds and sea turtles.

-Booklets and leaflets that illustrate methods for avoiding incidental catch and appropriate handling of seabirds and sea turtles;

-A guide book which summarizes the NPOA-Seabirds and NPOA-Sharks.

-A video program (VHS and DVD) which explain mitigation measures to reduce longline interactions with seabirds and sea turtles.

2) Under the government contract and with the cooperation of FRA and tuna fishing industries, GGT and Japan NUS had hold seminars for fishers at key fishing ports of longline fleets in Japan. In these seminars, mitigation techniques and methods for releasing live birds were explained by using various kinds of educational materials. Furthermore, they distributed tori lines and circle hooks to longline fishers, without charge, to facilitate the use of tori lines and circle hooks, and to test their effectiveness in commercial fishery. They also continued information exchange with fishers through discussion and questionnaires at the seminars and through port-side interviewing with fishers about practical usage and innovation/improvement on tori lines and other mitigation measures.

Education

Crew training, especially ship masters

The Federation of Japan Tuna Fisheries Co-operative Associations has hold seminars for crew members, ship masters and ship owners in fishing ports (i.e. Kesen-numa). Also, the Federation of Japan Tuna Fisheries Co-operative Associations has distributed brochures on bycatch mitigation to Japanese longliners at foreign ports (i.e. Cape Town). The Federation of Japan Tuna Fisheries Co-operative Associations will continue this effort.

Observers

Before the cruises, scientific observer candidates have to take a training seminar. JOP held the training seminars twice a year to train scientific observers in 2011 and 2012. During the training seminars, the candidates brushed up their knowledge and skills on research method, recording procedure and safety. Some training included the practical training with the actual tuna to measure the fish size and to collect the biological samples. After the return from the commercial longline vessels, every observer reported their research activity. Their experiences and information have been used for the improvement of the observer program and next research activity. (CCSBT-ERS/1308/Info03).

9. Information on other ERS (non-bycatch) such as prey and predator species

The diet of juvenile (predominantly age 1) southern bluefin tuna *Thunnus maccoyii* (SBT, N = 720), caught over 11 years of the recruitment monitoring survey off southern Western Australia during summer, consisted overwhelmingly of teleosts (97.4% by volume). Pilchard *Sardinops sagax* (27.4%V), blue mackerel *Scomber australasicus* (16.7%V), and jack mackerel *Trachurus declivis* (14.2%V) were the major taxa, with pilchard more abundant in coastal waters and jack mackerel more frequently encountered in fish caught closer to the shelf-edge. Prey size varied from 5 to 240 mm, with 67% of ingested items measuring between 30 and 50 mm. Pilchard dominated the prey size category 130–190 mm (84% by number), but the overall contribution of this species to the diet of juvenile SBT was much lower than previously reported. Future research in relation to the feeding ecology of juvenile SBT should focus on the biology and ecology of the young lifestages of the main prey species in this area and on prey distribution and dynamics as a key factor linking environmental change and SBT distribution.

10. Others

No other information.

11. Implementation of the IPOA-Seabirds and IPOA-Sharks

Japan developed its own National Plans of Action (NPOAs) for both seabirds and sharks in 2001 according to the FAO International Plans of Action (IPOAs) and revised them in 2009 taking into account the latest management measures taken by several RFMOs. Fisheries Agency of Japan (FAJ) disseminated the NPOAs to fishermen through local governments and fishermen's organizations. FAJ has reviewed implementation status of these two NPOAs and submitted its implementation reports to the FAO Committee on Fisheries (COFI) every two years since 2003.

Table 1: Reporting form for estimation of total mortality of ERS in CCSBT fisheries

Country Japan Year (calendar year) 2011

Species (or group) Blue shark

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[1]	Total Observed Effort[1]	Observer Coverage[2]	Captures (*number*)	Capture Rate[3]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	240	1.502	218	1.364	14	
5	1,636,791	80,580	4.9%	82	1.018	68	0.844	5	
6	0	0							
7	1,986,133	146,552	7.4%	566	3.862	334	2.279	232	
8	2,801,163	589,051	21.0%	1540	2.614	1321	2.243	215	
9	7,252,181	985,154	13.6%	2138	2.170	1624	1.648	465	
TOTAL									

[1] For longline provide number of hooks, for purse seine provide number of sets.
[2] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[3] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Shortfin mako shark

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[4]	Total Observed Effort[1]	Observer Coverage[5]	Captures (*number*)	Capture Rate[6]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	62	0.388	47	0.294	15	
5	1,636,791	80,580	4.9%	67	0.831	36	0.447	28	
6	0	0							
7	1,986,133	146,552	7.4%	26	0.177	23	0.157	3	
8	2,801,163	589,051	21.0%	14	0.024	14	0.024	0	
9	7,252,181	985,154	13.6%	99	0.100	98	0.099	1	
TOTAL									

[4] For longline provide number of hooks, for purse seine provide number of sets.
[5] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[6] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Porbeagle

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[7]	Total Observed Effort[1]	Observer Coverage[8]	Captures (*number*)	Capture Rate[9]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	0	0.000	0	0.000	0	
5	1,636,791	80,580	4.9%	0	0.000	0	0.000	0	
6	0	0							
7	1,986,133	146,552	7.4%	58	0.396	22	0.150	36	
8	2,801,163	589,051	21.0%	280	0.475	177	0.300	103	
9	7,252,181	985,154	13.6%	158	0.160	115	0.117	42	
TOTAL									

[7] For longline provide number of hooks, for purse seine provide number of sets.
[8] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[9] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Other sharks

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[10]	Total Observed Effort[1]	Observer Coverage[11]	Captures (*number*)	Capture Rate[12]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	286	1.789	21	0.131	260	
5	1,636,791	80,580	4.9%	278	3.450	11	0.137	250	
6	0	0							
7	1,986,133	146,552	7.4%	28	0.191	6	0.041	22	
8	2,801,163	589,051	21.0%	25	0.042	0	0.000	24	
9	7,252,181	985,154	13.6%	122	0.124	77	0.078	40	
TOTAL									

[10] For longline provide number of hooks, for purse seine provide number of sets.
[11] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[12] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Large albatrosses

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[13]	Total Observed Effort[1]	Observer Coverage[14]	Captures (*number*)	Capture Rate[15]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	13	0.081	13	0.081	0	
5	1,636,791	80,580	4.9%	8	0.099	8	0.099	0	
6	0	0							
7	1,986,133	146,552	7.4%	1	0.007	1	0.007	0	
8	2,801,163	589,051	21.0%	4	0.007	4	0.007	0	
9	7,252,181	985,154	13.6%	12	0.012	11	0.011	1	
TOTAL									

[13] For longline provide number of hooks, for purse seine provide number of sets.
[14] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[15] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Dark coloured albatrosses

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[16]	Total Observed Effort[1]	Observer Coverage[17]	Captures (*number*)	Capture Rate[18]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	0	0.000	0	0.000	0	
5	1,636,791	80,580	4.9%	0	0.000	0	0.000	0	
6	0	0							
7	1,986,133	146,552	7.4%	0	0.000	0	0.000	0	
8	2,801,163	589,051	21.0%	1	0.002	1	0.002	0	
9	7,252,181	985,154	13.6%	4	0.004	3	0.003	1	
TOTAL									

[16] For longline provide number of hooks, for purse seine provide number of sets.
[17] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[18] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Other albatrosses

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[19]	Total Observed Effort[1]	Observer Coverage[20]	Captures (*number*)	Capture Rate[21]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	8	0.050	8	0.050	0	
5	1,636,791	80,580	4.9%	2	0.025	2	0.025	0	
6	0	0							
7	1,986,133	146,552	7.4%	44	0.300	44	0.300	0	
8	2,801,163	589,051	21.0%	104	0.177	101	0.171	2	
9	7,252,181	985,154	13.6%	76	0.077	76	0.077	0	
TOTAL									

[19] For longline provide number of hooks, for purse seine provide number of sets.
[20] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[21] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Other petrels

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[22]	Total Observed Effort[1]	Observer Coverage[23]	Captures (*number*)	Capture Rate[24]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	6	0.038	6	0.038	0	
5	1,636,791	80,580	4.9%	0	0.000	0	0.000	0	
6	0	0							
7	1,986,133	146,552	7.4%	11	0.075	11	0.075	0	
8	2,801,163	589,051	21.0%	12	0.020	12	0.020	0	
9	7,252,181	985,154	13.6%	7	0.007	7	0.007	0	
TOTAL									

[22] For longline provide number of hooks, for purse seine provide number of sets.
[23] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[24] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Other seabirds

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[25]	Total Observed Effort[1]	Observer Coverage[26]	Captures (*number*)	Capture Rate[27]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	0	0.000	0	0.000	0	
5	1,636,791	80,580	4.9%	0	0.000	0	0.000	0	
6	0	0							
7	1,986,133	146,552	7.4%	0	0.000	0	0.000	0	
8	2,801,163	589,051	21.0%	0	0.000	0	0.000	0	
9	7,252,181	985,154	13.6%	1	0.001	1	0.001	0	
TOTAL									

[25] For longline provide number of hooks, for purse seine provide number of sets.
[26] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[27] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Unidentified birds

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[28]	Total Observed Effort[1]	Observer Coverage[29]	Captures (*number*)	Capture Rate[30]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	35	0.219	32	0.200	3	
5	1,636,791	80,580	4.9%	1	0.012	1	0.012	0	
6	0	0							
7	1,986,133	146,552	7.4%	21	0.143	20	0.136	1	
8	2,801,163	589,051	21.0%	33	0.056	33	0.056	0	
9	7,252,181	985,154	13.6%	12	0.012	11	0.011	1	
TOTAL									

[28] For longline provide number of hooks, for purse seine provide number of sets.
[29] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[30] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2011

Species (or group) Leatherback turtle

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[31]	Total Observed Effort[1]	Observer Coverage[32]	Captures (*number*)	Capture Rate[33]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	4,077,280	159,830	3.9%	0	0.000	0	0.000	0	
5	1,636,791	80,580	4.9%	1	0.012	0	0.000	1	
6	0	0							
7	1,986,133	146,552	7.4%	0	0.000	0	0.000	0	
8	2,801,163	589,051	21.0%	0	0.000	0	0.000	0	
9	7,252,181	985,154	13.6%	0	0.000	0	0.000	0	
TOTAL									

[31] For longline provide number of hooks, for purse seine provide number of sets.
[32] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[33] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Blue shark

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[34]	Total Observed Effort[1]	Observer Coverage[35]	Captures (*number*)	Capture Rate[36]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	112	0.420	29	0.109	0	
5	1,490,011	20,702	1.4%	17	0.821	0	0.000	0	
6	0	0							
7	2,451,017	110,110	4.5%	46	0.418	40	0.363	1	
8	2,518,715	279,867	11.1%	944	3.373	928	3.316	15	
9	6,151,022	583,245	9.5%	1065	1.826	965	1.655	71	
TOTAL									

[34] For longline provide number of hooks, for purse seine provide number of sets.
[35] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[36] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Shortfin mako shark

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[37]	Total Observed Effort[1]	Observer Coverage[38]	Captures (*number*)	Capture Rate[39]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	66	0.247	66	0.247	0	
5	1,490,011	20,702	1.4%	1	0.048	1	0.048	0	
6	0	0							
7	2,451,017	110,110	4.5%	5	0.045	5	0.045	0	
8	2,518,715	279,867	11.1%	6	0.021	3	0.011	3	
9	6,151,022	583,245	9.5%	39	0.067	38	0.065	1	
TOTAL									

[37] For longline provide number of hooks, for purse seine provide number of sets.
[38] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[39] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Porbeagle

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[40]	Total Observed Effort[1]	Observer Coverage[41]	Captures (*number*)	Capture Rate[42]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	0	0.000	0	0.000	0	
5	1,490,011	20,702	1.4%	0	0.000	0	0.000	0	
6	0	0							
7	2,451,017	110,110	4.5%	10	0.091	2	0.018	8	
8	2,518,715	279,867	11.1%	58	0.207	10	0.036	48	
9	6,151,022	583,245	9.5%	360	0.617	358	0.614	1	
TOTAL									

[40] For longline provide number of hooks, for purse seine provide number of sets.
[41] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[42] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Other sharks

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[43]	Total Observed Effort[1]	Observer Coverage[44]	Captures (*number*)	Capture Rate[45]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	98	0.367	6	0.022	12	
5	1,490,011	20,702	1.4%	11	0.531	0	0.000	0	
6	0	0							
7	2,451,017	110,110	4.5%	2	0.018	0	0.000	0	
8	2,518,715	279,867	11.1%	12	0.043	2	0.007	9	
9	6,151,022	583,245	9.5%	19	0.033	11	0.019	7	
TOTAL									

[43] For longline provide number of hooks, for purse seine provide number of sets.
[44] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[45] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Large albatrosses

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[46]	Total Observed Effort[1]	Observer Coverage[47]	Captures (*number*)	Capture Rate[48]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	3	0.011	3	0.011	0	
5	1,490,011	20,702	1.4%	0	0.000	0	0.000	0	
6	0	0							
7	2,451,017	110,110	4.5%	1	0.009	1	0.009	0	
8	2,518,715	279,867	11.1%	0	0.000	0	0.000	0	
9	6,151,022	583,245	9.5%	5	0.009	5	0.009	0	
TOTAL									

[46] For longline provide number of hooks, for purse seine provide number of sets.
[47] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[48] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Dark coloured albatrosses

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[49]	Total Observed Effort[1]	Observer Coverage[50]	Captures (*number*)	Capture Rate[51]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	0	0.000	0	0.000	0	
5	1,490,011	20,702	1.4%	0	0.000	0	0.000	0	
6	0	0							
7	2,451,017	110,110	4.5%	0	0.000	0	0.000	0	
8	2,518,715	279,867	11.1%	0	0.000	0	0.000	0	
9	6,151,022	583,245	9.5%	8	0.014	7	0.012	0	
TOTAL									

[49] For longline provide number of hooks, for purse seine provide number of sets.
[50] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[51] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Other albatrosses

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[52]	Total Observed Effort[1]	Observer Coverage[53]	Captures (*number*)	Capture Rate[54]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	3	0.011	3	0.011	0	
5	1,490,011	20,702	1.4%	0	0.000	0	0.000	0	
6	0	0							
7	2,451,017	110,110	4.5%	6	0.054	5	0.045	0	
8	2,518,715	279,867	11.1%	0	0.000	0	0.000	0	
9	6,151,022	583,245	9.5%	34	0.058	30	0.051	2	
TOTAL									

[52] For longline provide number of hooks, for purse seine provide number of sets.
[53] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[54] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Unidentified albatrosses

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[55]	Total Observed Effort[1]	Observer Coverage[56]	Captures (*number*)	Capture Rate[57]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	0	0.000	0	0.000	0	
5	1,490,011	20,702	1.4%	0	0.000	0	0.000	0	
6	0	0							
7	2,451,017	110,110	4.5%	0	0.000	0	0.000	0	
8	2,518,715	279,867	11.1%	0	0.000	0	0.000	0	
9	6,151,022	583,245	9.5%	7	0.012	4	0.007	1	
TOTAL									

[55] For longline provide number of hooks, for purse seine provide number of sets.
[56] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[57] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Other petrels

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[58]	Total Observed Effort[1]	Observer Coverage[59]	Captures (*number*)	Capture Rate[60]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	1	0.004	1	0.004	0	
5	1,490,011	20,702	1.4%	0	0.000	0	0.000	0	
6	0	0							
7	2,451,017	110,110	4.5%	3	0.027	3	0.027	0	
8	2,518,715	279,867	11.1%	0	0.000	0	0.000	0	
9	6,151,022	583,245	9.5%	14	0.024	14	0.024	0	
TOTAL									

[58] For longline provide number of hooks, for purse seine provide number of sets.
[59] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[60] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 1: Continued

Country Japan Year (calendar year) 2012

Species (or group) Unidentified birds

Fishery		Observed							Estimate
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[61]	Total Observed Effort[1]	Observer Coverage[62]	Captures (*number*)	Capture Rate[63]	Mortalities (*number*)	Mortality Rate[3]	Live releases (*number*)	Estimated total mortalities (*number*)
4	3,346,668	266,684	8.0%	3	0.011	3	0.011	0	
5	1,490,011	20,702	1.4%	0	0.000	0	0.000	0	
6	0	0							
7	2,451,017	110,110	4.5%	3	0.027	3	0.027	0	
8	2,518,715	279,867	11.1%	0	0.000	0	0.000	0	
9	6,151,022	583,245	9.5%	8	0.014	6	0.010	0	
TOTAL									

[61] For longline provide number of hooks, for purse seine provide number of sets.
[62] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[63] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.