National Report of Japan

Overview of Researches on Ecologically Related Species in Japanese SBT Longline Fishery, 2006-2007

Fisheries Agency of Japan

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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 take 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 take 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 quarter, at Area 8 in the third and fourth quarters, and at Area 9 in the second and third quarters.

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).

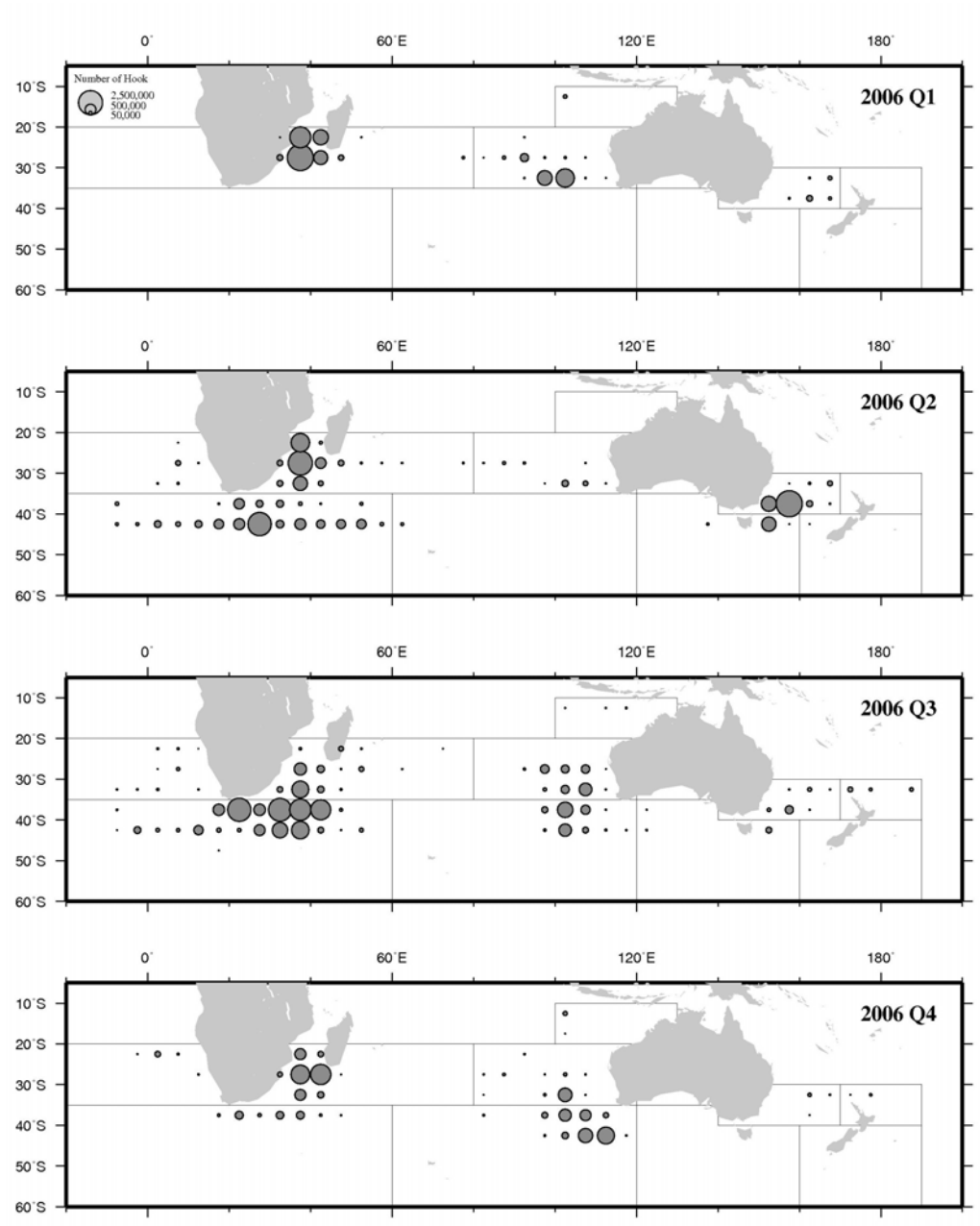


Fig.1. Number of fishing hooks used Japanese RTMP vessels by quarter and 5x5 degrees square in 2006.

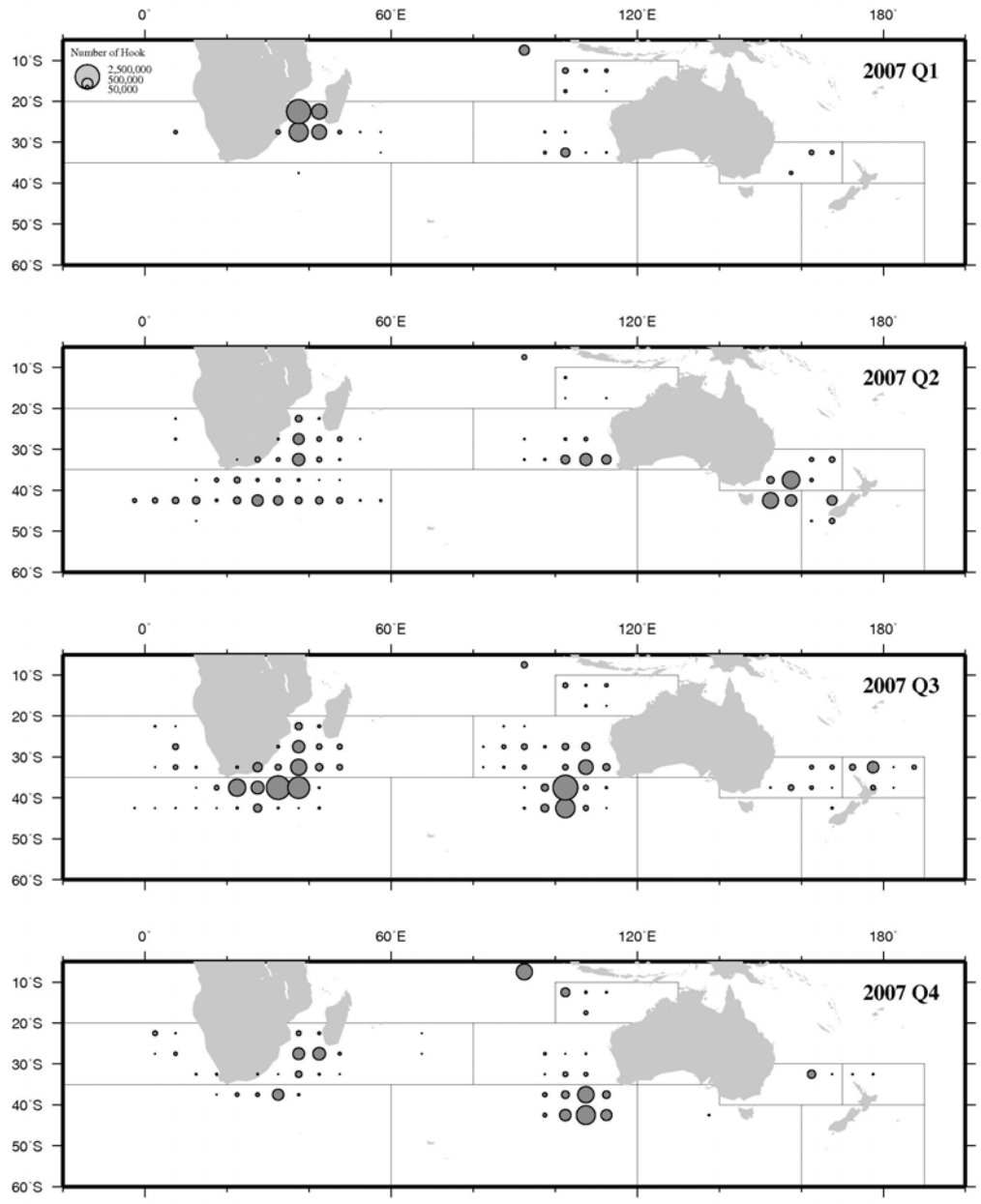


Fig.2. Number of fishing hooks used Japanese RTMP vessels by quarter and 5x5 degrees square in 2007.

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 by target and non-target species, biological information, incidental catch of seabirds, etc. In 2006 and 2007, 13 and 9 fishing vessels and 2,777,000 and 1,412,000 hooks were observed, respectively. Coverage of observation was 9.6

and 6.5 % for vessels and 8.2 and 5.7 % for hooks in 2006 and 2007, respectively (Table 1). The total costs of the scientific observer program were US$395,000 in 2006 and US$199,000 in 2007. The observation effort was tried to be distributed in proportion to the fishing effort for each area and season (CCSBT-ERS/0909/Info02).

Table 1. Number and coverage of fishing vessels and hooks observed in the Japanese RTMP observer program in 2006-2007.

Area	Year	Month	Number of vessels observed	Number of all vessels	Rate of observed vessels	Number of hooks observed (x1000)	Number of all hooks (x1000)	Rate of observed hooks
Area 8	2006	5	1	1	100.0%	39	39	100.4%
		7	0	7	0.0%	0	249	0.0%
		8	3	20	15.0%	206	1,290	15.9%
		9	2	18	11.1%	200	880	22.7%
		10	2	20	10.0%	141	1,139	12.4%
		11	1	22	4.5%	13	1,762	0.7%
		12	1	19	5.3%	38	893	4.3%
	2007	7	2	21	9.5%	51	326	15.8%
		8	2	31	6.5%	168	2,506	6.7%
		9	2	33	6.1%	119	2,066	5.8%
		10	2	25	8.0%	103	1,302	7.9%
		11	1	34	2.9%	57	2,544	2.2%
		12	0	13	0.0%	0	477	0.0%
Area 9	2006	4	0	2	0.0%	0	69	0.0%
		5	8	52	15.4%	474	2,923	16.2%
		6	9	62	14.5%	612	3,851	15.9%
		7	8	70	11.4%	668	4,830	13.8%
		8	4	76	5.3%	292	5,263	5.5%
		9	1	61	1.6%	3	3,256	0.1%
		10	0	26	0.0%	0	849	0.0%
		11	0	5	0.0%	0	78	0.0%
	2007	3	0	1	0.0%	0	5	0.0%
		4	0	4	0.0%	0	229	0.0%
		5	2	18	11.1%	54	554	9.7%
		6	3	35	8.6%	218	1,869	11.7%
		7	5	42	11.9%	131	2,268	5.8%
		8	4	43	9.3%	209	2,429	8.6%
		9	2	37	5.4%	168	2,073	8.1%
		10	2	17	11.8%	117	644	18.1%
		11	1	1	100.0%	17	15	112.5%[*1]
Area 8	2006	Total	5	42	11.9%	637	6,251	10.2%
	2007	Total	3	58	5.2%	499	9,221	5.4%
Area 9	2006	Total	9	87	10.3%	2,049	21,118	9.7%
	2007	Total	7	66	10.6%	913	10,088	9.1%
Area 4-9	2006	Apr.-Dec.	13	135	9.6%	2,777	33,745	8.2%
	2007	Apr.-Dec.	9	138	6.5%	1,412	24,962	5.7%

4. Seabird

Sixteen species of seabirds were recorded through RTMP observer program in 2006-2007. Annual total take of seabirds in 2006 and 2007 was estimated at 8,746 (95% CI: 4,082-14,182) and 3,852 (95% CI: 1,163-7,682), respectively. The recent level of incidental take of seabirds in RTMP were stable around 2,000-9,000 birds/year (CCSBT-ERS/0909/05).

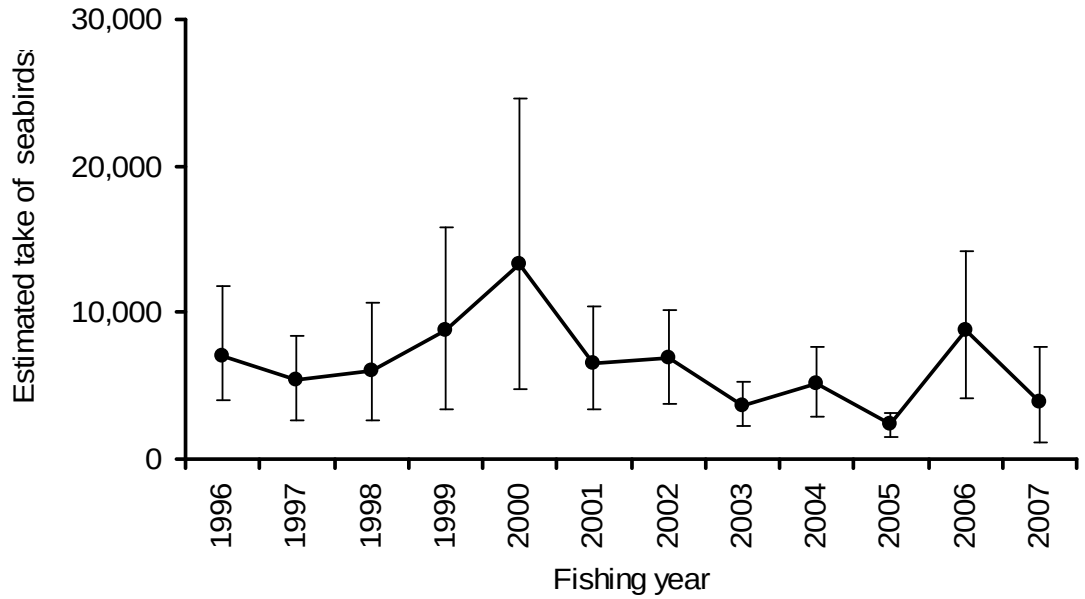


Fig.3. Annual trends of incidental take of seabirds in the Japanese SBT fisheries. Vertical bars indicate 95% confidence intervals.

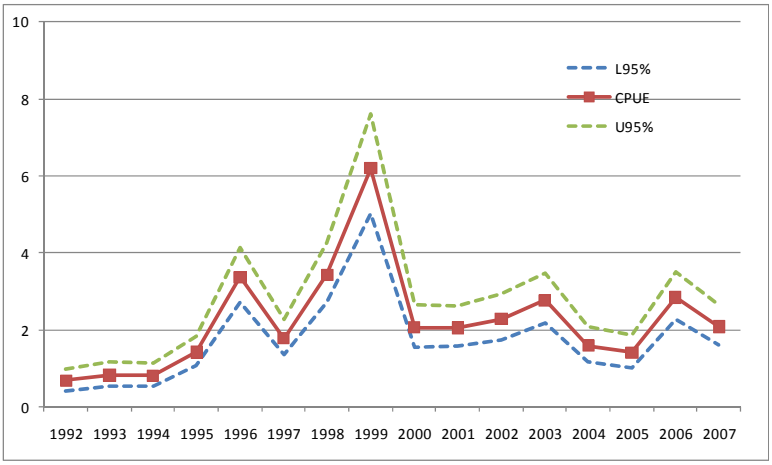
5. Other Non-target Fish

Fourteen species of elasmobranchs were reported by the RTMP observers in 2006-2007. Blue shark was most dominant occupying about 82.9-83.8% of elasmobranch catch observed, followed by porbeagle (7.8-9.6%). Velvet dogfish, shortfin mako shark, thresher sharks and pelagic stingray were also much caught. The standardized CPUEs of blue shark, porbeagle and shortfin mako shark were calculated using the RTMP and EFP observer data from 1992 to 2007. The standardized CPUEs of these three shark species seem to be stable with annual fluctuation and do not show any trend of long-term increase or decrease (Fig. 4, CCSBT/ERS/0909/06).

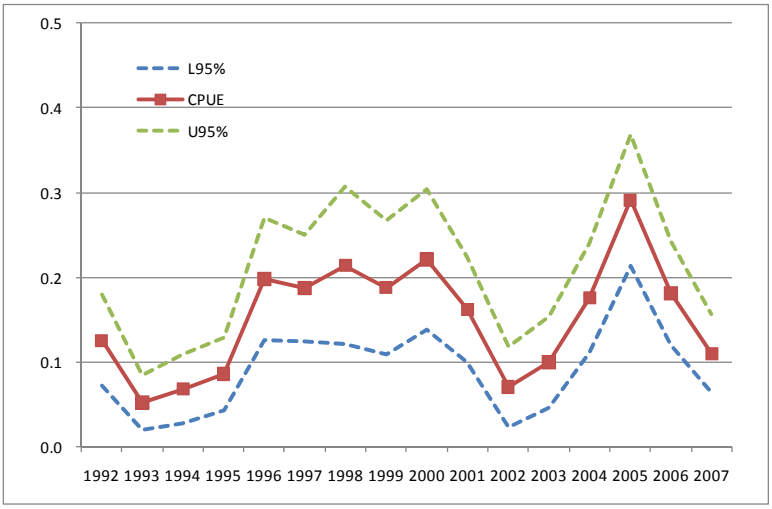
In the RTMP and EFP observer program, 3,339 sharks of 10 species were released with tags by the research vessels and scientific observers in about 11 years until 2008. Among the 3,339 tagged sharks, Blue shark was the most dominant species occupying 75% (2,492 individual), followed by porbeagle (21%, 701 individual). Twenty-five sharks were recaptured, which included 18 blue sharks and 7 porbeagles. Ratio of recapture was 0.7%. The longest time at liberty was 1,738 days, the longest migration was 5,400 km, and both of them were blue sharks (CCSBT-ERS/0909/07).

Many teleosts were caught by longline fishery other than tunas and billfishes in the SBT fishing ground. Forty-one species of teleost fish including tuna and billfish were identified in the RTMP observer data in 2006-2007. 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/0909/Info02).

Blue shark



Shortfin mako



Porbeable

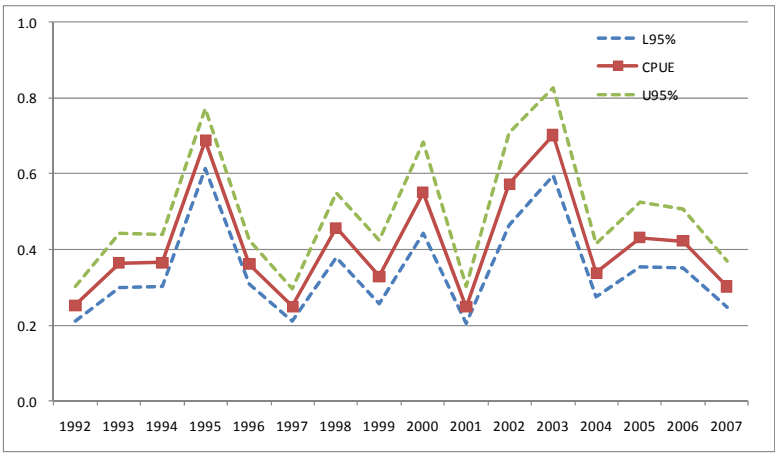


Fig.4. Annual trends in standardized CPUEs of blue, short-fin mako shark and porbeagle using three different models for 1992-2007.

6. Marine Mammal and Marine Reptile

Two Pinnipedia species and one loggerhead turtle were recorded through the Japanese

scientific observer program in 2006-2007 (CCSBT-ERS/0909/Info02). Incidental take 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 take for these animals.

7. Mitigation Measures to Minimize Seabird and Other Species Bycatch

Current Measures

Mandatory measures (tori line):

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 take of seabirds since 1997. Any violation of this condition is subject to punishment. The Government of Japan makes this mandatory measure known to every fisherman by specifying in the license.

Tori line (bird scaring line) is a seabird deterrent device, in which a line with threatening streamers is drawn from a pole installed at the end of a ship.

Following analyses were conducted to evaluate effectiveness of different kinds of tori lines for various sized and shaped longline vessels. Firstly, observer data collected in the Southern Ocean were analyzed to examine factors affecting effectiveness of tori lines. Among the factors examined in the GLM analysis, number of albatrosses sighted during line setting and lengths of tori line had significant effects. Conventional tori line (Type-A) and light-streamer tori line (Type-B) showed similar effectiveness in terms of reducing incidental take of seabirds. Secondly, controlled experiments with a chartered commercial fishing vessel (75GRT) and a research vessel (196GRT) were conducted in the North Pacific to compare the effectiveness of the conventional and light-streamer tori lines, and the results showed that the light-streamer tori line had larger aerial coverage, smaller bait-taken rate by Laysan albatross and smaller incidental taking rate of Laysan albatross. Finally, on-site trial tests with about 30 small and middle-sized longline vessels were conducted to obtain feedback from fishers on effectiveness and practicality of these two types of tori lines. These results indicated that both types of tori lines had satisfactory effectiveness of seabird avoidance and that the light-streamer tori-line was more user-friendly in these small and middle-sized longline vessels (CCSBT-ERS/0909/11).

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 take of seabirds by avoiding propeller turbulence, increasing sinking rates of baited hooks, and casting baited hooks constantly below the tori line. In 2006-2007, 86.7% and 100% 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. At least 4 observed vessels used lead-cored branch lines in 2006 and 2007. Of the 1,075 observed fishing operations, in which bait condition was recorded by onboard observers during line setting in 2006 and 2007, partially-thawed bait was used in 60.1%, and fully-thawed bait was used in 39.3%.

At least 5 observed vessels took the strategic offal control to keep seabirds away from the vessels temporarily by casting the retained offal and used bait to the side opposite to that of throwing the lines in case many seabirds gathered around the vessel.

Measures under Development/Testing

1) Mitigation Measures:

Mitigation measures to reduce incidental take 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. Under the contract with FRA, Hokkaido University is conducting research to explore ideal hook shape to reduce incidental mortality of sea turtles in longline fishery. 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, 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. Satellite tracking of post-nesting female leatherback turtles has been conducted in Jamursba-medi and Welmon since 2003, and it showed that post-nesting foraging areas of females differed according to the nesting seasons and/or areas. Most of the females that nested in dry season (mainly in the Jamursba-medi area) moved eastward to the central tropical Pacific, and small number of them moved northward to the western North Pacific off Japan and off Philippine. In contrast, females that nested in rainy season (in the Welmon area) moved southward to the South Pacific off Australia and off New Zealand. 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 (CCSBT-ERS/0909/10).

8. Public Relations and Education 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 take of seabirds and sea turtles.

-Identification guide for sharks, seabirds and sea turtles.

-Booklets and leaflets that illustrate methods for avoiding incidental take 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 hold seminars for fishers to explain the NPOA-Seabirds, NPOA-Sharks and draft guidelines for sea turtles. Instructions on mitigation techniques of incidental take of seabirds and sea turtles, handling methods for rescuing live-caught birds and turtles, and promotion of full utilization of sharks were given in the seminar. OPRT undertakes a grant program to promote the use of mitigation measures to reduce incidental mortality of sea turtles and seabirds in Japanese longline fishery. They support the use of circle hooks and distribute de-hooking devices and educational materials for commercial fishermen.

3) GGT, Japan NUS and FRA conducted an educational program for teachers and students of fishery high schools. They hold seminar in fishery high schools and gave lecture on the conservation and management of marine ecosystems. Research and/or training vessels of fishery high schools and local governments participated in the tuna resources survey and bycatch mitigation experiments.

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

Twelve and seven observers were trained in 2006 and 2007, respectively. Prior to the detachment to commercial vessels, all the observers took a training course on survey procedure, species identification, and safety ensuring. A debriefing session was held after the observer had returned to Japan to ensure data quality and to improve practicality and safety of the future program (CCSBT-ERS/0909/Info02).

9. Information on other ERS (non-bycatch)

Japan collect and analyze stomach contents of large pelagic species, including southern bluefin tuna (SBT), caught by Japanese longline between 1998 and 2008 in Area 4, 7, 8 and 9 for 5,314 individuals (including 3,449 SBT). In the stomachs contents from seven groups of predator species (SBT, bigeye tuna, yellowfin tuna, albacore, butterfly tuna, swordfish and lancetfishes), it was common that most of the wet weight compositions were made by Cephalopoda and Osteichthyes (Fig.5 CCSBT-ERS/0909/12). Comparing to SBT, prey weight compositions of Osteichthyes were larger for yellowfin tuna, butterfly tuna and swordfish and smaller for albacore. Prey weight composition, as well as the ratio of prey weight to body weight of predator (%BW), were similar regardless of body size of SBT. To understand the feeding ecology of SBT for the whole distribution area and the whole its life history, investigations and cooperation among the CCSBT members should be encouraged.

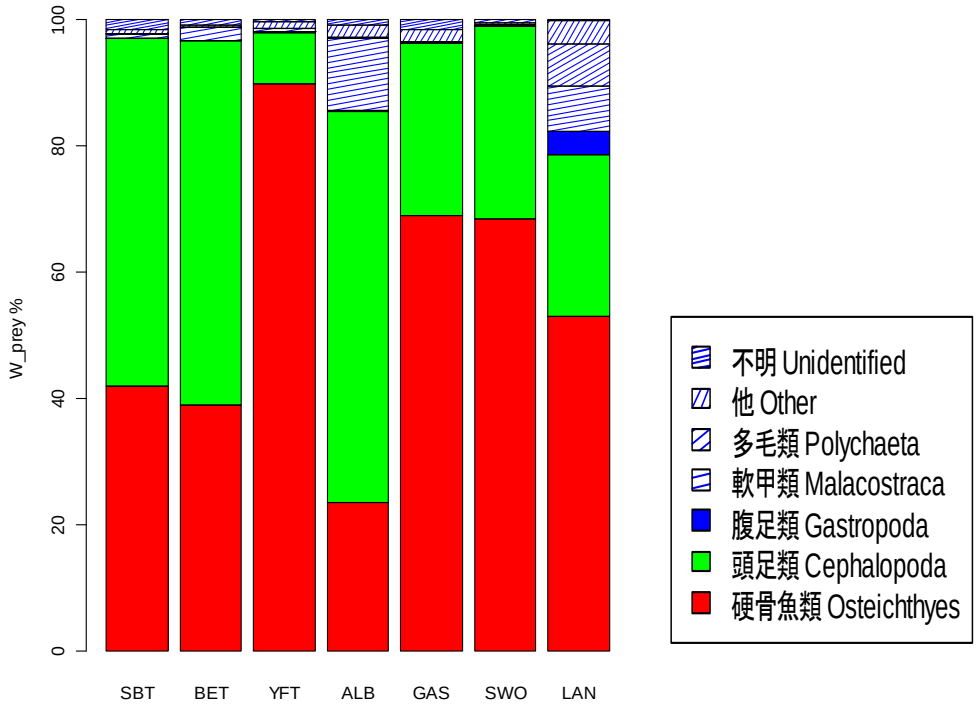


Fig.5. Compositions of the prey in the wet weight of prey for the seven species caught by longline in the CCSBT statistical area 4, 7, 8, and 9.

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.