Assessment Report On The Implementation of Japan's National Plan of Action For Reducing Incidental Catch of Seabirds In Longline Fisheries

(Preliminary version)

(Document for submission to the 26th FAO Committee on Fisheries)

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Introduction

The FAO International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (IPOA-Seabirds) was adopted at the 23rd FAO Committee on Fisheries in February 1999. Following this decision, Japan developed its National Plan of Action (NPOA-Seabirds) through discussion and consultation with the National Consultative Committee as well as internal discussion within the national government. Japan's NPOA-Seabirds was reported to the 24th FAO Committee on Fisheries in March 2001.

Under the NPOA-Seabirds, Japan has strived to reduce the incidental take of seabirds by longline fisheries and has achieved successful results. This document reports on the assessment and implementation of the NPOA-Seabirds to the 26th FAO Committee on Fisheries in March 2005 in accordance with paragraph 21 of the IPOA-Seabirds.

1. The current status of relevant fisheries

(1) Types of fisheries

Longline fisheries in Japan can be classified into categories based on target fish species and size of fishing vessels. Except for very small-scale vessels, longline fisheries are managed by national or prefectural governments depending on the range and scale of operations. Fisheries subject to the NPOA-Seabirds include distant-water tuna longline fisheries, near-shore tuna longline fisheries, and coastal tuna longline fisheries under the management of the national government; and other small-scale longline fisheries operating in Japanese coastal waters under the management of prefectural governments.

(2) Current status of fisheries

(i) Distant-water tuna longline fishery

This pelagic longline fishery uses fishing vessels of 120 tons or greater and is managed on a vessel-by-vessel basis by the national government. Major areas of operation include the Pacific, Indian and Atlantic Oceans. As a result of vessel decommissioning in 1999 in accordance with the FAO IPOA-Capacity, the fleet was reduced by 132 vessels, which corresponded to approximately 20% of the total number of tuna longline vessels at the time. As of August 2004, the number of fishing vessels was 506, representing a further reduction of 19 vessels since the previous Assessment Report.

(ii) Near-shore tuna longline fishery

This pelagic longline fishery (as distinguished from the coastal tuna longline fishery in (iii)) uses fishing vessels between 10-120 tons, and is managed on a vessel-by-vessel basis by the national government. The areas of operation are Japan's near-shore waters and the Central and Western Pacific. The number of fishing vessels has been declining annually, and as of August 2004 stood at 403, a decrease of 24 vessels since the previous Assessment Report.

(iii) Coastal tuna longline fishery

This pelagic longline fishery operates primarily in Japan's Exclusive Economic Zone, using fishing vessels of 10-20 tons, and is managed on a vessel-by-vessel basis by the national government. The number of fishing vessels has decreased slightly in recent years to 365 (of which 252 are concurrently engaged both in this fishery and in the near-shore tuna longline fishery in (ii)) as compared with 399 at the time of the previous Assessment Report.

(iv) Other longline fisheries operating in Japan's coastal and offshore areas

These are small-scale longline fisheries managed primarily by prefectural governments. Their operations in Japan's coastal and offshore areas are characterized by single-day trips and limited seasons.

The number of fishing vessels (5 tons or larger) in 2002 was 1,810, a decrease of 226 vessels (13%) since the previous Assessment Report. The main target fish are cod and pufferfish species.

(v) Summary

The number of all of the above longline fishing vessels subject to the NPOA-Seabirds has been significantly reduced in recent years as a result of the government's policy to reduce fishing effort, thus substantially contributing not only to the management of tuna resources, but also to a reduction in the incidental take of seabirds. However, despite such efforts in Japan, according to FAO statistics the fishing effort in longline fisheries worldwide, particularly tuna longline fisheries, continues to increase. Concerted actions to reduce fishing effort by other longline fishing nations are therefore highly desirable.

(3) Management of fisheries

Vessels operating in tuna longline fisheries managed by the national government must obtain a license from the Minister of Agriculture, Forestry and Fisheries (distant-water tuna longline fisheries, near-shore tuna longline fisheries) or submit a confirmation of notification for operation (coastal tuna longline fisheries), in accordance with national laws and regulations. In license-based fisheries, the Minister determines the overall number of licensed fishing vessels and the conditions of operation taking into account the state of the resources. This decision is reviewed once every five years. In recent years, the number of licensed vessels has been decreasing. In the fisheries requiring notification, submission of an annual operations plan is required at the time of notification to the Minister. Furthermore, in tuna longline fisheries managed by the national government, vessels are asked to submit trip-by-trip logbook reports for target and non-target species, which allow for a better understanding of the status of catch and incidental catch species, including seabirds.

Other small-scale longline fisheries are managed mainly under the licensing systems of prefectural governments. However, the national government requests these fisheries to provide information on their incidental take of seabirds.

2. Occurrence of incidental take of seabirds and introduction of mitigation measures to avoid incidental take

In order to confirm the implementation status of the NPOA-Seabirds, relevant fishery organizations were surveyed regarding their experience with incidental take as well as methods of mitigation and their implementation.

(1) Distant-water tuna longline fisheries, near-shore tuna longline fisheries, and coastal tuna longline fisheries

(i) Southern bluefin tuna fishing grounds

Distant-water tuna longline fishing vessels are operating in the southern bluefin tuna fishing ground. At the time of the previous Assessment Report, the reported occurrence of incidental catch was 95%. The rate of implementation of tori-poles as required by government order was 100%, use of automatic bait-casting machines was 100%, use of weighted branch lines was 91%, and use of night line setting was 70%. Thus, full implementation of the NPOA-Seabirds has been achieved.

(ii) Areas in the Pacific Ocean north of 20 degrees N

Near-shore tuna longline fishing vessels are mostly operating in the waters of the central and western Pacific north of 20 degrees N. At the time of the previous Assessment Report, the reported occurrence of incidental catch was 78%. Implementation of mitigation measures by fishing vessels operating in this area was relatively high: use of the tori-pole was 71%; use of weighted branch lines was 77%; and use of thawed baits was 88%. Thus the introduction of the NPOA-Seabirds must be substantially contributing to the reduction of seabird incidental catch, but there remain future tasks of further promoting the introduction of mitigation devices and quantifying the amount of incidental catch.

(iii) Torishima Island Special Area (within 20 nautical miles of Torishima Island)

Torishima Island lies within the waters described in point (ii) above and hosts breeding colonies of the Short-tailed Albatross (*Diomedea albatrus*). All the near-shore tuna longline fishing vessels operating within 20 nautical miles of the island have implemented mitigation measures in accordance with the NPOA-Seabirds since May 2003.

Furthermore, in this specific area, in order to protect the Short-tailed Albatross, implementation of two or more methods of mitigation are required by the NPOA-Seabirds during the breeding period from May to October, and most of fishing vessels fulfilled this requirement.

(iv) Other areas

The reported occurrences of incidental catch by tuna longline fishing vessels operating in the Indian and the Atlantic Oceans were 0% and 5%, respectively.

(2) Other longline fisheries

With respect to small-scale longline fisheries operating day-trip fishing or seasonally limited fishing in coastal and offshore waters, a survey of fisheries cooperative associations was conducted through the prefectural governments. Of the associations surveyed, 14% reported having members with experience of incidental catch since March 2003. This rate has remained low since the previous Assessment Report. Of those fishing vessels reporting incidental take, many reported effective use of mitigation measures such as thawing of baits, the use of weighted branch lines and night line setting.

(3) Summary

(i) Incidental take of seabirds occurs with the highest frequency in the southern bluefin tuna waters (i.e. Indian Ocean mid to high latitude waters). In addition to Japan’s duty to comply with requirements for tori-pole mitigation as a contracting party to the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the NPOA-Seabirds also requires the use of other mitigation measures in combination with the tori-pole, and full implementation of those measures has been achieved. Because of these efforts, the incidental take of seabirds, which was said to total 30,000 to 50,000 birds a year, has been reduced to below 10,000 birds. However, to achieve further reduction of the incidental take of seabirds, promotion of research studies regarding new mitigation measures is necessary as the pace of reduction of seabird incidental catch has somewhat stalled in recent years.

(ii) Although no international measures are in place in the North Pacific, and despite the fact that small-size near-shore tuna longline fishing vessels are not well-suited to deployment of mitigation measures appropriate for the majority of vessels, all vessels in this area took some kind of mitigation measures. In the future, further research will be needed to identify which mitigation measures are the most effective and practical for small-size longline fishing vessels.

(iii) The number of fishing vessels operating near the breeding ground of the Short-tailed Albatross on Torishima Island was small, and the attainment of special measures requiring implementation of two or more mitigation measures was high. Nevertheless, efforts toward the full implementation of the NPOA-Seabirds, particularly this special measure, will continue.

(iv) In other waters (the Atlantic and the Indian Ocean), incidental take of seabirds is considered to be small, but this will continue to be monitored.

(4) Additional information from onboard scientific observers and survey vessels

(i) Information from scientific observer programs

(a) The southern bluefin tuna longline fishery is managed by the CCSBT and since 1992, scientific observers onboard fishing vessels have collected data on ecologically-related species as well as southern bluefin tuna through the Real-time Monitoring Program. The information obtained through observer programs since 1995 is summarized below.

Japan's fishing effort in the southern bluefin tuna longline fisheries increased until 1997, but leveled off at 40-50 million hooks in 1997-2001, and showed a declining trend since 2002. (Fig.1)

The total incidental catch of seabirds was estimated by extrapolating the incidental catch rate of seabirds in the observed fishing operations according to strata defined by sea area (south of 35 degrees S) and season. The estimated incidental catch of seabirds from 1996 to 2003 was consistently between 6,000-8,000 birds a year (Fig. 2). The high estimate for 2000 was due to low rates of observer coverage in some strata in that year.

According to preliminary analysis of observer data for 1992-1994, the number of seabirds caught incidentally in 1992 was high, totaling 35,000 birds. This corresponds to the approximately 40,000 individuals estimated by Brothers (1991) as Japan's incidental seabird catch. As this level of incidental seabird catch developed into an international issue, the tori-pole was introduced as a voluntary measure, and it rapidly decreased incidental seabird catches. Observer data show that incidental catch has remained relatively constant since 1997 as a result of Japan's requirement to use the tori-pole.

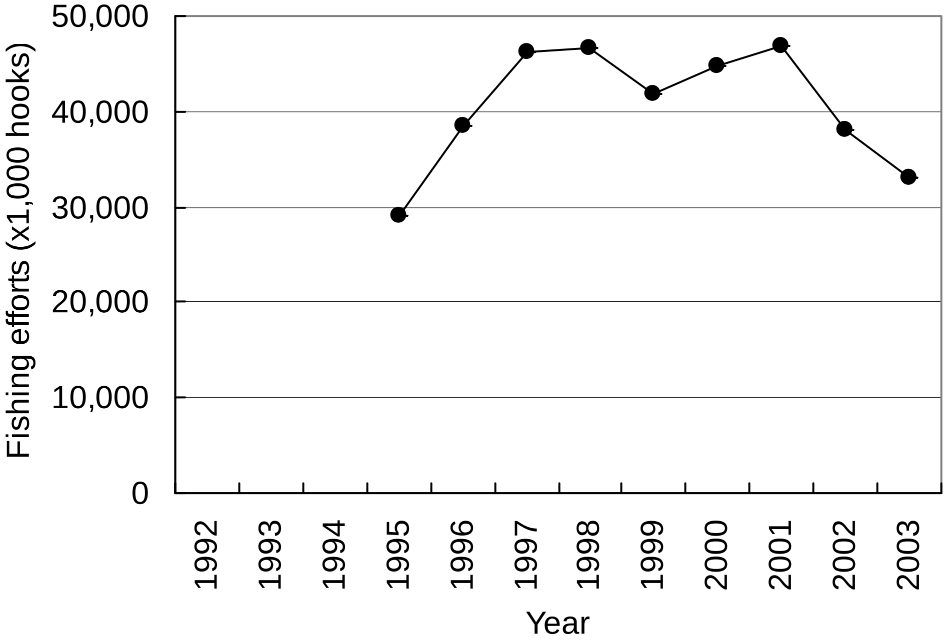

Fig.1.
Changes in fishing effort by Japan's high seas southern bluefin tuna longline fishery

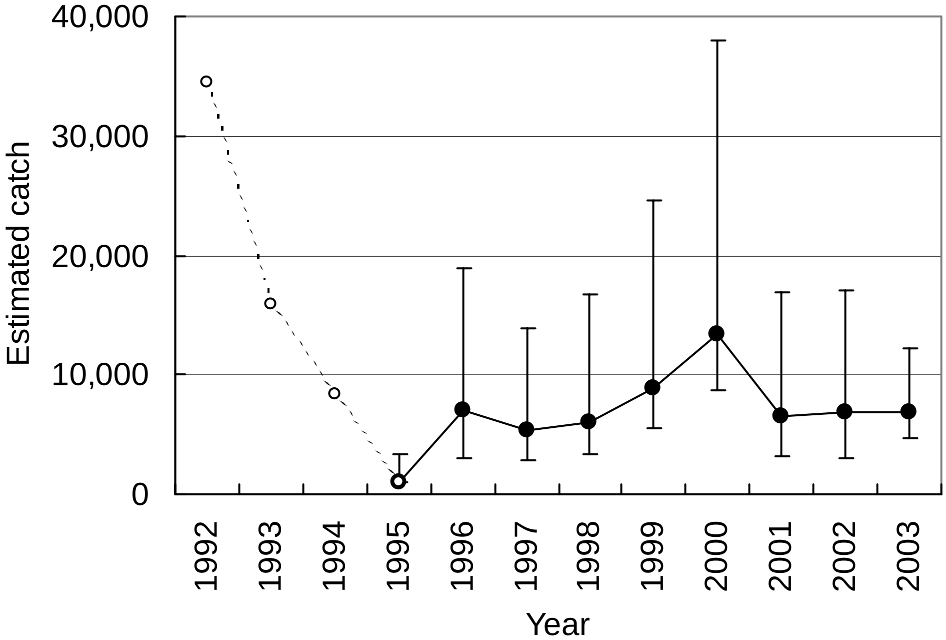

Fig. 2.
Changes in estimates of the number of seabirds caught incidentally in Japan's high seas southern bluefin tuna longline fishery (estimates for 1992-1994 are provided for reference only.)

On the whole, the number of seabirds caught incidentally was visibly reduced in Japan's high seas southern bluefin tuna longline fisheries in the first part of the 1990s as a result of the introduction of the tori-pole. Since then, however, there have been no conspicuous changes in numbers or rates of incidental catches, despite improved rates of implementation of other mitigation measures as a result of the NPOA-Seabirds.

(b) Atlantic longline fisheries

Tuna longline fisheries in the Atlantic are managed by the International Commission for the Conservation of Atlantic Tuna (ICCAT), and surveys by scientific observers onboard Japanese fishing vessels have been carried out since 1995. Generally, the incidental catch of seabirds in the Atlantic has remained at a low level (average catch rate of 0.0043 per 1,000 hooks). In particular, incidental seabird catches in the northern Atlantic are small, with only 3 petrels being caught (average catch rate of 0.00056 per 1,000 hooks). In the southern Atlantic, incidental seabird catches occurred in some areas. According to observer surveys off Angola in the Gulf of Guinea in 2003, 24 seabirds were taken incidentally at a rate of 0.0488 per 1,000 hooks. Incidental catch of petrels was highest in this area off Angola, and there was some incidental catch of albatrosses in this area also.

There is no incidental seabird catch problem in the North Atlantic, but since incidental catch occurred in the coastal and high latitude areas of the South Atlantic, caution is required in these areas.

(ii) Incidental catch in North Pacific longline fisheries based on data from government and other survey vessels

Information on incidental catch species has also been collected by prefectural government survey vessels and by fisheries high school training vessels. Species of seabirds have been identified using photographs taken onboard the vessels. Laysan Albatross (*Phoebastria immutabilis*) and Black-footed Albatross (*Phoebastria nigripes*) were the most commonly caught species, with a small portion of records composed of Streaked Shearwater (*Calonectris leucomelas*), Wedge-tailed Shearwater (*Puffinus pacificus*), Sooty Shearwater (*P. griseus*), and Blue-footed Booby (*Sula nebouxii*). There has been no record of incidental catch of Short-tailed Albatross.

According to data by government vessels, incidental catch of Laysan Albatross mainly occurred in the offshore fishing grounds east of the Japanese Archipelago (Western Pacific) and northwest of the Midway area (Central Pacific). In contrast, incidental catch of Black-footed Albatross occurred primarily northwest of the Midway area (Central Pacific) and in the eastern part of the North Pacific, showing that the at-sea distribution of these two species is divided longitudinally (Fig. 3).

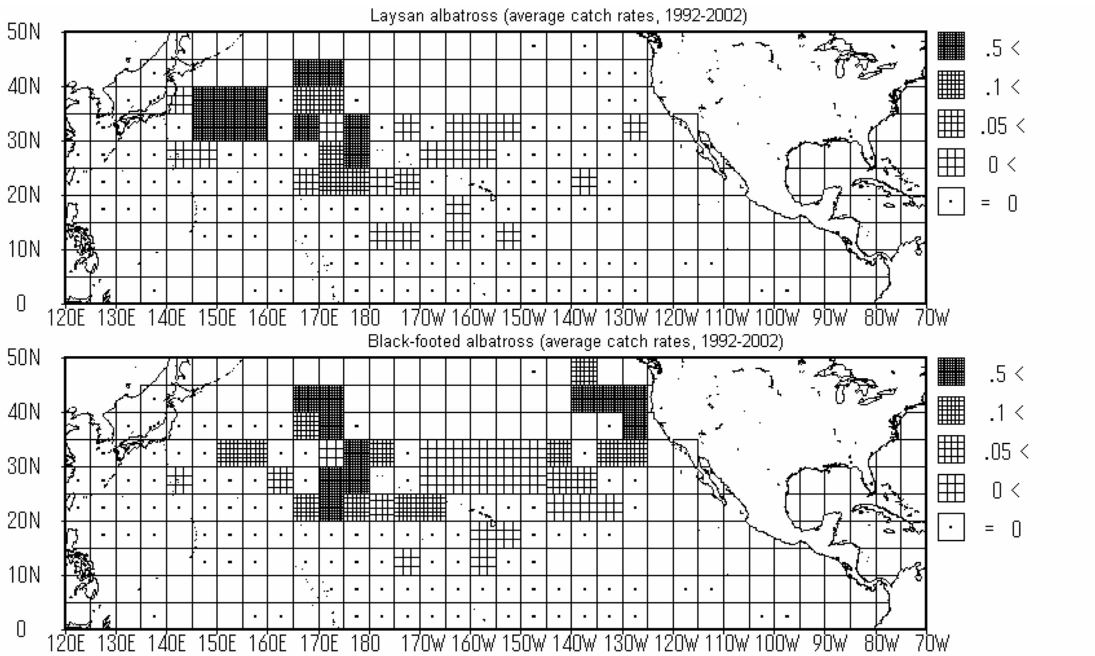

Fig. 3. Catch rates (per 1,000 hooks) of Laysan Albatross and Black-footed Albatross by area in surveys by government vessels (values shown are 1992-2002 averages).

(iii) Incidental catch in the Pacific based on logbook data from commercial fishing vessels)

Tuna longline fishing vessels under government management have been required since 1992 to submit records of species caught incidentally in tuna fisheries. As a result of factors such as vessel decommissioning, the fishing effort of the tuna longline fleet in the North Pacific has shown a long-term declining trend in the 1990s However, since 2000 effort has leveled off or, as in the case of the Central Pacific, showed an slightly increasing trend.

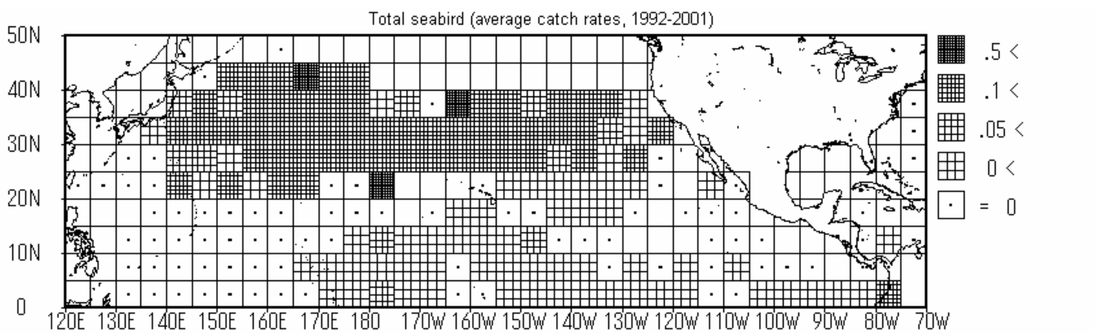

Fig. 4. Catch rates of seabirds (per 1,000 hooks) by area based on logbook data from commercial fishing vessels (values shown are 1992-2001 averages).

Analysis of data collected by commercial vessels shows that incidental catch of seabirds occurs mainly in a band extending across the North Pacific from 20 to 40 degrees N. (Fig. 4). This situation has served as the basis for introducing mitigation measures in the North Pacific by the

NPOA. The total number of birds caught per year was estimated at 3,000 in the Western North Pacific, 5,000 in the Central North Pacific, and 800 in the Eastern North Pacific. Incidental seabird catch rates fluctuated by year and area, but the average remained constant at around 0.07 birds per 1,000 hooks. For the entire North Pacific, recent estimates suggest that approximately 4,000 Laysan Albatrosses, 4,000 Black-footed Albatrosses and 800 Shearwaters are taken each year.

3. Status of seabird populations relevant to Japanese longline fisheries

(1) Trends in albatross populations in Japan and adjacent waters

Three species of albatrosses breed in the area surrounding Japan. The breeding of the Short-tailed Albatross is now confirmed only on Torishima Island in the Izu Islands and Minami-kojima and Kita-kojima Islands in the Senkaku Islands. In the 19th century, large numbers of Short-tailed Albatross bred on Torishima Island and other islands off Japan, but the number declined sharply because of overexploitation due to feather harvesting. This species was believed to be extinct in 1949, but the existence of 10 birds was subsequently confirmed on Torishima Island in 1951. Since then, environmental enhancement and conservation activities undertaken in the breeding area have led to rapid recovery of the population such that in 2004 numbers had increased to 1,655 birds.

Little information is available about the Short-tailed Albatross in the Senkaku Islands, but in 2002, approximately 250 birds were nesting on Minami-kojima Island and showing an increasing population trend. In addition to known breeding grounds on Minami-kojima Island, nesting was also confirmed at a new colony in the Kita-kojima Islands in 2002. Furthermore, in recent years, one adult bird settled on Yomejima Island in the Mukojima Islands of the Ogasawara Islands group, and young birds were found on Torishima Island in the Mukojima Islands. Thus there is a possibility for the breeding range of this species to expand in the future.

The Black-footed Albatross breeds mainly on the Hawaiian Islands. This species also breeds on Torishima Island of the Izu Islands (about 1,400 pairs), the Mukojima Islands of the Ogasawara Island group (about 400 pairs), and the Senkaku Islands (about 30 pairs). The number of breeding pairs on Torishima Island is showing an increasing trend: about 500 pairs in the early 1980s and 700-750 pairs in 1996 (Hayashi et al. 1997). The Black-footed Albatross in the Mukojima Islands is also said to be increasing in number, but no detailed information is available for birds on the Senkaku Islands.

The Laysan Albatross is the most abundant albatross species inhabiting the Northern Hemisphere. Their major breeding grounds are located on the Hawaiian Islands. Small numbers of breeding birds (20-30 pairs in total) are observed in Japan on Torishima Island and the Mukojima Islands of the Ogasawara Island group.

(2) Trends of albatross populations in the Central and Eastern Pacific

The Hawaiian Islands in the Central Pacific contain the main breeding grounds of Laysan and Black-footed Albatrosses. In the Hawaiian Islands, the number of these albatrosses was affected by harvesting for feathers and eggs from the late 1800s to the 1930s, and military activities since the middle of the 1990s. Since 1988, when Midway Atoll was designated as a National Wildlife Refuge, conservation and management of albatrosses have been promoted by the United States Fish and Wildlife Service (USFWS).

There is a large population of Laysan Albatross on Midway Atoll, with 286,662 pairs breeding in 2001. On Laysan Island where the second largest population is found, 103,689 pairs bred in 2001. A small population (about 50 pairs) breeds on Guadalupe and Clarion Islands in the eastern Pacific as well. The total number of pairs in the world is considered to be about 437,000 (BirdLife International 2004). The trend in the number of individuals of Laysan Albatross increased until the first half of the 1990s. However, in the Hawaiian Islands, where 90% of the world's total population is found, an estimated annual 3.2% decrease in the number of individuals between 1992 and 2002 suggests that the abundance of this species has been declining in recent years.

Large breeding populations of Black-footed Albatross on Laysan and Midway Islands in the Hawaiian Islands group were estimated at 23,000 and 20,500, respectively, in 2000. The total number of pairs worldwide is estimated at about 54,500 (BirdLife International 2004). With respect to population trends, an annual decrease of 9.6% was shown between 1992 and 2001 in the Hawaiian Islands where over 75% of the world's population is found, suggesting that the number of birds of this species has declined in recent years.

A total of 18,000 pairs of Galapagos Albatross breed on the Galapagos Islands and La Plata Island in the eastern tropical Pacific. As this species is coastal and its distribution at sea is limited, its potential for interaction with longline fisheries is considered to be low.

(3) Trends in albatross and petrel populations in the Southern Hemisphere

A substantial amount of published information is available on trends in populations of albatrosses and petrels in the Southern Hemisphere (e.g., Tickell 2000, BirdLife International 2004, Brooke 2004).

4. Impact on seabird populations from sources other than fisheries

As seabirds have two life stages consisting of feeding at sea and breeding on land, managing both the ocean and land habitats in a integrated manner is essential for seabird conservation. Albatrosses and other large seabirds have been exposed to the effects of a variety of natural and human factors. Efforts have been made to identify such impact factors and minimize their detrimental effects to breeding colonies in the waters adjacent to Japan.

(1) Factors affecting breeding colonies

(i) Populations in Japan

Historically, hunting by humans was the largest factor impacting the breeding colonies of albatrosses in Japan. The population of albatrosses decreased dramatically as a result of over-exploitation in pursuit of feathers dating back to the 19th century, causing many breeding colonies around Japan to disappear. Since albatrosses were designated as specially protected species in Japan in 1962, no hunting of albatrosses now takes place. Other species of seabirds are managed in Japan under The Wildlife Protection and Hunting Law, and no harvesting of feathers and eggs takes place.

Torishima Island, which hosts a major breeding colony of albatrosses, is a volcanic island, and breeding colonies and chicks are affected by landslides caused by heavy rainfall. Furthermore, a volcanic eruption in August 2002 aroused concern for albatross breeding colonies.

Feral and introduced animals are also threatening seabirds. In the Ogasawara Islands, where breeding colonies of Black-footed Albatross and Laysan Albatross exist, grazing by introduced goats is destroying vegetation, and causing landslides in denuded areas. In addition, predation by feral cat and crow populations caused problems on Torishima Island until these populations were exterminated in the 1970s. Black rats are found even today, but there have been no reports of predation on albatross eggs and chicks. When many albatrosses were breeding on the island, diseases transmitted by mites were considered to be one of the causes of chick mortality. Even at present, ectoparasitic mites occur at high densities in breeding grounds of the Black-footed Albatross and the Short-tail Albatross, but the effects of these mites on host birds have not been assessed.

(ii) Other populations in the Pacific

The main breeding grounds of the Black-footed Albatross and the Laysan Albatross are located on the Hawaiian Islands. Breeding grounds were largely destroyed by island development such as the construction of airports. Interactions with airplanes exist even today. Other factors affecting breeding colonies include predation on eggs and young birds by cats, rats and pigs; destruction of plant life by herbivorous animals like rabbits; and viral diseases transmitted by ants, mosquitoes (Tickell 2000).

(2) Factors other than fisheries affecting albatrosses at sea

Sharks are known to be predators of albatrosses at sea and in the Hawaiian Islands, it is known that fledglings are attacked by tiger sharks (Tickell 2000). Another factor is marine contamination caused by organochlorine residues which are reported to be causing thinning of eggshells and reduction of hatching success (Ludwig et al. 1998). When adult albatrosses ingest floating marine debris, especially plastic fragments, and then regurgitate this material to their chicks, it is reported that chicks suffer digestive blockage problems (Auman et al. 1998). Plastic objects are often found in the stomach contents of albatross chicks on Torishima Island but effects on the survival rate of chicks have not been assessed. Large-scale oceanographic change is also known to affect seabird population (Weimerskirch et al. 2003)

5. Improvement of breeding colonies habitat and promotion of reproduction

Short-tailed Albatross once bred on Torishima Island in the Izu Islands; the Ogasawara Islands including Yomejima Island; the Daito Islands; the Senkaku Islands; and other islands. Since the Meiji Period (post 1868), they have been overexploited due to the harvesting of feathers for trade, and were thought to be extinct in 1949. However, survival of about 10 birds was confirmed in 1951 on Torishima Island. This re-discovery prompted designation of this species as a Protected Species under The Law for the Protection of Cultural Properties in 1958. In 1962, it was listed as a Special Protected Species (Hasegawa 1999). In line with this designation, the Torishima Island Observatory of the Meteorological Agency was commissioned by the Cultural Properties Protection Committee to promote conservation and monitoring of albatrosses, and efforts were launched to improve the breeding habitat. Since 1976, Dr. Hiroshi Hasegawa, Associate Professor of Science and Engineering Development at Toho University, has made continuous efforts to conserve and monitor the albatross population. In 1972, the Environment Agency designated this species as special bird in accordance with The Law relating to the Regulations of Transfers of Designated Special Birds. At present, it is designated as a rare wildlife species in Japan in accordance with The Law for the Conservation of Endangered Species of Wild Fauna and Flora, and hunting and killing of these birds are strictly forbidden. Furthermore, in 1954, the entire area of Torishima Island (453ha) was designated as a national protection area for birds and animals, under which their habitats are protected. In 1981, a conservation project by the Environment Agency (now the Environment Ministry) and the Tokyo Metropolitan Government was launched. In 1994, it was designated as a project for conservation and propagation under The Law for the Conservation of Endangered Species of Wild Fauna and Flora. At present, this project is implemented through agreements between the Environment Ministry, the Yamashina Bird Research Institute and the Tokyo Metropolitan Government. In addition, the Yamashina Bird Research Institute and Dr. Hasegawa of Toho University are conducting independent monitoring.

On Torishima Island, the Meteorological Agency's Torishima Island Observation Station has promoted improvement of breeding habitat since the 1960s by exterminating feral cats, and transplanting and fertilizing chrysanthemum shrubs. As Torishima Island is a volcanic island, landslides due to mud flow constituted a serious threat to chick survival. For this reason, the Environment Agency and the Tokyo Metropolitan Government, acting on a proposal by Dr Hasegawa, have continuously worked to stabilize the substrate of the breeding grounds by setting up wooden fences and transplanting shrubs to protect the colonies of albatrosses from landslides and mud flows.

On the Mukojima Islands in the Ogasawara Islands group, vegetation had been destroyed mainly by the grazing of feral goats, resulting in denuded ground and mud flows, which affected the breeding colonies of the birds. For this reason, the Tokyo Metropolitan Government has conducted a project since 1994 to exterminate goats and restore vegetation on Mukojima Island.

The major breeding colony of albatrosses at Tsubamezaki on Torishima Island is in a vulnerable location where landslides occur frequently. Due to this situation, a project was launched in 1991 to attract breeding colonies to another flat and stable location using decoys and broadcast playback of recorded calls. As a result, a pair of albatross began breeding in Hatsunezaki in 1995. Thus far, five hatchings have been confirmed in this area, and young birds, which fledged from this breeding ground, were observed to have returned to the same place at the age of 3 in 1998. In a survey conducted in 2004, the presence of a breeding pair was observed, thus confirming the success of the project in attracting birds to the new colony.

6. Research and development

(1) Development, assessment and improvement of incidental catch mitigation methods

In developing mitigation measures to avoid incidental seabird catches, efforts have been made to encourage innovation by fishers, and a number of potential methods have been tested. In evaluating the methods, consideration was given not only to effectively reducing the incidental catch of seabirds, but also to ensuring safe working conditions in fishing operations, maintaining catch efficiency for the main target fish species, and achieving cost effectiveness. It is expected that by developing many available methods satisfying those conditions, it will be easier for fishers to apply mitigation measures which are well-suited to their operational conditions.

(i) Tori-pole

The tori-pole is a solid line towed from a pole installed at the stern of the fishing vessel, equipped with a curtain of streamers and bird-avoidance tapes, aimed at deterring seabirds from taking baited hooks. Since albatrosses have poor in-flight maneuverability, their feeding behavior is disrupted when obstacles are set above the baited hooks cast onto the water surface. This device was originally developed by Japanese tuna longline fishers and had been used on a voluntary basis in order to prevent bait loss caused by seabirds. It drew the attention of Nigel Brothers of Tasmania Parks & Wildlife Service, and came into extensive use through the cooperation of the Federation of Japan Tuna Fisheries Cooperative Associations. At present all southern bluefin tuna longline fishing vessels are obliged to use this device during line setting.

Method of use and special considerations: A sturdy line is towed for a distance of 150m or more from a glass fiber or iron pole installed at the highest point on the ship’s stern. Streamers of bird-avoidance tapes are installed in a curtain formation to the part of line exposed to the air. The height and angle of the pole and the length of the line should be adjusted so that the line, and the attached bird scaring device, are situated above the area in which the bait is cast and drifts at the surface during line setting.

Effectiveness: It has been confirmed that the tori-pole can reduce incidental catch rates of albatrosses to about 30% of the unmitigated rates when it is used for tuna longline fishing. However, the effectiveness of the tori-pole fluctuates according to various factors such as sea conditions and the position of the longline relative to the bird-scaring streamer line, i.e. it is important to adjust the length and the angle of the pole so that the streamer line is placed just above the baited hooks.

Cost and issues : This device is relatively low-cost, and can be deployed with only minimal modification of fishing vessels, gear and methods. Problems with tangling the main line and the fishing gear or the screw can occur during operations. When plummets are added to the streamers, there is a danger that crew working on the deck during line setting could be hit by these weights. More time and labor is required for line setting and retrieval.

Future tasks: It is essential to educate fishers to be fully versed in using this device in order to achieve to maximum mitigation effectiveness. Mechanized devices using hydraulic and electric motors enable minor modifications to the line position and facilitate line retrieval, and will enhance deterrence effectiveness and lead to operational labor-saving. Therefore, installation of the device on newly-constructed vessels should be encouraged. As installation of large-scale devices is difficult for small-sized fishing vessels, development of specifications suited to small-sized vessels should be promoted.

(ii) Water-jet device

As an alternative to the tori-pole, seabirds may be deterred from approaching the vicinity of baited hooks by jetting high-pressure water. Unlike the tori-pole, the water-jet device has the advantage of being able to be turned on or off with ease and without the risk of entangling fishing gear.

Method of use and special considerations: Sea water is jetted by connecting jet nozzles to specialized high pressure pumps in order to prevent the seabirds from approaching the stern of the vessel where the bait is cast.

Effectiveness: Results of at-sea experiments have shown that water-jets are effective deterrents as seabirds avoided both direct contact with the jetted water and flying below the water curtains. However, the effective range of the waterjet is basically determined by the jetting power of the pumps, although it can be improved to some extent by modifying the shape of the nozzle tip. Also, water jetting is affected by wind and the effective range is reduced when strong head winds or crosswinds are present.

Cost and issues: Large-type pumps with strong jetting capacity are costly, and installation locations are limited because the pumps are heavy and large in size.

Future tasks: Sufficient mitigation effectiveness cannot be expected with this device alone because the effective range is small and the device is affected by wind. However, overall bird deterrent effectiveness can be enhanced by using the waterjet as a supplement to the tori-pole method for seabird deterrence near the stern.

(iii) Other deterrent devices

Various stimulants, such as sound (explosive sounds, sounds of predatory animals, and distress calls of seabirds), magnetic power, lights (flash and laser beam), and electricity (DC pulses) have been used to deter seabirds from fishing vessels.

Method of use and special considerations: Available methods include explosive sound generating devices using propane gas and acetylene gas and laser guns—all of these are commercially available as devices to deter birds on land.

Effectiveness: Explosive noise can deter birds temporarily, but birds will become accustomed to noises when used repeatedly and with time the effectiveness of the device will be reduced. Although at-sea experiments have not tested all of the potentially available devices, none have yet proven to be practical and effective.

Costs and issues : Development and testing of new devices requires a large budget.

Future tasks: Small-scale preliminary experiments and at-sea experiments to test potentially effective devices will be continued.

(iv) Improvement of sinking speed of baited hooks

Since albatrosses are generally not good at diving, another method of reducing incidental seabird catch involves quickly sinking the baited hooks to a sufficient depth. There are several methods which can achieve this including weighting the branch lines, fully thawing bait and casting bait so as to avoid turbulence caused by propeller current.

Method of use and special considerations: Sinking speed is accelerated by weighting, such as attaching lead sinkers or using weighted swivels and wire leaders at the tip of branch lines. Bait should be fully thawed before line setting, and the use of bait species with swim bladders should be avoided in areas where many seabirds are found. Bait should be cast in areas where there is little effect of propeller currents.

Effectiveness: It has been shown experimentally that sinking speeds can be increased if the weight of the tip of the branch lines is enlarged. There are existing methods involving the addition of lead sinkers, use of fully thawed bait and to attachment of wire or fluorocarbon lines. The use of bait-casting machines has the advantage of avoiding propeller currents, and throwing baited hooks to the location where the tori-pole is effective.

Costs and issues : The use of weighted branch lines incurs costs for modification of fishing gear, and has the risk of affecting catch efficiency. Also, attaching weights to the branch lines may raise safety concerns in fishing operations.

Future tasks: Weighting methods should be improved so as not to affect either the safety of the fishing crew or the target species catch efficiency.

(v) Underwater line setting

This is a method to set baited hooks directly underwater and avoid casting them through the air. Underwater setting ducts are commercially used in bottom longline fisheries, but practical application in pelagic tuna longline fisheries is difficult because of the complex structure of the fishing gear. Some experimental devices have been designed and are being tested in Japan.

(vi) Side-setting

In comparison to conventional setting of main lines and branch lines from the stern of longline fishing vessels, the effects of propeller currents are minimized and the bait sinking speed is faster if the main lines and branch lines are set from the gunwale. Furthermore, catch rates of seabirds are said to be reduced because seabirds do not approach the bait immediately after casting due to the bird scaring effects of the vessel. This method is now under development in the Hawaii longline fleet, but it requires gear adjustment and operational modifications. Operational safety and efficiency must be confirmed through experimental trials, including the feasibility of using this method in high latitude waters under adverse sea conditions.

(vii) Line setting at night

As most albatrosses' visual acuity requires them to search for food during the daytime, nocturnal line setting can reduce the occurrence of incidental take.

Method of use and special considerations: Line-setting is conducted in darkness at night. The use of deck lights is reduced to a minimum so that light is not shed on the sea surface. When effectiveness is reduced at full moon and at times of extended daylight hours at high latitudes, other deterrent measures should be used concurrently.

Effectiveness: This method is known to be effective for many seabirds during completely black nights, but caution is warranted since some species engage in night-time feeding activities.

Cost and issues: If line setting is limited only to night-time, the crew's working schedule may become too demanding. Because the use of light should be minimized to ensure the effectiveness of night setting, this type of line setting work tends to be more dangerous.

Future tasks: Fishermen can be encouraged to adopt night setting methods by ensuring operational safety and by demonstrating that the catch rates for the main targeted fish species are not lowered.

(viii) Colored and artificial bait

This method uses dyed or artificial bait in order to discourage feeding by seabirds.

Method of use and special considerations: Bait is dyed blue with edible coloring pigments. There are two methods: dyeing bait onboard the fishing vessel prior to line setting and using pre-dyed bait prepared and frozen on land. Artificial bait may be comprised of molded squid viscera or plastic lures.

Effectiveness: It has been confirmed through at-sea surveys that the use of blue-dyed bait reduces the visibility of bait to seabirds, preventing feeding, and thus clearly reducing incidental catch rates to 1/10 or less of the unmitigated rate. It has also been shown that the blue-colored bait does not have significant effects on catch rates of the main target fish species.

Cost and issues: Onboard dyeing is difficult under stormy conditions. Preparation of pre-dyed bait increases bait costs.

Future issues: The avoidance effect is very high, but to encourage the use of this method, cost reduction or labor-saving methods for dyeing will be necessary. Further consideration of main target fish species catch rates and incidental seabird catch rates are required for artificial bait.

(ix) Summary concerning mitigation techniques

In developing seabird-avoidance techniques, research studies as well as information from fishers actually working at sea are indispensable. It is important to develop various possible methods through research, inform fishers and test the methods in the actual fishing grounds, and collect feedback from the fishers about the effectiveness and drawbacks. In this respect, research and development, and educational and outreach activities have been promoted in parallel in Japan. Fishermen will find mitigation measures easier to accept if there are a number of possible methods which are cost effective and have little or no problems in application.

The tori-pole is an effective method, but efforts should be made to develop configurations suitable to vessels of various sizes, and to educate fishers for increased and more efficient use of the device. Although blue-dyed bait is a method with high potential, the cost and labor involved in preparing colored bait must be reduced. Improvement of bait sinking speed, if combined with other deterrence methods, is expected to reinforce the effectiveness of the other techniques but due consideration should be given to reducing operational burdens and risks to fishers. Supplementary methods, such as night line setting and well-organized offal discards, will be improved, taking into account the views of fishers who work at sea.

(2) Research and studies on the ecology of seabirds

(i) Surveys of the pelagic distribution of albatrosses

Surveys of seabirds have been conducted using research vessels in order to clarify spatial and temporal changes in the distribution of albatrosses in the waters adjacent to Japan. It has been confirmed that Short-tailed, Laysan, and Black-footed Albatrosses are found in the waters near Japan from late autumn to late spring (Minami et al. 2000). The results of the surveys confirmed that the density of Laysan and Black-footed Albatrosses is high in the area off the Pacific coast of northeastern Japan, where the Kuroshio and Oyashio currents mix. Also, Short-tailed Albatrosses were observed not only in the breeding colonies on Torishima Island in the Izu Islands and the Senkaku Islands, but also in the area off the Pacific coast of northeastern Japan, where they are supposed to feed (Fig. 5).

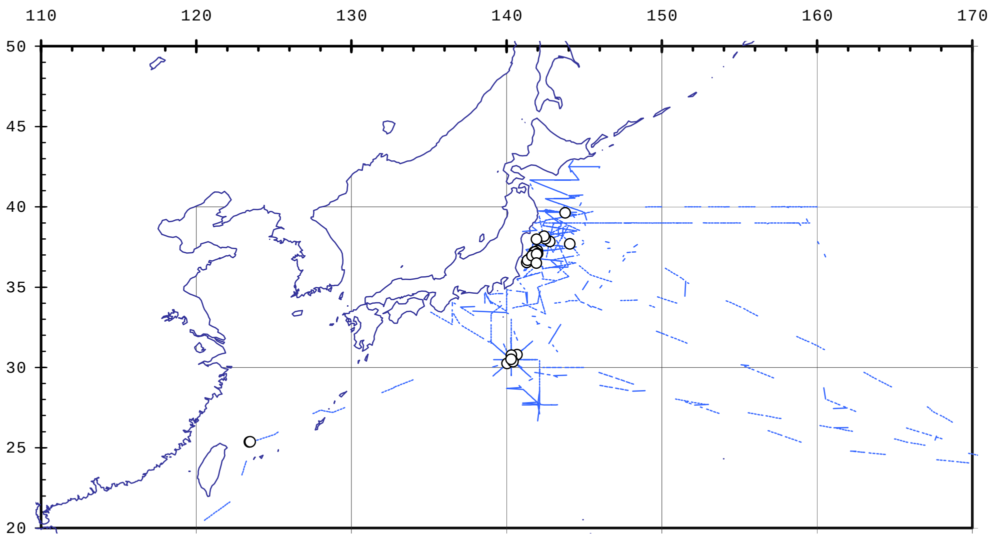

Fig. 5. Transect lines of seabirds surveys in the waters adjacent to Japan and the locations where Short-tailed Albatrosses were sighted.

Satellite tracking of the Short-tailed Albatross on Torishima Island was started in 2001 in cooperation with the USFWS and in accordance with the Japan-U.S. Treaty on Migratory Birds. The satellite data showed that Short-tailed Albatrosses, to which small-size transmitters for satellite tracking were attached on Torishima Island, migrate along the Pacific coast of Japan to the Alaskan Peninsula via the Aleutian Islands.

These results indicate that the coastal waters in the Western North Pacific off Japan and the Aleutian Islands are important habitats for Short-tailed Albatrosses during their breeding and migration periods.

(ii) Research on feeding ecology

Albatrosses and petrels that interact with tuna longline fisheries have two different methods for feeding: scavenging and live capture (Croxall and Prince 1994). The relative dependence on each of these two methods differs according to the species. Knowledge of the feeding habits of seabirds will help to estimate the vulnerability of each species to fisheries interactions. For this purpose, stomach content and stable isotope analyses have been conducted in Japan to compile information on feeding status in the food web and feeding characteristics. Results of the stable isotope analysis of southern seabirds indicated the presence of three groups having different feeding ecology: (1) large and medium-sized albatrosses which are top predators in the Southern Ocean ecosystem preying on species in high trophic levels, (2) petrels which prey on species at lower trophic levels, and (3) albatrosses and petrels with extensive feeding areas and habits which prey on a wide range of prey species and forage in the Southern Ocean and Antarctic ecosystems. In general, seabirds in higher trophic levels tend to be scavengeous and are more susceptible to fisheries interactions.

(iii) Research on identification of seabirds

Through studies of the external morphology of bills, practical methods have been developed to identify albatross species based on bill shape and color (Kiyota and Minami 2000). Educational materials have been provided to onboard scientific observers, and instructors and officers on experimental and training vessels, to improve the accuracy of their data collection. This information has also been used in booklets for fishers to aid in education and improvement of the quality of information reported from commercial vessels.

(iv) Research activities at breeding locations

The Environment Ministry has continuously conducted tagging surveys in major habitats of bird species including seabirds, as well as research and monitoring at many breeding locations of seabirds in Japan. In particular, with respect to seabirds designated as rare species of wildlife in Japan in accordance with the Species Conservation law, including Short-tailed Albatross, Tuffed puffin (*Lunda cirrhata*), and Common murre (*Uria aalge*), efforts are being made to collect information on their population status. In 2000, a project was launched to build a database on breeding colonies of seabirds through cooperation with the Japan Seabird Study Group. Also, Japan-U.S. joint research was initiated to attract albatross colonies from Torishima Island, where they are at risk from large-scale volcanic eruption, to the Ogasawara Islands which provide stable breeding grounds.

7. Guidance, outreach and educational activities

(1) Preparation of educational and outreach materials

Educational activities are being carried out by the longline fishing industry, under the assistance and cooperation by the government and researchers, using distributed materials in order to educate them about the importance of accurate reporting of incidental take of seabirds, how to avoid incidental catch, and appropriate handling of birds captured alive.

The prepared and distributed materials include:

- Identification sheets for “Albatrosses and Giant Shearwaters of the Southern Ocean” and “Large Seabirds Observed in the North Pacific” for purposes of identifying incidentally caught species;

- A guide book entitled “Identifying Pelagic Species observed in Tuna Longline Fisheries”;

- A booklet entitled “Toward Coexistence of Seabirds and Longline Fisheries” that illustrates methods for avoiding incidental take and appropriate handling of seabirds capture alive;

- A guide book entitled “A Manual for Fisheries Friendly to the Marine Environment,” which summarizes the NPOA-Seabirds and NPOA-Sharks.

- “For the Future of Tuna Fisheries and Seabirds” which outlines, using cartoons, the issue of incidental take in an understandable manner.

Some of these materials are also used as manuals by research staff on survey vessels and scientific observers to collect accurate scientific data.

(2) Educational activities directed at fishers

Regional fisheries organizations in Japan are holding seminars for fishers, in cooperation with the Fisheries Agency, the Global Guardian Trust and the National Research Institute of Far Seas Fisheries, to provide them with opportunities for education and open discussion, as well as distribute materials, regarding the NPOA-Seabirds, the methods of releasing live birds, and introduction and improvement of mitigation techniques.

(3) Lectures for fisheries high schools

Lectures are given to the teachers of high schools engaged in training students for tuna longline fisheries. Explanation of the importance of fishery and seabird coexistence, methods of species identification, proper implementation of mitigation techniques, and the importance of accurate data collection from fishing operations is provided.

8. Promotion of international cooperation

(1) Basic position of Japan

In order to encourage the “reduction of incidental take of seabirds by longline fisheries”, which is the objective of the FAO IPOA-Seabirds, Japan will continue to promote multilateral cooperation via FAO and regional fisheries management organizations, such as the CCSBT, ICCAT and other appropriate fora, and promote research and cooperation among concerned fishing nations.

(2) Cooperation with FAO

In FAO, Japan plays a central role in developing the IPOA-Seabirds. To this end, Japan continues to contribute in the form of a trust fund as well as in human resources to FAO, and cooperates actively in the implementation of the IPOA-Seabirds focusing on assistance in formulating NPOA-Seabirds in developing countries.

(3) Cooperation in regional fisheries management organizations

Japan, as a responsible fishing nation, participates in multilateral regional fisheries management organizations, and has actively contributed both to monitoring and research at various organizations relating to the conservation and management of target fish species, such as tunas and skipjack. Furthermore, with respect to non-target species such as seabirds, Japan plays a leading role in research on ecology, population status and the introduction of methods to avoid incidental take.

Regarding seabirds, Japan will continue various means of cooperation in regional fisheries management organizations such as the Working Group on Ecologically-Related Species (ERSWG) of the CCSBT, the Standing Committee on Research and Statistics (SCRS) of the ICCAT, the Working Group on Bycatch of the Inter-American Tropical Tuna Commission (IATTC) and the Scientific Committee of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

As part of its cooperation with concerned fishing nations, Japan has been implementing joint research studies with the United States on the improvement of techniques to reduce the incidental catch of seabirds.

(4) Others

Illegal, Unregulated and Unreported (IUU) fishing activities including flag-of-convenience (FOC) fishing vessels are deemed not to be complying with conservation and management measures for target species such as tunas and skipjack, nor taking any measures to avoid incidental take of seabirds, as their fishing activities circumvent all applicable conservation and management measures. To counter these activities, Japan will continue, within FAO and regional fisheries management organizations, and in concert with concerned countries, to work toward elimination of IUU fishing activities and will encourage compliance with the IPOA-Seabirds for fishing vessels converted from IUU to legitimate fishing activities.

In addition, Japan has taken an active part in fora regarding conservation of seabirds, such as the Third International Albatross and Petrel Conference, where the results of Japan's efforts to enhance awareness of incidental catch issues and develop mitigation techniques were reported.

Furthermore, Japan is promoting cooperation with concerned countries regarding data collection, research, monitoring, and implementation of conservation measures on distribution, habitat and ecology of seabirds. Specifically, joint monitoring and exchanges of information on the Short-tailed Albatross under the Japan-U.S. Treaty for Protection of Migratory Species of Birds have occurred and Japan will continue these efforts.

9. Revision of the NPOA-Seabirds

(1) Four years after the development of the NPOA-Seabirds, it is now necessary to carry out a review to enhance its effectiveness. To this end, experts comprising academics and industry representatives were consulted by means of the National Consultative Committee as was the case in the initial development of the NPOA-Seabirds.

(2) The main revisions to the NPOA-Seabirds were as follows:

(i) Setting a target for achieving 100% implementation of the mitigation measures for incidental catch of seabirds pursuant to the NPOA-Seabirds within 10 years;

(ii) Undertaking an updated review of the current measures for avoiding incidental catch of seabirds based on the latest available information;

(iii) Requiring use of the tori-pole as an albatross conservation measure in the area within 20 miles of Torishima Island; and

(iv) Inclusion of the Atlantic and Indian Oceans as areas in which mitigation measures for incidental catch should be taken, as necessary.

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