Planning

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Taiwans National Plan of Action for the Conservation and Management of Sharks

1.Introduction (basic principle and objectives)

Taiwan, as a responsible fishing nation, is fully aware that fisheries activities have an important role in the supply of food to human beings. Taiwan although is not a member of United Nations duly respects:

(1) The awareness of the international society that fisheries are an important industry having the function to ensure social and economic welfare of the people around the world (Kyoto Declaration on Sustainable Contribution of Fisheries to Food Security and its Action Plan).

(2) The international agreement that states commit themselves to the conservation and sustainable use of marine living resources (United Nations Conference of Environment and Development (UNCED) and Chapter 17 of Agenda 21).

(3) Code of Conduct for Responsible Fishing of the United Nations Food and Agriculture Organization (FAO) that calls for promotion of contribution of fisheries to food security.Taiwan recognizes that sharks are important fisheries resources and many states and international organizations concern fisheries impacts on shark stocks. Therefore, Taiwan has proposed an effective and feasible National Plan of Action on sharks by taking into account the internationally agreed codes of conduct in order to implement appropriate conservation and management of sharks. The pecies subjected to this Action Plan are Elasmobranchii (sharks/rays) living or migrating in Taiwanese exclusive economic zone (EEZ) and Elasmobranchii caught by Taiwanese fisheries outside the EEZ. The fisheries subjected to this Action Plan are all harvesting those species.

Taiwan recognizes that sharks provide tremendous amounts of protein, food and considerable economic incomes. Doubtlessly, sharks are precious marine resources. Noticing that according to UN's Law of the Sea, highly migratory species should be jointly managed by regional or subregional organizations and pelagic sharks are no expectation. Currently many regional fisheries management organizations (RFMOs) have been set up all over the world. These organizations incorporate manpower, resources and funds to carry out the long-term research and assessment on shark stocks. With much experience on management, member states can execute conscientious assessment and consultation to resolve any difficulty related to marine resources. In addition, resolution adopted this way is compulsory for all member states and goals for conservation can thus be realized. For this reason, any issue regarding conservation and management of marine resources should be deliberated on under consultation of FAO and the framework of RFMOs. Thus, using trade control to monitor marine resources in a rash moment seems not an appropriate way for shark management.

2. Shark fauna in Taiwan

There are 8 orders, 25 families, 52 genera, and 91 species of shark as well as 3 orders, 16 families, 24 genera, and 55 species of skate and ray in Taiwan's waters (Shen 1993). Several new records of shark and ray were reported in recent years.

3. Shark fisheries

3.1. Historical overview

Over the last 10 years, annual shark landing combined coastal, offshore and far sea in Taiwan averaged between 39,000 and 55,000 metric tons. Eighty-five percent of Taiwan's shark landings are from far sea fisheries and 15% are from coastal and offshore fisheries.

3.2. Coastal and offshore fisheries

The major bases for coastal and offshore shark fishery are in Chengkung and Nanfangao. These two harbors together landed 2,019 MT of shark accounting for 37.4% of Taiwan's total coastal and offshore shark landings (5,394MT). Most of fishing vessels in Nanfangao target sharks from September to the following April and shift to other species such as tuna and billfish in the remaining months of the year.

The major fishing method of shark fisheries in Nanfangao is the bottom longline. The dominant species are blue shark, Prionace glauca, shortfin mako, Isurus oxyrinchus, scalloped hammerhead, Sphyrna lewini, smooth hammerhead, S. zygaena, bigeye thresher, Alopias superciliosus, pelagic thresher, A. pelagicus, sandbar shark, Carcharhinus plumbeus, silky shark, C. falciformis, oceanic whitetip shark, C. longimanus, spinner shark, C. brevipinna, and dusky shark, C. obscurus. In Chengkung, the large-mesh drift-net target bigeye threshers and pelagic threshers. The mid-water longline target requiem sharks, scalloped hammerhead, blue shark and shortfin mako. In addition to the above two fishing ports, Tongkang is also an important fishing port for shark fishery. Sharks are the by-catch of tuna longline fishery at Tongkang.

3.3. Far sea fisheries

Most sharks are the by-catch of tuna longline and trawl fisheries. However, there are some longliers directly target on sharks. As most of the sharks are bycatch, the catch statistics are not in detail. To improve the quality of catch data, the observer program will be expanded and the number of sampling vessels will be

increased. The major shark bycatch species are blue shark (70-80%), mako sharks, thresher sharks, hammerhead sharks and oceanic whitetip shark (Carcharhinus longimanus). Most of these bycatches are landed and sold at foreigner bases and few are transported back to Taiwan by transport vessels.

4. Data collection

Taiwanese fishing vessels harvest varieties of shark species. For coastal and offshore fisheries direct targeting on sharks are common but most of far sea fishing vessels catch sharks as the by-catch. Therefore, it is difficult to get the accurate estimate of sharks caught by far sea fisheries. Taiwanese shark catch data were collected from various channels as follows:

4.1. Catch provided by commercial fishing vessels

These data are from the logbooks of commercial fishing vessels. There is only one category of shark in the logbook of far sea fisheries in the past. Starting from 2003, this category was further divided into four categories namely blue shark, mako shark, silky shark, and others to better understand the catch composition.

4.2. Landing data in Taiwanese ports

In two fishing ports, the landing data include species and weight of sharks which were caught in coastal and offshore waters of Taiwan. However, species information was not available for those landings caught by far sea fisheries. Only sampling vessels and observers provided species-specific catch information in recent years.

4.3. Catch data provided by sampling vessels

The questionnaires were distributed to more than 50 sampling vessels of far sea fishery in the past several years. Species- specific catch data are collected to validate the data from logbook.

4.4. Catch data provided by observers

The observer program was initialed in 1999 by scientist and implemented by government in 2001 to validate the catch data come from the above three sources. In the present, there are 9 observers on Taiwanese far sea tuna longline fishing vessels collecting the information of major catch, species-specific by-catch, effort, and by-catch rate. The number of observers will increase to 20 in the near future.

5. Utilization

5.1. Coastal and offshore catch

The sharks landed in Taiwan either from coastal, offshore or far sea fisheries are fully utilized. Their meats are used as common food, materials for fish steak, paste products or fish ball. Their skins are used as raw materials for skin products, their cartilages are used as pharmaceuticals, their livers are used as the material for vitamin pills, and their teeth are used as decoration.

5.2. Far sea catch

For those fisheries operated far away from Taiwan, contain parts of shark catch are brought back to Taiwan, and other parts are landed in nearby foreign ports and sold to local markets.

6. Shark research in Taiwan

6.1. Fishery biology

In addition to taxonomy, Wang and Chen (1981, 1982) reported reproductive biology and age and growth on the smooth dogfish,Mustelus griseus, in northwestern Taiwan waters. Chen et al. (1988, 1990) described age and growth, and reproduction biology of the scalloped hammerhead shark, Sphyrna lewina. The first record of 300 embryos of a female whale shark was reported by Joung et al. (1996). Fishery biology of the bigeye thresher shark, Alopias superciliosus has been reported in recent years,i.e., reproduction (Chen et al. 1997) and age and growth (Liu et al. 1998). Joung and Chen (1995) and Chen et al. (1996) described the reproductive biology of the sandbard shark, Carcharhinus plumbeus, and the blacktip sawtail catshark, Galeus sauteri, respectively. Fishery biology of the pelagic thresher shark, Alopias pelagicus and the spinner shark, Carcharhinus brevipinna, have been described by Liu et al. (1999) and Leu (1997), respectively.

Shark fishery in Taiwan has been reported by several authors i.e., the deep-sea shark fishery in Taiwan (Chen et al. 1979), a detailed description of Taiwan shark fishery including fish funa, biology, fishing grounds, catch and trades (Chen et al. 1996); a preliminary study on the whale shark catch and fishery in Taiwan (Chen et al. (1997). Chang et al. (1995) described cellar DNA contents and cell volumes of batoids. Chen et al. (2001) suggested that the starspotted smooth-hound, Mustelus manazo, in Taiwanese and Japanese waters are two different populations. Chen (1996) analyzed heavy metal concentration of the sawtail catshark and concluded that the concentrations of Cd and Hg are due to biomagnification of food and accumulation.Demographic analysis of the scalloped hammerhead indicated that the population can not withstand heavy exploitation starting from young age (Liu and Chen 1999).

6.2. Tagging program

To reveal the mystery of migratory route and ecology of whale shark, a tagging program was started in 2001. Five out of the seven individuals been tagged with satellite tags have been successfully traced.

7. Stock assessment

To date, the stock assessment of sharks has implemented for a few pelagic species in Taiwanese waters. No stock assessment has been done on those stocks caught by far sea fishery because of the lacking of data.

7.1. Pelagic species

The stock status of the bigeye thresher shark, pelagic thresher shark, and scalloped hammerhead in Taiwanese waters has been examined. All the three stocks seem in a condition of optimal utilization. However, the mean weight of the carcass for scalloped hammerhead decreased in recent years suggesting this species need to be monitored closely. The stock assessment on other species will be done in the near future.

7.2. Demersal species

As the demersal species are usually small comparing with pelagic species and they are not sold through the regular auction channel, it is difficult to collect the necessary data including catch and effort data to implement the stock assessment. In stead of the traditional stock assessment methods, a bioenergetic approach is applied

on the bamboo shark. In addition, the stock status of demersal species are evaluated by their frequency of occurrence and catch following the IUCN criterion.

8. Education and extension

It is important to evoke social interest in the idea of sustainable utilization and management of sharks not only among fishermen but also general public. To achieve this goal, Taiwanese government has taken several steps as follows:

(1) Distribution of species identification booklet for sharks to fishermen.
(2) Hosting international shark conference with environmental group.
(3) Promoting sustainable utilization concepts to fishermen and general public through workshops.
(4) Distributing video films of shark fishery and whale shark fishery management poster.
(5) Educational program for fisheries enterprises and young students.

9. International cooperation

9.1. Whale shark tagging and trade

A whale shark tagging and trade program was proposed to better understand the migratory route and ecology of whale shark and to collect the catch and trade information of whale shark in the Pacific region.

9.2. Data exchange

To better understand the stock of sharks, specimens and muscle of several species have been exchanged with foreign scientists. More effort is needed on the data exchange of trade in the future.

9.3. Reduction of whale shark catch from set net

An international cooperation research program on this issue was started in 2001. Australian and Taiwanese researchers work together to find a way to reduce the bycatch of whale shark from set net.

9.4. Regional cooperation

Taiwanese representatives and scientists will actively participate the meetings of FAO fisheries section or RFMOs such as WCPFC, IATTC, IOTC, ICCAT, ISC, and CCSBT to exchange fisheries statistics data with other countries for the propose of implementing stock assessment.

10. Management measures

10.1. Fisheries act and wildlife conservation act

Considering shark management measures of RFMOS and population status of sharks, the management measures of sharks in Taiwan are based on domestic fisheries act and wildlife conversation act to ensure the sustainable utilization and conservation of sharks.

10.2. Shark management working group

A shark management working group composed of scientists, administrators and fishermen was established in 2001 to discuss shark management and conservation issues.

10.3. Whale shark management

Most whale sharks in Taiwan waters are caught by harpoon and set-net with a small proportion by longline and gill net. There is no dedicated whale shark fishery in Taiwan. Due to a significant decline of whale shark catch from 1995-1998 and its characteristic slow growth and late maturity, the fishery management scheme of this species has been initiated in 2001.

10.3.1. Catch-report scheme

The catch-report scheme was implemented from 2001. The fishermen are mandatory to fill the catch sheet including length,weigh, sex, time, and fishing gear to the local government when they catch the whale shark. A total of 89 individuals were caught in the period July 1, 2001 to June 30, 2002 and 80 individuals were reported from July 1, 2002 to June 30, 2003. As basking shark and great white shark have been listed as Appendix II of the red list of CITES, these two species have been added to the report list since 2005.

10.3.2. TAC

Based on the information of catch-report system, the total allowable catch (TAC) of the whale shark was set as 80 individuals for the period July 2002 to June 2003. Because the TAC system runs well, Taiwanese government announced another TAC quota of 120 individuals for whale shark in the period from July 2003 to December 2004. The TAC reduced to 65 individuals in 2005 and to 60 individuals along with a size limit of 4 m in 2006. The size limit will be evaluated every year.

10.3.3. Trade

As the whale shark has been categorized as Appendix II of the red list of CITES, permission for export is required for whale shark export. A specific custom code was set for whale shark in 2002 to monitor the import of this species.

10.3.4. Ecotourism

In addition to consumption, the whale shark has been captivated in marine biology aquarium for educational propose. An international workshop on whale shark ecotourism was held in Taiwan in 2005 and the feasibility of the whale shark ecotourism will be evaluated.

10.4. Promotion of sustainable utilization

Taiwanese government realizes that many shark stocks have been overexploited and fully supports the concept of sustainable utilization. The finning activity of far sea fishery is not encouraged and fishermen were requested to completely utilize the shark resources. A series of workshop were held to promote and educate fishermen the concept of shark conservation and complete utilization. A technique of developing the new product of blue shark is undergoing to promote the utilization of the most common bycatch species for far sea fisheries.

10.5. Precautionary approach

Although the total catch of coastal and offshore shark fisheries increase significantly, some species have decreased as a percentage of total catch while others have increased. Certain demersal species once common in coastal and offshore fisheries have shown a decline in catch over the past 10 to 20 years due to the overexpansion of coastal trawl fisheries. The following species have become difficult to find: the starspotted smooth-hound Mustelus manazo, potless smooth-hound Mustelus griseus,Squalidae and Centrophorus spp.. However, the multi-species nature of trawl fisheries makes species-specific management problematic.Although existing data are insufficient to draw reliable conclusions on trends in Taiwan's shark fisheries, a precautionary approach can be used as a tool for fishery managemet. In future, more data on species catch levels and fishing effort must be collected. Only then will it be possible to create a workable management regime should that prove necessary.

10.6. Ban finning practice

To ban the finning practice, several RFMOs such as ICCAT, IOTC, and ICCAT have put that sharks fins shall not surpass more than 5% to carcass weight for all the sharks landed in the resolution. To compliance these resolution, Taiwanese government has requested our far fisheries vessels to ban finning practice and follow the regulation on the proportion between shark fins and carcass weight of RFMOs.

10.7.Set up shark management scheme

To ensure the sustainable utilization and to promote the complete utilization of sharks, Taiwanese government plans to monitor the fishing activities and shark catch via VMS and set up the criterion of a certain proportion between shark fins and carcass weight for all the sharks landed in Taiwan in the near future. The reduction of fishing effort or TAC management scheme will be implemented if the shark resources were proved to decline significantly. In addition, the concept of complete utilization of sharks will be promoted continuously.

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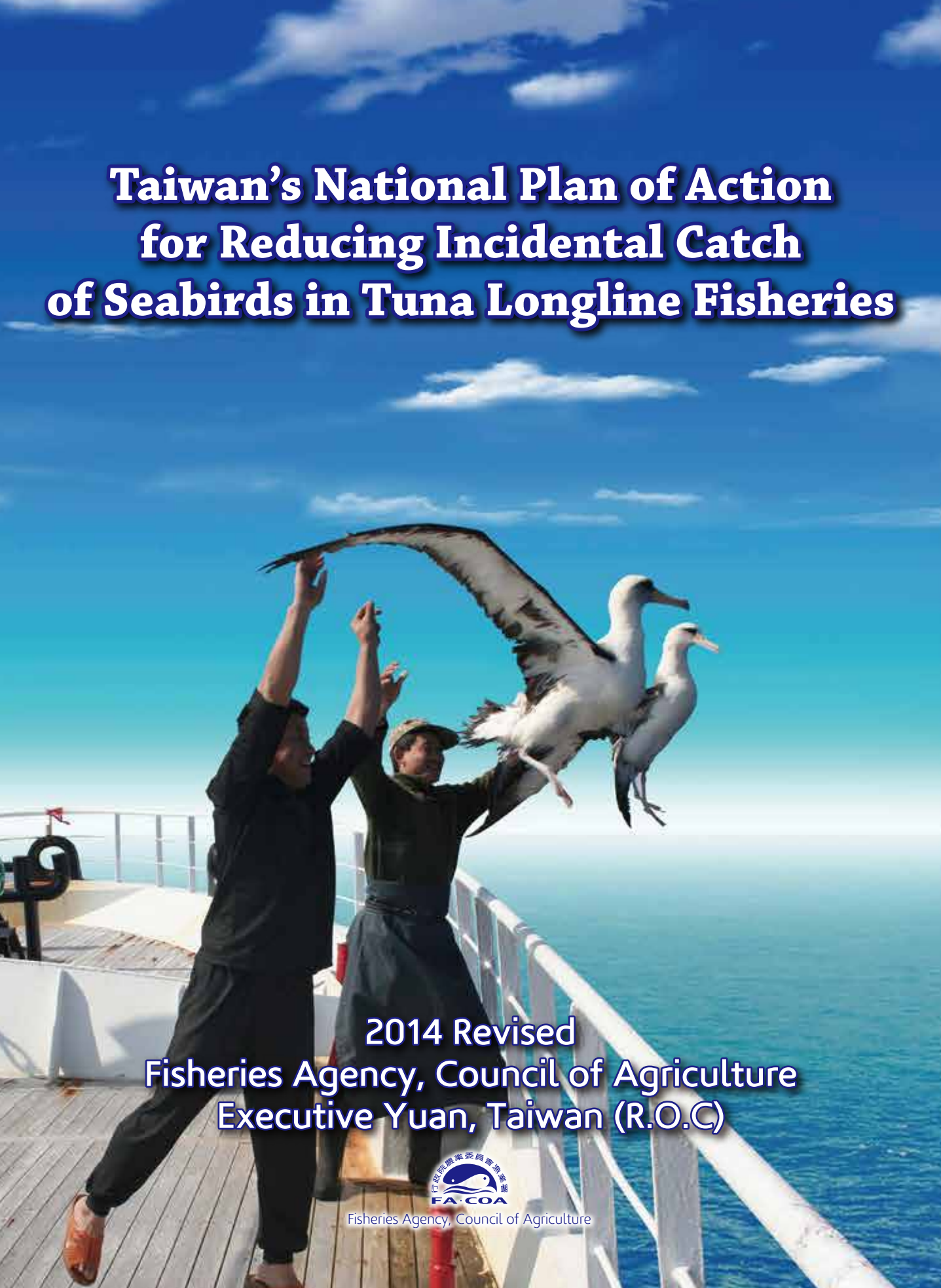
Taiwan's National Plan of Action for Reducing Incidental Catch of Seabirds in Tuna Longline Fisheries



2014 Revised

Fisheries Agency, Council of Agriculture

Executive Yuan, Taiwan (R.O.C)

Fisheries Agency, Council of Agriculture

Taiwan's National Plan of Action for Reducing Incidental Catch of Seabirds in Tuna Longline Fisheries

2014 Revised

Fisheries Agency, Council of Agriculture
Executive Yuan, Taiwan (R.O.C)

Foreword

The issue of seabird bycatch by longline fisheries has drawn the attention of the international community since the 1990s. Relevant international conservation organizations and countries began to conduct pertinent conservation research topics, including quantification of the seabird bycatch, through international cooperation and studies to provide recommendations for conservation measures and continuous monitoring of the extent of seabird incidental catch.

Fishery authorities and managers are responsible for the development of the methodology to avoid incidental seabird bycatch by vessels. As Taiwan is one of the countries engaging in tuna longline fishing, the government of Taiwan is obligated to monitor the incidental catch of seabirds by Taiwanese vessels in order to assess and analyze the seabird bycatch by longline fisheries and demand that fishers take appropriate measures to mitigate the incidental catch of seabirds so as to effectively reduce the impact of longline fisheries on seabird resources.

In response to the "International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries" adopted by the Food and Agricultural Organization (FAO) of the United Nations in 1999, the government of Taiwan formulated "The National Plan of Action for Reducing Incidental Catch of Seabirds by Taiwan Longline Vessels"(NPOA-Seabirds) in 2006. The NPOA-Seabirds call upon extensive collection of related international information, planning of data collection, evaluation of scientific research, continuation of educational advocacy, and requirement of fishers to obey relevant laws and regulations promulgated by the government of Taiwan based on the resolutions adopted by the respective Regional Fisheries Management Organizations (RFMOs) to fulfill the responsibility of seabird conservation.

The implementation of the 2006 NPOA-Seabirds was followed by progress in seabird incidental catch research and mitigation measures. In this context, the Fisheries Agency (FA), which conducted the overall program planning, invited Associate Professor H. W. Huang from the National Taiwan Ocean University (NTOU), Associate Professor C. C. Cheng from the Kuohsiung Medical University, Associate Professor S. S. Ding from the National Taiwan University (NTU) and experts from the Forestry Bureau of the Council of Agriculture (COA), Taiwan Tuna Association, and Chinese Wild Bird Federation, to participate in the program and help updatingthe information in the NPOA-Seabirds. Some of the figures in this report were taken from the results of such research. The photographs of seabirds were takenby observers on board tuna longline fishing vessels during their observer missionsat sea, and special thanks are hereby extended to Mr. Huan-Chang Liao in this regard.

By updating the NPOA-Seabirds, the Fisheries Agency hopes to pursue sustainable conservation of seabirds and sustainable use of fisheries resources based on the original objective of the NPOA.

Director-General

James Sha

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January 2014

Summary

Incidental catch of seabirds by longline fisheries threatens endangered seabirds such as albatrosses, and fishers have the obligation to take appropriate measures to reduce the seabird bycatch by longline fisheries in order to prevent the decline of seabird populations. In response to the International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (IPOA-Seabirds) adopted by the Food and Agricultural Organization (FAO) of the United Nations, the government of Taiwan publicized the first edition of the National Plan of Action (NPOA-Seabirds) in 2006, and formulated related work plans. The NPOA-Seabirds was revised in 2014 to achieve the objective of the sustainable conservation of seabird populations.

This revised NPOA is divided into four sections. Section 1 is a review and an examination of the development of the issue, including the development of relevant international regulations, the seabirds, and the list of endangered seabirds updated by international conventions, such as the Agreement on the Conservation of Albatrosses and Petrels (ACAP). This section also includes recently updated best mitigation practices and resolutions regarding mitigation-related measures adopted or updated by the respective tuna Regional Fisheries Management Organization (tRFMO).

Section 2 is divided into two parts: the first part includes information on the number of vessels operating in the three oceans, fishing grounds, and the distribution of fishing efforts by the pelagic tuna longline fisheries of Taiwan between 2003 and 2012, and the second part is a discussion of the possible effects of the Taiwanese tuna longline fisheries on seabird species such as albatrosses, assessed based on the observers data of the pelagic tuna longline vessels (TLVs).

Section 3 is a comprehensive review and an examination of the results of the implementation of each conservation measure in the 2004edition of the NPOA-Seabirds, including increasing of observers coverage, strengthening of educational advocacy, the adoption of mandatory decrees, and strengthening of international cooperation for the actual implementation of seabird conservation.

Section 4 summarizes the development of the promotion of seabird conservation measures through observers plans and international cooperation. It also explains the important affected areas and the species comprising the incidental catch of seabirds by Taiwanese tuna longline fisheries as well as the difficulties of implementing related plans, and confirms the work plans to be performed in the future.

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List of Acronyms

Acronyms	English
ACAP	Agreement on the Conservation of Albatrosses and Petrels
CBD	Convention on Biological Diversity
CCAMLR	Convention on the Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
Code Conduct	Code of Conduct for Responsible Fisheries
Compliance Agreement	FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization
Fish Stock Agreement	Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 Dec. 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICFA	International Coalition of Fisheries Association
IOTC	Indian Ocean Tuna Commission
IPOA-Seabirds	International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries
IUCN	International Union for Conservation of Nature
NPOA-Seabirds	National Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries
RFMOs	Regional Fisheries Management Organizations
OPRT	Organization for Promotion of Responsible Fisheries
UN	United Nations
WCPFC	Western and Central Pacific Fisheries Commission

1. Introduction

1.1 The threat to seabirds by fisheries

Seabird population faces incidental catch by fisheries, hunting pressure, habitat destruction, and threats from introduced species, resulting a rapid decrease in the size of seabird population. Of these threats, incidental catch in fishing operations has received concerns from many countries and conservation groups. The interaction between seabirds and longline fisheries became a focal issue in the 1990s.

It is observed that in longline fishing, before baited hooks sink into the sea, seabirds which tend to rush to snatch the baits, may be hooked and drowned. The 2003 Report of Birdlife International illustrates that there were 22 threatened seabird species in 2000. Distribution of seabirds is very extensive. In addition to their important habitats in Australia, New Zealand, South Africa, France, and United Kingdom's overseas territories, the impacts of fishing activities on seabirds in their offshore habitats should not be ignored. Interaction of seabirds in fishing activities were reported in many tuna RFMOs, among which, the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) reported that southern bluefin tuna (SBT) fisheries encountered 18 species of seabirds, and other tuna RFMOs reported encounter of approximately 10 seabird species by fisheries under their auspices. Black browed albatross and white-chinned petrel are the most frequently observed incidentally caught species, followed by wandering albatross. There are more than 25 countries with such related fisheries. They include Angola, Argentina, Australia, Brazil, Canada, Chile, China, Columbia, Ecuador, England, France, Japan, Mozambique, Madagascar, Mexico, Namibia, New Zealand, Panama, Peru, Russia, South Africa, South Korea, Taiwan, Uruguay, and the USA (Nel & Taylor 2003).

It is recorded that some 60 species of seabirds have been caught incidentally by fisheries worldwide. Currently, the fishing gear types which have been recognized as causing the greatest potential damage to seabirds include pelagic longline, bottom longline, and trawl. The rate of incident catch varies in accordance with such factors as the types of fisheries, fishing time and location, environmental features, and vessel. Experts affiliated with Birdlife International comprehensively evaluated the extent of seabird endangerment in 2012. They sought not only to reduce seabird incidental catch by fisheries to a degree of eliminating any threat to the persistent survival of the seabird population, but also to remind people to pay attention to certain emerging issues, such as global climate change and the conservation of important seabird habitats (even the establishment of marine protected areas). These experts also considered that RFMOs have gradually implemented various measures and that the focus of the next step is to actively evaluate their effects (Croxall et al. 2012).

1.2 List of endangered seabirds

For listing of the conservation status of seabirds, the International Union for Conservation of Nature (IUCN) releases from time to time the IUCN Red List, which is based on the criteria for evaluating the extinction risk of species, which include six categories from high to low risk: extinct (EX), critically endangered (CR), endangered (EN), vulnerable (VU), near threatened (NT), least concern (LC), and not evaluated (NE). Currently, albatrosses and petrels are listed in multiple risk categories as listed in Table 1 .

The Convention on Migratory Species (CMS) has established two categories of threatened species in Appendix 1 and Appendix 2. Appendix 1 lists endangered species for which there is reliable evidence showing that the species areclose to extinction. Accordingly, every country should take immediate actions to protect any species listed in Appendix 1. These species should only be caught under special conditions and for limited reasons, such as science and research purposes, the provision of information regarding reproductive rates, and the satisfaction of the needs in traditional diets. Currently, three albatross species are listed in Appendix 1. The species in Appendix 2 are in poor condition and required international agreements or the strengthening of international cooperation to improve their situation. There are 22 species of albatrosses and petrels currently listed in Appendix 2 (Table 1).

The Agreement on the Conservation of Albatrosses and Petrels (ACAP) uses the exchange of resources and data among countries to implement habitat conservation, strengthening the regulation of human behaviors, establishing monitoring systems, and advocating education to achieve conservation. ACAP's goals include protecting seabird habitat, controlling introduced species, developing mitigation measures to reduce seabird incidental catch, conducting research, performing training and education regarding conservation measures, exchanging information, and supporting the FAO IPOA-Seabirds. Thus, each related country is encouraged to develop data collection and exchange systems and to plan and design teaching materials to execute education training plans. In addition, ACAP seeks to conserve 30 species of albatrosses and petrels (Table 1).

[1] IUCN Red List Website is: http://www.iucnredlist.org/. The Red List used here is dated January 2013
[2] Appendix 1 and Appendix 2 of CMS can be found in the website: http://www.cms.int/documents/appendix/additions_table1.pdf
[3] ACAP Conservation List can be found in the website
http://www.acap.aq/index.php/en/species-assessments/doc_download/307-acap-species-list. The list is 2013 Version

Table 1 Endangered seabirds list and their status by organization

No	Species	Scientific name	IUCN	CMS	ACAP
1	Northern Royal Albatross	*Diomedea sanfordi*	EN	App 2	Y
2	Southern Royal Albatross	*Diomedea epomophora*	VU	App 2	Y
3	Wandering Albatross	*Diomedea exulans*	VU	App 2	Y
4	Antipodean Albatross	*Diomedea antipodensis*	VU	App 2	Y
5	Amsterdam Albatross	*Diomedea amsterdamensis*	CR	App1	Y
6	Tristan Albatross	*Diomedea dabbenena*	EN	App 2	Y
7	Sooty Albatross	*Phoebetria fusca*	EN	App 2	Y
8	Light-mantled Sooty Albatross	*Phoebetria palpebrata*	NT	App 2	Y
9	Waved Albatross	*Phoebastria irrorata*	VU	App 2	Y
10	Black-footed Albatross	*Phoebastria nigripes*	VU	App 2	Y
11	Laysan Albatross	*Phoebastria immutabilis*	NT	App 2	Y
12	Short-tailed Albatross*	*Phoebastria albatrus*	VU	App1	Y
13	Atlantic Yellow-nosed Albatross	*Thalassarche chlororhynchos*	EN	App 2	Y
14	Indian Yellow-nosed Albatross	*Thalassarche carteri*	EN	App 2	Y
15	Grey-headed Albatross	*Thalassarche chrysostoma*	VU	App 2	Y
16	Black-browed Albatross	*Thalassarche melanophris*	EN	App 2	Y
17	Campbell Albatross	*Thalassarche impavida*	VU	App 2	Y
18	Buller's Albatross	*Thalassarche bulleri*	NT	App 2	Y
19	Shy albatross	*Thalassarche cauta*	NT	App 2	Y
20	White-capped Albatross	*Thalassarche steadi*	NT	App 2	Y
21	Chatham Island Albatross	*Thalassarche eremita*	CR	App 2	Y
22	Salvin's Albatross	*Thalassarche salvini*	VU	App 2	Y
23	Southern Giant Petrel	*Macronectes giganteus*	VU	App 2	Y
24	Northern Giant Petrel	*Macronectes halli*	NT	App 2	Y
25	White-chinned Petrel	*Procellaria aequinoctialis*	VU	App 2	Y
26	Spectacled Petrel	*Procellaria conspicillata*	CR	App 2	Y
27	Black Petrel	*Procellaria parkinsoni*	VU	App 2	Y
28	Westland Petrel	*Procellaria westlandica*	VU	App 2	Y
29	Grey Petrel	*Procellaria cinerea*	NT	App 2	Y
30	Balearic Shearwater	*Puffinus mauretanicus*	CR	APP 1	Y
31	Sooty Shearwater	*Puffinus griseus*	NT		
32	Cory's Shearwater	*Calonectris diomedea*	LC		
33	Great Shearwater	*Puffinus gravis*	LC		
34	Wedge-tailed Shearwater	*Puffinus pacificus*	LC		
35	Short-tailed Shearwater	*Puffinus tenuirostris*	LC		
36	Northern Fulmar	*Fulmarus glacialis*	LC		

Note:*Short-tailed Albatross is listed in Appendix 1 of CITES.

1.3 International regulations and conservation measures

International law, including Article 61 of the United Nations Convention on the Law of the Sea (UNCLOS), Article 5 (f) of the 1995 Fish Stocks Agreement, Article 3 of the Compliance Agreement, and Articles 7 and 8 of the Code of Conduct, provide that flag states take appropriate measures to require their vessels to use possible means to avoid any impact of incidental catch on the sustainability of other species.

Considering the importance of seabird conservation, FAO adopted the IPOA-Seabirds based on the spirit of the Code of Conduct. The IPOA advocates that countries that conduct longline fisheries or have longline vessel operations in their exclusive economic zones (EEZs) pay attention to this issue, by taking the following actions: (1) evaluate the degree of incidental seabird catch by longline fisheries, (2) develop an NPOA for longline fisheries that have an incidental catch of seabirds to reduce such catch, and (3) conduct studies and actions to reduce future incidental seabird catches. For the reference and the use of vessels in each country, the IPOA put forth many mitigation measures that are currently in use or were applicable after evaluation (FAO 1999). A technical guideline to advance the best mitigation measures was subsequently proposed in 2008 (FAO 2008).

Although seabirds are not the target species managed by RFMOs, considering the conservation of marine ecosystems and the maintenance of seabird population without affecting fishery behaviors, the Commission on the Conservation of Antarctic Marine Living Resources (CCAMLR) first proposed seabird conservation measures demanding vessels operating at high latitudes in Antarctica delay the opening date of fishing season when the incidental seabird catch is too high. The SBT, which is extensively distributed in the three oceans, is the species managed by the CCSBT. The CCSBT has no specific jurisdictional waters; however, SBT fisheries encounter more species of seabirds than other fisheries. Thus, the CCSBT first adopted a resolution demanding that its members use mitigation measures, such as tori line, and requiring their vessels operating in the Pacific, Indian, or Atlantic Ocean to comply with the mitigation measures adopted by the respective RFMOs in each ocean area. The International Commission for the Conservation of Atlantic Tunas (ICCAT), Indian Ocean Tuna Commission (IOTC), Western and Central Pacific Fisheries Commission (WCPFC), and Inter-American Tropical Tuna Commission (IATTC) have adopted a number of conservation measures since2002, requiring that their member countries direct their vessels to take relevant measures to reduce the rate of incidental catch of seabirds. The conservation resolutions/recommendations currently applied by the respective RFMO are shown in Table 2.

Because several species of endangered albatrosses are primarily distributed in high-latitude areas, these measures mainly target on high-latitude areas, including north of 23° N, south of 30° S, around the Galapagos Islands in the Pacific Ocean, south of 30° S in the Indian Ocean, and south of 25° Sinthe Atlantic Ocean.

Table 2 List of the conservation resolutions/recommendations of tuna RFMOs

RFMOs	ICCAT [4]	IATTC [5]	WCPFC [6]	IOTC [7]
Recommendations/Resolutions [8]				
2002	02-14			
2005		05-01	2005-01	05-09
2006			2006-02	06-04
2007-08	07-07		2007-04	08-03
2010		10-02		10-06
2011-2012	11-09	11-02	2012-07	12-06
Current requirements				
Data reporting	V	V	V	V
NPOA	V	V	V	V
Research	V	V	V	V
Mandatory mitigation measures				
Applied areas	South of 25° S	South of 30° S	North of 23° N South of 30° S	South of 25° S
Principle of using mitigation measures		Areas near Galapagos Islands (Figure 9)		
Principle of using mitigation measures	Two of three (V)	One of each sets (A or B)	two of two sets, at least one from set A Two of three in south area(V)	Two of three
Bird-scaring line	V	A B	A B V	V
Night setting	V	A B	A V	V
Weighted branchline	V	A	A V	V
Side-setting		A	A	
Blue-dye baits		B	B	
Deep-setting line shooter		B	B	
Underwater setting chute		B		
Management of offal discharge		B	B	

[4] ICCAT recommendations: http://www.iccat.int/en/RecsRegs.asp
[5] IATTC resolutionshttp://www.iattc.org/ResolutionsActiveENG.htm
[6] WCPFC conservation management measureshttp://www.wcpfc.int/conservation-and-management-measures
[7] IOTC resoultionshttp://www.iotc.org/English/resolutions.php
[8] The first two or four codes represent the year of adoption. For example, 07 or 2007 means the resolution was adopted in year 2007

1.4 Goals of this NPOA

In response to the FAO IPOA-Seabirds, the FA is responsible for promoting this NPOA. Relevant groups, such as seabird organizations, conservation-related research academic institutions, non-governmental organizations (NGOs), fishery groups, and fishery authorities, are invited to engage in discussions. Taiwan's 1st NPOA-Seabirds was published in 2006. The goals and actions of the 1stNPOA were: (1) continued collection of data and evaluation of the impact of Taiwanese tuna longline fisheries on seabirds; (2) continued participation in relevant international cooperative endeavors and meetings; (3) coordination of the implementation of the relevant resolutions adopted by RFMOs and request that fishers apply the resolutions to effectively reduce the seabird incidental catch; (4) introduction of mitigation measures, technology, and training to conduct and promote the seabird conservation programs; (5) strengthening of international cooperation; and (6) performance of periodic assessments, including the preparation of relevant reports.

Despite the revision of the NPOA, the relevant work under each principle and working item of the NPOA is still ongoing, including data collection by observers, the establishment of a seabird database, and the assessment of the rate and number of seabird incidental catch to precisely identify the waters with a higher incidental seabird catch by Taiwanese longline vessels and the commonly observed bycatch species to strengthen the seabird conservation work. The objectives of this revised NPOA are to present the relevant progress and achievements of the plan and to confirm the goals for continued pursuit.

Images from Fisheries Agency

2. Taiwan's longline fisheries and incidental catch of seabirds

Taiwan is a major longline fisheries country. Based on the differences in their refrigeration equipments, the large-scale tuna longline vessels (LSTLVs) are divided into the conventional longline vessels (tonnage between 200 and 500 tons) and the ultra-low-temperature vessels (tonnage between 500 and 700 tons). The fishing grounds of the conventional longline vessels are mainly concentrated in the temperate and subtropical waters. The target fish species is albacore, mainly for supply to canneries as raw material for producing canned tuna. The development of this fishery reached its heyday in 1970, when it accounted for more than 60% of the production of the total pelagic tuna longline fisheries. Since1986, operators changed to the operation of ultra-low-temperature vessels, causing a decrease in the number of conventional longline vessels, and the drop of albacore catches. The reduction of albacore production was most evident in the Indian Ocean and the Pacific Ocean.

Ultra-low-temperature longline vessels were introduced from Japan in the early 1970s. The refrigeration equipment on these vessels has a freezing capacity for maintaining the catch on board at a temperature of -50 to -60° C. These vessels mainly catch bigeye tuna and yellowfin tuna that inhabit in the deeper tropical waters. The tuna catches are mainly provided to the Japanese sashimi market. High price of sashimi tuna from this fishery attracts many operators to invest in this fishery. In addition, the government's policy on the permission of construction of new vessels over 700 tons in October 1983, coupling with other factors, such as easy availability of funds from financial institutions for vessel building loans, prompted the development of the ultra-low-temperature LSTLVs. The total number of vessels in 2004 reached the peak of 633. In response to the international management trend on fishing capacity and the difficult situation of incommensurability between the fishing capacity and fishing opportunity in the tuna fisheries, the government implemented a series of vessel buyback programs, scrapping more than 180 LSTLVs between2005 and 2007. Thus, by 2012, the number of LSTLVs declined to 357.

Images from Fisheries Agency

With the introduction of modern shipbuilding technology and recent increase in fuel costs, there has been a tendency of building smaller size longline vessels with fiberglass reinforced plastic hull to save energy. In the past, small-scale tuna longline vessels (SSTLVs) mainly operated in waters around the island of Taiwan and used ice flakes to preserve catches. A small number of newly built SSTLVs are equipped with ultra-low-temperature freezers, thus greatly increasing the competitiveness of their operation. The number of SSTLVs reached 1706 in 2004, and their range of operation covers the waters in the Pacific and Indian Oceans. In 2012, there were 1117 SSTLVs operating in the Pacific and Indian Oceans, of which 832 vessels operated in international waters and the EEZs of countries where they entered into fishing agreement.

Overall, the total number of Taiwanese TLVs reached its highest level of more than 2300 during 2003-2005. After that, in response to the international conservation trend and the availability of fishing opportunities, the number decreased, and the total number of vessels in 2012 was 1474.

The distribution of seabirds varies spatially and temporally (Birdlife International 2004), and the seabird incidental catch rates and numbers change accordingly (Tuck et al. 2003). To understand the operation of the Taiwanese TLVs and the situation of the incidental seabird catch, Taiwan began implementing a national observers program in 2002, sending observers on board longline vessels to observe and record the fishing operations (Huang 2011). The observer program is still ongoing, and a detailed record of the observations is described below by ocean area.

[9] It is an international practice that vessels larger than 24 meters are considered as large-scale vessels, and vessels less than 24 meters are considered as small-scale fishing vessels. However, in Taiwan, vessels with tonnage less than 100 tons are considered as small-scale vessels.

2.1 Pacific Ocean

2.1.1 Fisheries

Pacific tuna fisheries include two fleets, the LSTLVs and the SSTLVs. Some SSTLVs operate in the EEZ of Taiwan; other SSTLVs and LSTLVs operate on the high seas and the EEZs of Pacific Island countries where they have fishing agreement. Because of vessel reduction under the vessel buyback program and high fuel prices, the fleet of LSTLVs declined from 115 vessels in 2006 to 90 vessels in 2008 and to 87 vessels in 2012. The number of SSTLVs is approximately 1,326 (FA & OFDC 2013).

In the 1990s, the LSTLVs operated in the South Pacific, targeting on albacore; some vessels shifted fishing grounds seasonally to catch albacore in the North Pacific. After the 1990s, some LSTLVs with ultra-low-temperature freezers changed their fishing pattern and shifted to the tropical waters (between 15° N and 15° S) to catch bigeye tuna. The fishing grounds for Pacific albacore are primarily distributed in (1) 130° E-150° W and 15-40° N and (2) 150° E-110° W and 15-40° S. The main fishing seasons in the North Pacific waters are during the first and the fourth quarters, whereas the main fishing seasons in the South Pacific waters are during the second and third quarters. The catches of bigeye tuna are primarily distributed in tropical waters between 15° N and 15° S, although there are also higher percentages of bigeye tuna catches in 15-25 ° N and 130-145 ° W. The fishing grounds of yellowfin tuna and billfishes are close to those of bigeye tuna. There are higher catches of yellowfin tuna in waters along the Solomon Islands and Vanuatu. During 2003-2012, the major fishing efforts in the Pacific waters were mainly concentrated in the South Pacific. The fishing efforts of the albacore fleets in the North Pacific are greater during the first and the fourth quarters. SSTLVs mainly use Taiwan and foreign bases as their operation ports. The target fish species include yellowfin tuna, billfishes, such as swordfish, and bigeye tuna (Figure 1).

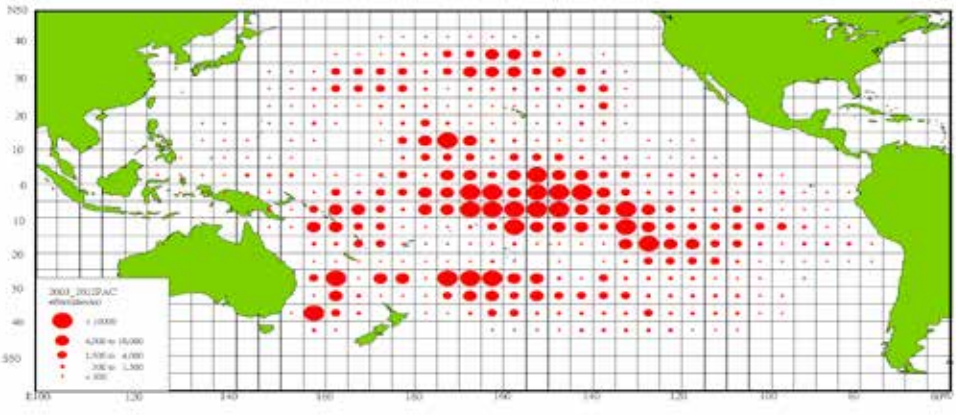


Figure 1 Efforts distribution of Taiwanese LSTLVs in the Pacific Ocean between 2003 and 2012
Source: OFDC

2.1.2 Seabirds incidental catch

Based on the data collected by observers between 2002 and 2007, the seabirds sighted in the Pacific included 14 species in the North Pacific, nine species in tropical waters, and nine species in the South Pacific (Table 3). The species of seabirds incidentally caught were mainly black-footed and Laysan albatross. The incidental catch include some frigatebirds in tropical waters and wandering albatrosses and southern giant petrels in the South Pacific. The average seasonal seabird incidental catch rates in each region were between 0.00003 and 0.2213 per thousand hooks (Table 4). The waters with the highest incidental catch rates were 25-40 ° N and 165 ° W to 165 ° E in the North Pacific and 25-35 ° S and 165-170 ° W in the South Pacific (Huang and Yeh 2011) (Figure 2). In summary, it is estimated from the above information that the number of seabirds incidentally caught during 2002-2007 was approximately 1120-4290 (Table 5).

Photo: Huan-Chang Liao

Table 3 Seabird species sighted by area and their IUCN status

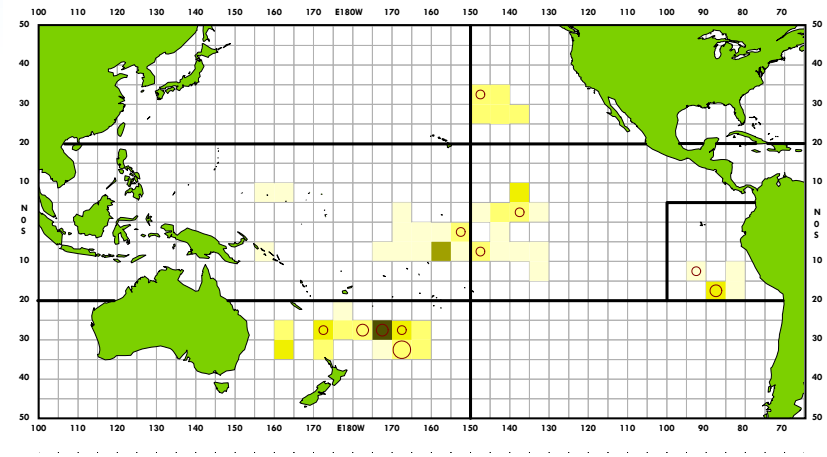
Area	Species	Scientific name	IUCN status*
N-Pacific	Black-footed albatross*	*Phoebastria nigripes*	EN
	Short-tailed albatross	*Phoebetria albatrus*	VU
	Laysan albatross*	*Phoebetria palpebrata*	NT
	Mottled petrel	*Pterodroma inexpectata*	NT
	Northern fulmar	*Fulmarus glacialis*	LC
	Glaucous gull	*Larus hyperboreus*	LC
	Slaty-backed gull	*Larus schistisagus*	LC
	Leach's storm-petrel	*Oceanodroma leucorhoa*	LC
	Red-tailed tropicbird	*Phaethon rubricauda*	LC
	Red phalarope	*Phalaropus fulicarius*	LC
	Kermadec petrel	*Pterodroma neglecta*	LC
	Flesh-footed shearwater	*Puffinus carneipes*	LC
	Short-tailed shearwater	*Puffinus tenuirostris*	LC
	Brown booby	*Sula leucogaster*	LC
Tropical	Ascension frigatebird	*Fregata aquila*	VU
	Brown noddy	*Anous stolidus*	LC
	Lesser frigatebird	*Fregata ariel*	LC
	Greater frigatebird*	*Fregata minor*	LC
	Leach's storm-petrel	*Oceanodroma leucorhoa*	LC
	Red-tailed tropicbird	*Phaethon rubricauda*	LC
	Masked booby	*Sula dactylatra*	LC
	Brown booby	*Sula leucogaster*	LC
	Red-footed booby	*Sula sula*	LC
South	White-chinned petrel*	*Procellaria aequinoctialis*	VU
Pacific	Southern giant-petrel*	*Macronectes giganteus*	LC
	Buller's albatross*	*Thalassarche bulleri*	NT
	Black-browed albatross	*Thalassarche melanophris*	EN
	Grey-headed albatross	*Thalassarche chrysostoma*	VU
	Wandering albatross*	*Diomedea exulans*	VU
	Westland petrel	*Procellaria westlandica*	VU
	Southern giant-petrel	*Macronectes giganteus*	LC
	Northern giant-petrel	*Macronectes halli*	LC

Note

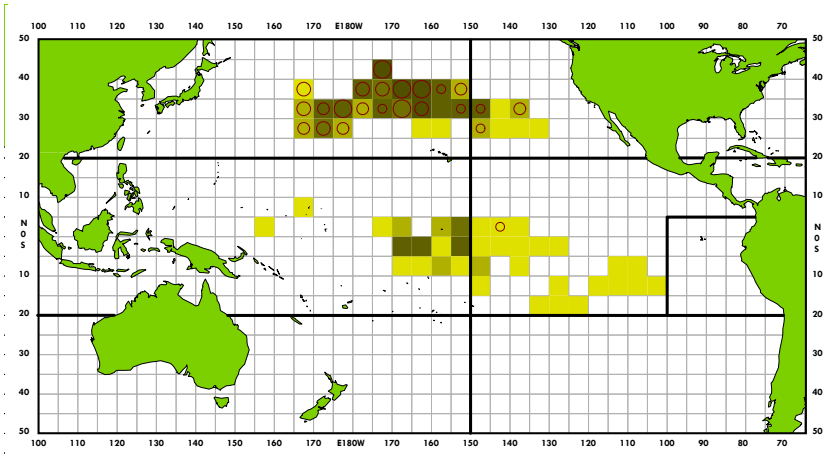
1.Source: Huang & Yeh 2011

2.* means incidental catch, others were sighted around the fishing vessels during operations.

The first half of fishing season(April to September)



The second half of fishing season(October to March)



Sighted seabirds
Unit：Birds

- 1,000 to 1,450
- 500 to 1,000
- 200 to 500
- 50 to 200
- 0 to 50

Seabirds bycatch rate
Unit：Birds/ 1000 Hooks

- 0.336-0.692
- 0.151-.336
- 0.031-0.151
- 0.006-0.031

Figure 2 Distribution of the number of seabirds sighted and their incidental catch from 2002 to 2007
Source:Huang & Yeh 2011

Table 4 Incidental catch numbers and rates by area divided into seasons

Region	Area	Fishing Season	No. of Sets	Incidental catch (include live release)	Estimated incidental catch rate (birds/1000 hooks)
North Pacific	WNP	1st	8	0	0.0036(0.0016-0.0079)
	ENP	1st	52	1	
	WNP	2nd	362	342	0.2213(0.2067-0.2369)
	ENP	2nd	65	7	0.0227(0.0101-0.0509)
Tropical Pacific	WTP	1st	643	1	0.0003(0.0000-0.0029)
		2nd	405	0	
	ETP	1st	277	2	0.0011(0.0002-0.0049)
		2nd	610	1	
	GI	1st	40	6	0.0323(0.0140-0.0742)
		2nd	22	0	
South Pacific	WSP	1st	179	19	0.0250(0.0077-0.0812)
		2nd	0	0	
	ESP	1st	3	0	
		2nd	0	0	
Total			2666	379	0.023

Source: Huang & Yeh 2011

Images from Fisheries Agency

Table 5 Estimated mortality of seabirds by area, year and species

		WPO					
Area	Seabirds	2002	2003	2004	2005	2006	2007
North		461 (460-462)	941 (878-1,008)	3,165 (2,955-3,389)	3,066 (2,864-3,283)	1,709 (1,596-1,830)	1,308 (1,221-1,402)
Apr-Sep		1 (1-3)	0 (0-1)	1 (0-2)	0 (0-0)	0 (0-1)	2 (1-3)
Oct-Mar		459 (429-492)	940 (878-1,007)	3,164 (2,955-3,387)	3,066 (2,864-3,283)	1,708 (1,595-1,829)	1,306 (1,220-1,398)
	Black-footed albatross	136	278	935	906	505	386
	Laysan albatross	303	619	2,082	2,017	1,124	860
	Storm petrel	2	3	9	9	5	4
	Unidentified seabirds	20	41	139	134	75	58
South		9 (1-80)	7 (1-64)	12 (1-108)	8 (1-74)	6 (1-51)	6 (1-51)
Apr-Sep		5 (1-45)	3 (0-29)	7 (1-63)	4 (0-33)	3 (0-23)	3 (0-26)
Oct-Mar		4 (0-36)	4 (0-35)	5 (1-45)	5 (1-41)	3 (0-28)	3 (0-25)
	Greater frigatebird	9	7	12	8	6	6
	Leach's storm petrel						
	(GI)Buller's albatross						
	(GI)Southern giant petrel						
	(GI)White-chinned petrel						
	Unidentified seabirds						
South							
Apr-Sep		311 (96-1,011)	564 (174-1,832)	567 (175-1,840)	385 (119-3,283)	224 (69-728)	129 (40-419)
Oct-Mar		-	-	-	-	-	-
	Wandering albatross	68	123	124	84	49	28
	Unidentified seabirds	243	441	443	301	175	101
Toeal		781	1,512	3,744	3,460	1,938	1,442

The figures in parentheses are 95% confidence interval.

EPO						PAC					
2002	2003	2004	2005	2006	2007	2002	2003	2004	2005	2006	2007
31 (14-71)	29 (13-66)	74 (33-166)	46 (20-103)	83 (37-186)	86 (38-192)	492 (474-533)	971 (892-1,074)	3,239 (2,988-3,555)	3,112 (2,885-3,386)	1,791 (1,632-2,015)	1,393 (1,259-1,593)
0	0	0	1 (0-1)	7 (3-16)	4 (2-8)	1 (1-3)	0 (0-1)	1 (0-2)	1 (0-1)	8 (3-17)	5 (2-12)
31 (14-71)	29 (13-66)	74 (33-166)	45 (20-102)	76 (34-170)	82 (36-184)	491 (473-530)	970 (891-1,073)	3,238 (2,988-3,553)	3,112 (2,884-3,385)	1,784 (1,629-1,998)	1,388 (1,256-1,582)
						136	278	935	906	505	386
12	11	27	18	31	33	314	629	2,109	2,034	1,154	892
						2	3	9	9	5	4
19	18	47	28	52	53	40	60	187	163	128	112
143 (45-513)	289 (110-825)	101 (32-362)	126 (46-383)	82 (27-280)	33 (7-152)	152 (46-594)	296 (111-889)	114 (33-470)	134 (47-457)	88 (28-331)	39 (8-204)
83 (28-273)	166 (66-451)	27 (7-116)	75 (29-213)	52 (18-162)	13 (3-61)	88 (29-317)	169 (66-480)	35 (8-179)	78 (29-246)	54 (19-185)	16 (3-88)
60 (17-241)	86 (45-375)	61 (25-246)	51 (17-170)	31 (9-118)	20 (4-91)	64 (17-276)	127 (45-410)	79 (26-291)	56 (18-211)	34 (9-146)	23 (5-116)
						9	7	13	9	6	6
27	24	19	14	13	11	27	24	19	14	13	11
21	73	15	29	14	-	21	73	15	28	14	-
10	36	8	14	7	-	10	37	8	14	7	-
31	108	23	42	22	-	32	109	23	42	22	-
54	47	37	28	27	22	54	47	37	27	27	22
135 (42-438)	207 (64-673)	296 (91-961)	110 (34-358)	80 (25-259)	27 (8-88)	446 (137-1,449)	771 (238-2,504)	863 (266-2,801)	495 (153-1,609)	304 (94-987)	156 (48-507)
-	-	-	-	-	-	-	-	-	-	-	-
						68	123	124	84	49	28
135	207	296	110	80	27	378	648	739	411	255	128
309	526	472	282	245	146	1,091	2,038	4,215	3,742	2,184	1,589

2.2 Atlantic Ocean

2.2.1 Fisheries

The Taiwanese fishery has a long history of operation in the Atlantic, mainly by LSTLVs. The number of vessels reached 202 in 1997 and gradually declined to 134 in 2012 because of the vessel buyback program. There are no SSTLVs operating in this region.

Fishing efforts in the Atlantic are extensively distributed between 35° N and 45° S. The seasonal changes of catch efforts in the tropical regions are negligible, whereas the seasonal changes of catch efforts in high-latitude waters are more significant (Figure 3). The fishing grounds of Atlantic albacore are divided into southern and northern groups. The North Atlantic albacore fishing grounds are concentrated in 35-60 ° W and 30-35 ° N waters. In the first quarter, the North Atlantic albacore fishing grounds are mainly in 35-60° W and 30-35° N. The fishing grounds move southward in the second quarter and are concentrated in 35-65 ° W and 30-35 ° N. The fishing grounds in the third quarter are concentrated in 30-60° W and 10-25° N. In the fourth quarter, the operating vessels are concentrated between 40-45° W and 25-35° N. The South Atlantic albacore fishing grounds are distributed in the waters south of 15° S. In the first quarter, the efforts are mainly distributed in waters between 20° E-55° W and 20-45° S. The fishing grounds in the second quarter are distributed in waters south of 25° S and between 20° E-55° W and 25-45° S. In the third quarter, the fishing grounds are in the waters south of 15° S and between 15° E-50° W and 15-35° S. The fishing grounds in the fourth quarter are distributed in waters from 10 ° E-40 ° W and 10-

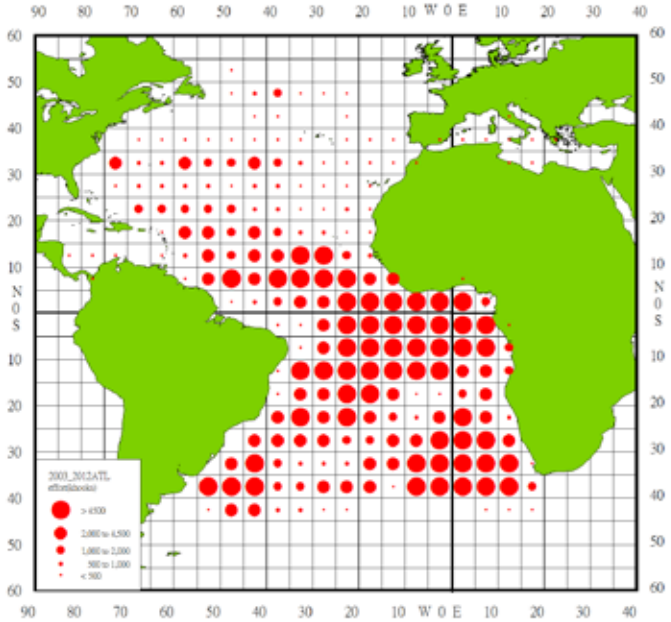


Figure 3 Efforts distribution of Taiwanese LSTLVs in the Atlantic Ocean between 2003 and 2012
Source: OFDC

30° S. The main bigeye tuna catches are distributed in tropical waters between 15° N and 15° S. The distribution of yellowfin tuna is mainly confined to the northern part of low-latitude regions in the tropical waters but also sporadically includes middle-latitude regions. The fishing grounds of billfishes are extremely close to the fishing grounds of bigeye tuna with distribution in the southern part of low-latitude regions in the tropical waters.

2.2.2 Seabirds incidental catch

According to the data collected by observers from 2004 to 2008, 28 seabird species have been sighted in the Atlantic waters, including two species in the north, 15 species in the tropical waters, and 12 species in the south (Table 6). The incidental catch is mainly distributed in the southeastern and southwestern Atlantic (35-45 ° S and 35-45° W, 30-40° S and 5-15° W) (Figure 4) The species in the incidental catch include wandering albatross, Atlantic yellow-nosed albatross, black-browed albatross, sooty albatross, spectacled petrel, southern giant petrel, and cape petrel. The seasonal and regional incidental catch rates are between 0 and 0.2266 per thousand hooks. The incidental catch rates are higher in the southeastern Atlantic, with 0.0265 per thousand hooks, and in the southwestern Atlantic, with 0.063 per thousand hooks (Table 7), Therefore, it is estimated that the number of seabirds incidental catch taken by all countries using pelagic longline fisheries in the Atlantic during 2004-2008 is between 3,400 and 6,000 (Table 8) (Yeh et al. 2013).

Images from Fisheries Agency

Table 6 Seabird species sighted during the daytime and caught by area

Area	Species	Scientific Name	IUCN
All areas	Great shearwater	*Puffinus gravis*	LC
North	Northern fulmar	*Fulmarus glacialis*	LC
	Cory's shearwater	*Calonectris diomedea*	LC
	South polar skua	*Catharacta maccormicki*	LC
	Lesser frigatebird	*Fregata ariel*	LC
	Wilson's storm-petrel	*Oceanites oceanicus*	LC
	Madeiran storm-petrel	*Oceanodroma castro*	LC
	Leach's storm-petrel	*Oceanodroma leucorhoa*	LC
Tropical	Long-tailed jaeger	*Stercorarius longicaudus*	LC
	Common tern	*Sterna hirundo*	LC
	Arctic tern	*Sterna paradisaea*	LC
	Masked booby	*Sula dactylatra*	LC
	Brown booby	*Sula leucogaster*	LC
	Red-footed booby	*Sula sula*	LC
	Sabine's gull	*Xema sabini*	LC
	Gannet	*Morus spp.*	
	Tristan albatross	*Diomedea dabbenena*	CR
	Southern Royal albatross	*Diomedea epomophora*	VU
	Wandering albatross*	*Diomedea exulans*	VU
	Northern Royal albatross	*Diomedea sanfordi*	EN
	Sooty albatross*	*Phoebetria fusca*	EN
	Light-mantled albatross	*Phoebetria palpebrata*	NT
South	Atlantic yellow-nosed albatross*	*Thalassarche chlororhynchos*	EN
	Black-browed albatross	*Thalassarche melanophrys*	EN
	White-chinned petrel	*Procellaria aequinoctialis*	VU
	Spectacled petrel*	*Procellaria conspicillata*	VU
	Cape petrel*	*Daption capense*	LC
	Southern giant-petrel*	*Macronectes giganteus*	LC

Note
1. Sources: Yeh et al., 2013
2.* means the incidental catch species. Others were sighted around the fishing vessel during fishing operations.

Table 7 Total fishing efforts, effort observed, and percent effort observed by fishery observers (coverage), number of seabirds sighted, number of seabirds caught, and incidental catch rate by area for the Taiwanese pelagic tuna longline fleets in the Atlantic Ocean from 2004 to 2008

Area	Number of sets	hooks (1000s)	Effort coverage rates	Number of caught (dead/live)	Bycatch rate(SD) (birds/1000 hooks)
N_ATL	203	706	3.3%	0/0	0.000
T_ATL	5131	16281	7.6%	0/1	0.000
SE_ATL	642	2516	4.4%	140/22	0.070 (0.258)
SW_ATL	205	726	1.3%	35/ 0	0.047 (0.206)
Total	6181	20230		175 /23	0.010

Source: Yeh et al., 2013

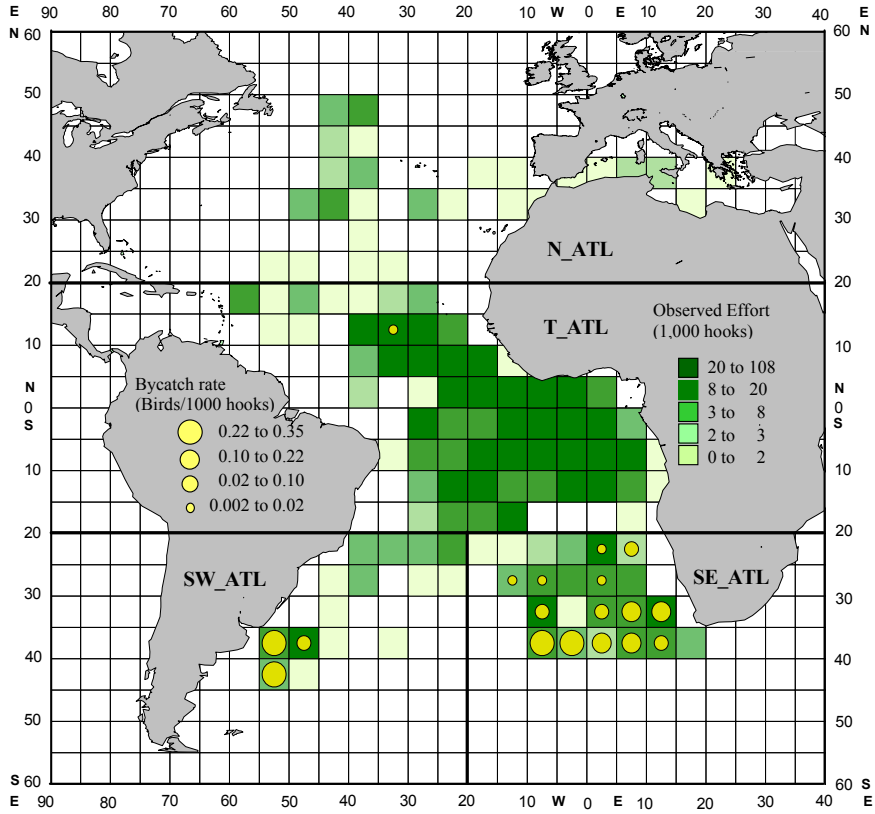


Figure 4 Observed effort distribution and average nominal incidental catch rate (birds/1000 hooks) of Taiwanese pelagic longline fleets in 5*5-degree grid from 2004 to 2008.

Source: Yeh et al., 2013

Table 8 Seabird incidental catch rates and total mortality by area and year for distant water and coastal pelagic longline fleets in the South Atlantic Ocean

Area	Estimated bycatch rate (#/1000 hooks)	2004	2005	2006	2007	2008
SE_ATL		**2,527**	**2,839**	**3,707**	**2,255**	**3,604**
DWLFs[a]	0.063[b]	2,115 (1,096-3,964)[c]	2,372 (1,186-3,270)	3,250 (1,391-3,976)	1,637 (997-2,482)	3,022 (1,150-3,987)
South Africa	0.44[d]	354	359	320	470	497
Namibia	0.07[e]	58	108	137	148	85
SW_ATL		**1,317**	**1,482**	**2,376**	**1,191**	**932**
DWLFs[a]	0.026[b]	501 (118-639)	488 (227-594)	891 (345-1,300)	597 (227-819)	416 (131-517)
Brazil	0.229[f]	286	546	687	191	291
Uruguay	0.281[g]	530	448	798	403	225
Total		**3,844**	**4,321**	**6,083**	**3,446**	**4,536**

Source: Yeh et al., 2013

Photo: Huan-Chang Liao

2.3 Indian Ocean

2.3.1 Fisheries

The Indian Ocean is an important fishing ground for the fishing operations of Taiwan. There are two fleets, the LSTLVs and SSTLVs. The number of LSTLVs was highest in 2004, with341 vessels. As the result of the government's vessel buyback program, adding to the problem of piracy off Somali waters, as well as other reasons, the number of vessels declined to 151 in 2012, and the number of SSTLVs maintained at approximately 241.

Fishing efforts in the Indian Ocean are mainly concentrated in low-latitude areas. In the first quarter, in addition to the equatorial area, some vessels also operate in the waters off Bangladesh. In addition to low-latitude areas, there are fairly high fishing efforts in the waters off Durban of South Africa during the third quarter (Figure 5). The albacore fishing grounds in the waters of Indian Ocean are located between 15 and 40° S. The fishing grounds in the first quarter are in two areas, waters between 60-110° E and 30-40° S and between 40-60° E and 15-40° S. The fishing grounds in the second quarter are concentrated in the waters between 30-105° E and 30-40° S. The fishing grounds in the third quarter are slightly north of those in the second quarter. The fishing grounds in the fourth quarter are concentrated in the waters west of 70° E and between 15 and 30° S. The catches of bigeye tuna are mainly distributed in tropical waters between 10° N and 15° S, without seasonal changes. The distributions of yellowfin and bigeye tuna fishing grounds are basically similar. In addition, yellowfin tuna is a target species of vessels operating in the waters of Bay of Bengal during the first and the fourth quarters and the waters of the Arabian Sea during the second quarter. The fishing areas of billfishes are quite close to the fishing grounds of bigeye tuna and yellowfin tuna.

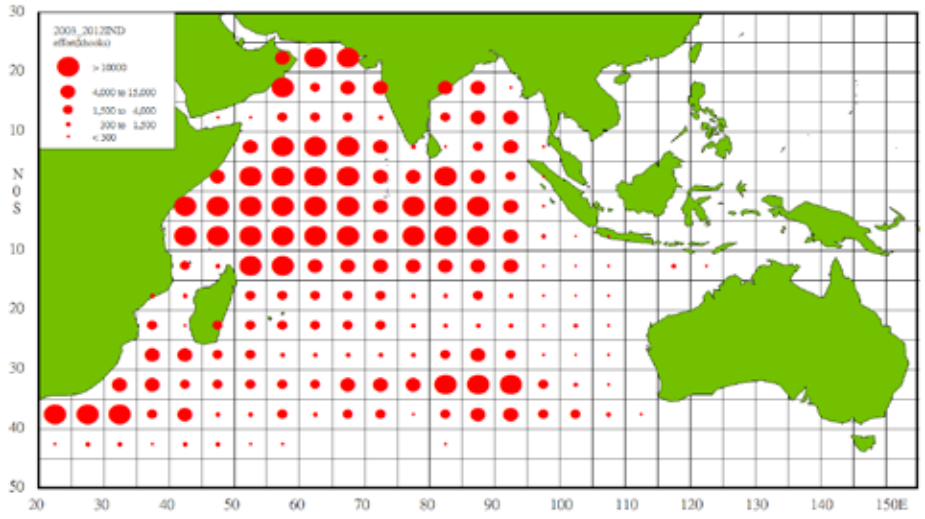


Figure 5 Efforts distribution of Taiwanese LSTLVs in the Indian Ocean between 2003 and 2012
Source: OFDC

2.3.2 Seabirds bycatch

According to the observer data during 2004-2008, 33 species of seabirds were sighted and six species were caught incidentally, including the Indian yellow-nosed albatross, sooty albatross, wandering albatross, Salvia's albatross, white-chinned petrel, and short-tailed shearwater(Table 9). The incidental catch is mainly distributed within 29-32° S and 70-90° E(Figure 6), and the incidental catch rates are between 0.0002 per thousand hooks in the tropical areas and 0.0158 per thousand hooks in high-latitude waters (Table 10).It is estimated that the number of seabird incidental catch taken each year is approximately 300-700(Table 11) (Huang & Liu 2010).

Images from Fisheries Agency

Table 9 Sighted seabirds' species in the Indian Ocean

Species	Scientific Name	IUCN Status*
Grey-headed Albatross	*Alassarche chrysostoma*	VN
Wandering Albatross*	*Diomedea exulans*	VN
Sooty Albatross*	*Phoebetria fusca*	EN
Light-mantled Albatross	*Phoebetria palpebrata*	EN
Indian Yellow-nosed Albatross*	*Thalassarche carteri*	EN
Shy Albatross	*Thalassarche cauta*	NT
Black-browed Albatross	*Thalassarche melanophrys*	EN
Salvin's Albatross*	*Thalassarche salvini*	VN
Southern Giant Petrel	*Macronectes giganteus*	LC
Northern Giant Petrel	*Macronectes halli*	LC
Black Noddy	*Anous minutus*	LC
Cattle Egret	*Bubulcus ibis*	LC
South Polar Skua	*Catharacta maccormicki*	LC
Cape Petrel	*Daption capense*	LC
Asian Koel	*Eudynamys scolopaceus*	LC
White-bellied Storm-Petrel	*Fregetta grallaria*	LC
Barn Swallow	*Hirundo rustica*	LC
Sooty Gull	*Larus hemprichii*	LC
Cape Gannet	*Morus capensis*	VN
Wilson's Storm-Petrel	*Oceanites oceanicus*	LC
White-chinned Petrel*	*Procellaria aequinoctialis*	VN
Grey Petrel	*Procellaria cinerea*	NT
Grey Shearwater	*Procellaria cinerea*	NT
Spectacled Petrel	*Procellaria conspicillata*	VN
Flesh-footed Shearwater	*Puffinus carneipes*	LC
Short-tailed Shearwater*	*Puffinus tenuirostris*	LC
Bridled Tern	*Sterna anaethetus*	LC
Lesser Crested Tern	*Sterna bengalensis*	LC
Black-naped Tern	*Sterna sumatrana*	LC
Rosy Starling	*Sturnus roseus*	LC
Masked Booby	*Sula dactylatra*	LC
Brown Booby	*Sula leucogaster*	LC
Red-footed Booby	*Sula sula*	LC

Note: * means the seabirds incidental catch, the others were sighted around the fishing vessels during operations

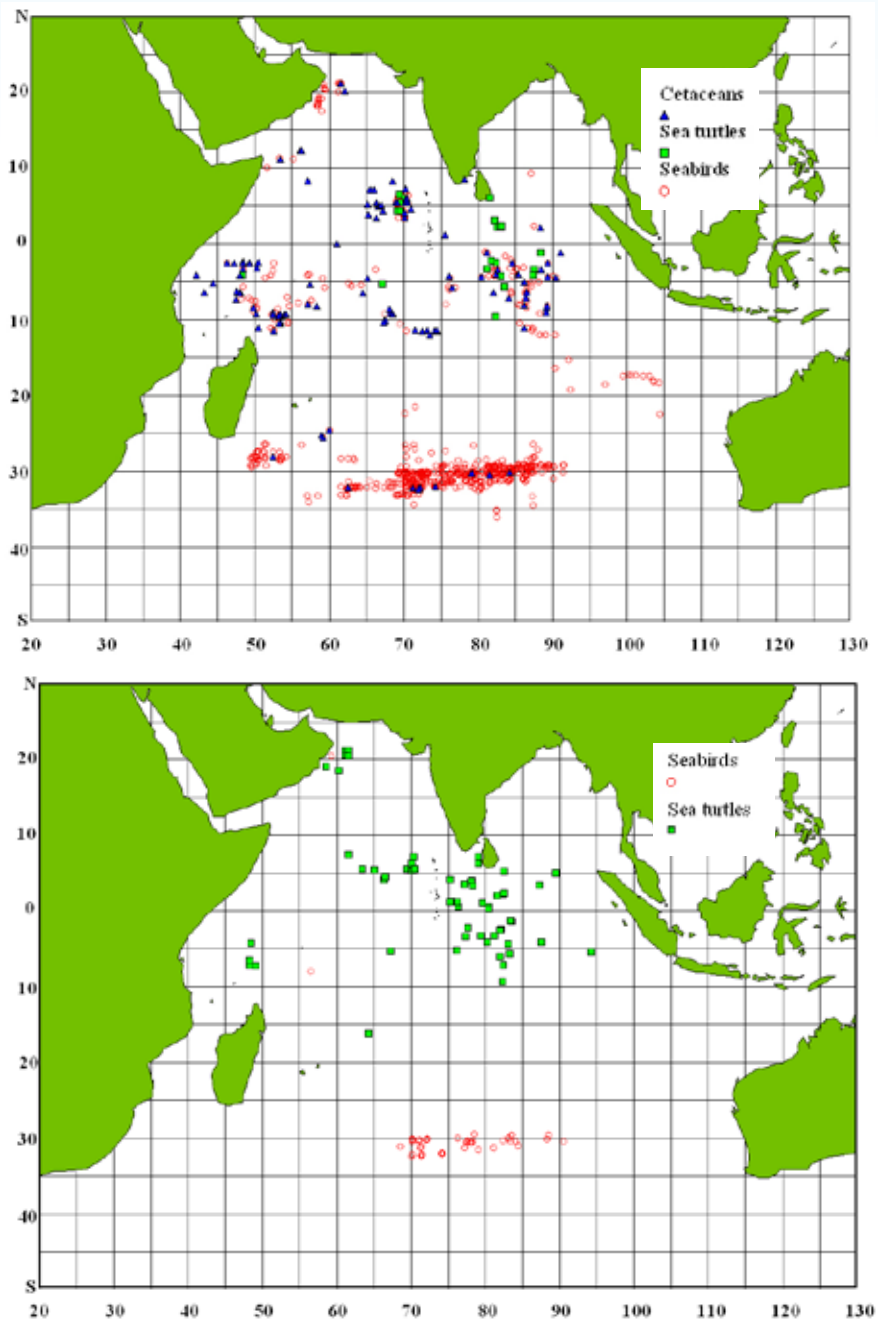


Figure 6 Distribution of sightings (above) and incidental catch (bottom) of seabirds (red points)
Source: Huang and Liu, 2010

Table 10 Incidental catch per unit effort (BPUE) of seabirds and sea turtles by area.

Area	BPUE(no per 1000 hooks)	
	Point estimate	95% CI
NIND	0.0009	0.0001–0.0032
TropIND	0.0002	0.0000–0.0009
TempIND	0.0000	0.0000–0.0021
SIND	0.0158	0.0120–0.0205

Source: Huang & Liu 2010

Table 11 Estimated annual numbers of the incidental catch of seabirds

Unit: birds

Species	2004	2005	2006	2007
	715	455	400	311
Yellow-nosed Albatross	181	104	95	69
Wandering Albatross	50	29	26	19
Sooty Albatross	74	45	41	30
Salvin's Albatross	10	6	5	4
Other albatross	251	144	132	96
White-chinned Petrel	44	27	25	19
Short-tailed Shearwater	10	6	5	4
Other seabirds	95	94	71	70

Source: Huang & Liu 2010

In addition, some LSTLVs in the Indian Ocean will seasonally targetSBTas bycatch. During 2003-2012, the number of LSTLVs seasonal and bycatch SBT was between 30 and100. The fishing grounds in the waters of the Indian Ocean are located in south of 30° S. Some operated in the Pacific Ocean and Atlantic Ocean. The incidental catch species included yellow-nosed albatross, black-browed albatross, wandering albatross, sooty albatross, grey-headed albatross, light-mantled albatross, Salvin's albatross, shy albatross, white-chinned petrel, giant petrels, and cape petrels. The incidental catches rates ranged between 0.006-0.06 per thousand hooks (Table 12, Figure 7).

Table 12 Incidental catch per unit effort (BPUE) of seabirds of SBTfleets

Season Area	April to September	October to February
A (20°~50°E)	-	0.060(0.046-0.077)
B (50°~70°E)	0.006(0.001-0.020)	-
C (70°~90°E)	0.012(0.008-0.016)	-
D (east of 90°E)	0.034(0.021-0.052)	-

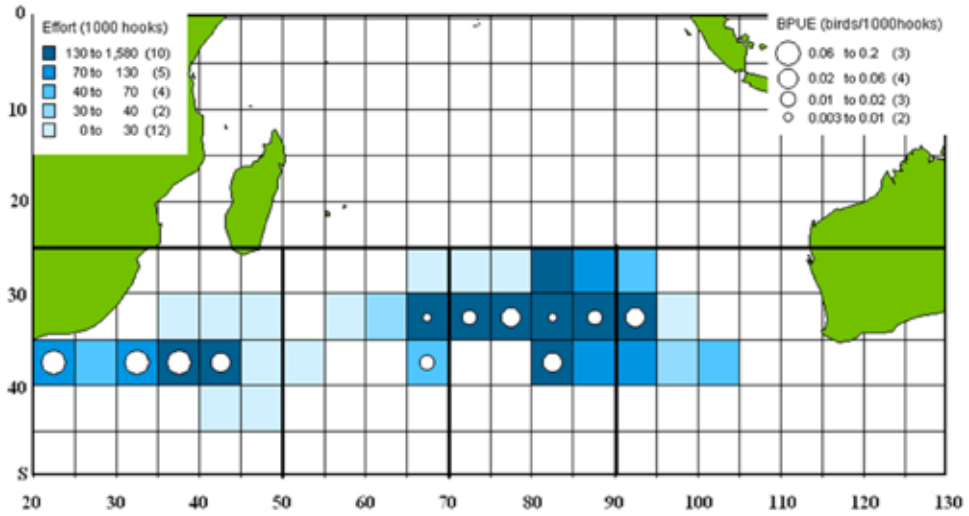


Figure 7 Effort and incidental catch per unit effort of seabirds and Distribution of SBT fleet in the Indian Ocean between 2003 and 2012

3. Actions

According to the international standards and requirements, Taiwan published its NPOA-Seabirds in 2006, with six measures that included the following objectives: (1) establishment of a system and methodology to evaluate seabird incidental catch,(2) performance of data collection,(3) promoting the implementation of mitigation measures,(4) continued implementation and promotion of conservation measures and conduct appropriate training,(5) to strengthening of international cooperation and active participation in relevant international conferences on seabirds, and (6) continuation of academic studies and preparation of periodic evaluation reports. These six items form important actions to enable Taiwan to reduce the incidental catch of seabirds by TLVs. The specific progress is described below.

3.1 Establishment of seabirds incidental catch evaluation system

In line with the requirement of the FAO IPOA-Seabirds, the following data collection continues:

(1) Systems for collecting catch statistics data have been established for the three oceans and provision of complete vessel data (owner, tonnage, and captain), including information on fishing gear and fishing grounds, as well as fishing efforts (season, fish species, catch, and number of hooks per year per vessel). These data are sent to the respective RFMOs every year according to their requirements.

(2)A databank on incidental seabird catches has been established using the observer program and an experimental vessel plan to monitor the number of incidental seabird catch. The vessels performing the experiments will be selected based on the mitigation measures. The methodology of the experimental plan requires that for each fleet in each ocean area, a certain percentage of observers be on board each year to collect the data.

(3) The changes in seabird incidental catch rates have been estimated annually in each ocean area to understand the effects of the mitigation measures and monitor the number of incidental catch. The information concerning the Taiwan longline vessel incidental catch of seabirds has been sent occasionally to the RFMOs since 2005.

(4) The relevant data will be available to the public in a timely manner to earn public trust and achieve the goal of data transparency.

3.2 Data collection

The government of Taiwan has been collecting basic statistics on LSTLVs, including catches and bycatch since the 1970s. The data obtained from the statistical data collection system are published yearly and posted on websites by the FA (www.fa.gov.tw) and Overseas Fisheries Development Council (OFDC) (www.ofdc.org.tw). Information on the distribution of efforts and catch is p submitted to the respective RFMOs.

Since its launch in 2002, the coverage in the observer program gradually increased to a level of 5%, fulfilling the requirements of RFMOs (Figure 8). The records used by the observers (Appendix 1) and the seabird illustrations(Appendix 2) have been updated from time to time to re-educate the observers and strengthen the quality of the seabird incidental catch information.

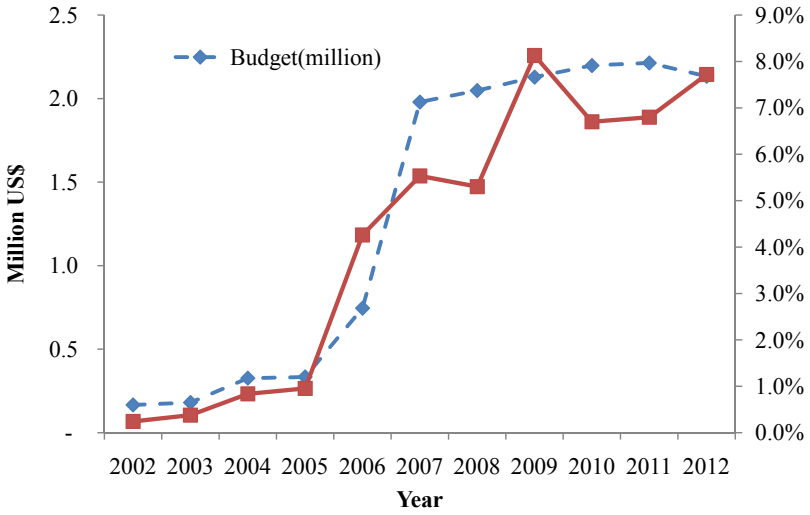


Figure 8 Budget and observer coverage rate by effort of Taiwanese longline fisheries from 2002 to 2012.

In 2010, the observer program started to send personnel to the SSTLVs to collect information expanding the coverage of scientific observers to strengthen the collection of seabird data.

3.3 Scientific research

Since 1995, the FA has invited scholars to perform studies on the relationship between TLVs and seabirds and to collect data on the incidental catch of seabirds. The studies performed throughout the years are described below.

- Research on the installation of tori line on LLSTVs was conducted in 2000. The investigation results showed that the average incidental catch rate was 0.1467 and 0.0355 seabirds per thousand hooks, respectively, before and after the installation of tori line on LSTLVs. The reduction rate was 75%.

- A national observers program was officially established in 2002. The program includes collection of the data regarding the incidental catch of seabirds by the Taiwanese TLVs. At the outset, because seabirds were not the species required in data collection, the percentage of species identified was limited. With the increased importance of the issue of seabird incidental catch and the accumulated educational training and experience of the observers, the seabird incidental catch data have increased in quality and can be used as the basis for academic studies.

- Since 2003, more than ten reports regarding longline incidental seabird catches have been published by the RFMOs. Some information is described in the annual national reports.

- Since 2010, many articles have been published in international scientific journals. For example, the seabird bycatch research results were published for the Indian Ocean in Fisheries Research in 2010(Huang & Liu 2010) and for the Pacific and Atlantic Oceans in Animal Conservation in 2011 and 2013, respectively (Huang & Yeh 2011; Yeh et al. 2013). The 2013 article was selected as the Animal Conservation feature paper (Yeh et al. 2013). The aforementioned papers comprehensively analyzed and estimated the seabird incidental catch by Taiwanese TLVs and seabird mortality in the three oceans.

- RFMOs have demanded that the TLVs operating in high-latitude areas select and utilize two of the three following mitigation measures: tori line, weighted branch-lines, and night setting. To actually understand the effect of these measures adopted by the Taiwanese vessels, research was performed on southern Atlantic albacore vessels in 2013 to investigate the effect of tori line, weighted branch-lines, and nights setting on seabird incidental catch rates.

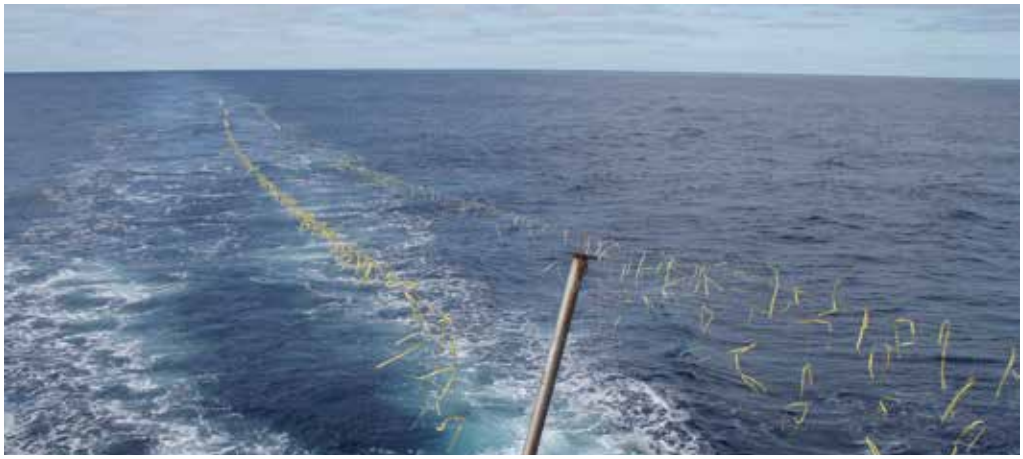
Scholars will continue be invited to study the relationship between TLVs and seabirds, collect biological samples of seabirds if possible, collect literature references regarding the incidental catch of seabirds by longline fisheries, further the understanding of the dynamics of international fisheries, and monitor the improvement in conditions resulting from the mitigation measures. Based on the above results, the effectiveness of the mitigation measures in reducing the incidental catch of seabirds by longline fisheries can be improved.

3.4 Mitigation measures

Several studies showed that a reduction in the incidental seabird catch rate cannot be achieved by a single mitigation measure, and instead it requires the combined use of several measures. Therefore, vessels need to choose the suitable measures based on the conditions at sea and use in combination in order to reduce the seabird incidental catch to the lowest possible level. The FAO IPOA-Seabirds referenced different studies and proposed more than 10 specific mitigation methods. Moreover, Birdlife International and the ACAP continued to compare the effects of relevant methods and provided information concerning mitigation measures to the appropriate fishers for reference. More countries have been engaging in studies to analyze the effects of different combined seabird conservation measures. International organizations such as the IATTC, ICCAT, WCPFC, CCSBT, and IOTC have even updated several new seabird conservation measures. The USA and Japan cooperated to perform the recommended two out three seabird mitigation measures in the EEZ of South Africa in 2010, a cooperative effort that has received the most attention. The results of that research showed that the use of tori line, weighted branch-lines, and night setting is the best practice (Melvin et al. 2013). This practice has become the model for a new generation of seabird mitigation measures. As such, some organizations have begun to demand that at least two of the three measures be adopted. Simultaneously, the use of other measures has become voluntary.

3.4.1 Tori line

The results of studies by scholars commissioned showed that the TLVs targeting SBT and working in waters near South Africa may have an incidental seabird catch. Therefore, Taiwan encourages the aforementioned vessels to install tori line, when possible, to deter seabirds from pecking their baited hooks. The actual survey using



Images from Fisheries Agency

sample vessels equipped with tori line showed that the installation of these lines on the TLVs operating in high-latitude waters reduced the incidental seabird catch rate by an average of 75%, concluding that this measure is the most efficient and least costly one available for reducing seabird incidental catch rates.

Therefore, in 2000, the FA funded 50 vessels operating in high-latitude waters to install tori line. Starting from 2001, it became mandatory for all TLVs fishing in South African waters to install tori line. Starting from 2004, the RFMOs required that all of the TLVs fishing for SBT install tori line. As of 2007-2008, vessels operating in the high-latitude areas of the Pacific, Atlantic, and Indian Oceans are mandatory to use more than two mitigation measures including the installation of tori line.

3.4.2 Night Setting

The activity of seabirds is lower at night. To effectively prevent incidental seabird catches, TLVs are encouraged to operate at night when possible. Especially for vessels operating in high-latitude waters, the chances of incidental seabird catches decrease when the sky remains dark after the bait shooting operation.

Taiwanese vessels require a long time to deploy their gear and start the deployment at dusk or dawn is recommended, for spanning the deployment period night and morning. These technical issues still await further studies.

3.4.3 Weighted branch-lines

The selection of branch-line material is made so that gears controlling the material allow it to sink rapidly to reduce the time spent in shallow waters, which can not only reduce the incidental catch of seabirds but also increase tuna catch rates. Based on many studies, the following guidelines are suggested for weighting branch-lines:

- Greater than or equal to a total of 40g weight attached to branch lines within 0.5 m of the hook.
- Greater than or equal to a total of 45g weight attached to branch lines within 1m of the hook.
- Greater than or equal to a total of 60g weight attached to branch lines within 3.5 m of the hook; or
- Greater than or equal to a total of 98g weight attached to branch lines within 4 m of the hook.

Images from Fisheries Agency

3.4.4 Automatic bait shooter

Automatic bait shooting machine is used in pelagic longline operations, thus shortening the time during which the line is on the water surface. Therefore, the FA encouraged TLVs to install automatic bait shooters. In fact, the majority of vessels have already installed automatic bait shooters to increase operational efficiency. However, the use of automatic bait shooters in the wind may alter the bait line directions and jeopardize the safety of crews on board. Operation manuals should be developed, and the bait shooting should be conducted according to the wind direction.

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3.4.5 Management of offal discharge

Offal discharge from vessels (such as the discarding of fish and garbage) should be conducted at times and with methods that are least likely to induce seabirds to peck the baited hooks to avoid their injury, including the avoidance of dumping discarded fish, offal, and fish heads with hooks at sea. When this avoidance measure is not feasible, offal should be dumped on the opposite side of the line hauler or using a method that will not attract seabirds to the ship (such as dumping at night). This approach is relatively simple, low cost, and effective and is usually used by fishers.

3.5 Legislations

In response to the adjustment of regulations by the respective organizations, governments adopt mitigation measures for compliance by fishers. The measures adopted for different ocean areas are described below (Table 13).

Atlantic Ocean

Starting from2008, vessels operating in waters south of 20°S should use tori line. The main lines should be longer than 150m, and the distance between streamers should be approximately 5-7m. At least one spare set should be maintained.

From 2013, vessels operating in waters between 20°S and 25°S should use tori line with a spare set on board. When operating in waters south of 25° S, in addition to using tori line, the mitigation measure of weighted branch-lines should be practiced.

Indian Ocean

Since 2008, vessels fishing in waters south of 28° S are required to use tori line with at least a spare set. The length of mainlines in tori line must exceed 150m, and the maximum distance between each group of streamers must be 5-7m. If the hook deployment speed is 10 knots, three groups of streamers are needed.

In 2009, the required mitigation measures revised for application of at least two measures. One measure is the use of tori line and the other is either night setting, use of weighted branch-lines, management of offal discharge or the use of line setters. The use of mitigation measures should be consistent with the requirements of IOTC resolution 08/03. To ensure the implementation of the above measures, vessels operators should present a document proving the purchase of tori line, and equipment of the mitigation measures that will be used, and a photograph of the tori line before they can conduct operations.

Since 2013, LLSLVs operating in waters south of 25° S are required to use at least two mitigation measures. One measure is the use of tori line and the other is night setting, weighted branch-line, management of discarded offal, or the use of line setters. The measures used shall follow the Recommendation of IOTC 10-06. Starting from July 1, 2014, vessels will be required to use at least two of three mitigation measures chosen from night setting with the lights on deck dimmed to the greatest extent practicable, use of tori line, and weighted branch-lines. The measures used shall follow the Recommendation of IOTC 12-06.

Pacific Ocean

Starting from 2007, vessels operating south of 30° S or north of 23° N must install two tori line; for this purpose, each vessel should purchase at least four tori line. When using tori line, at least 90m of the lines should be kept in the air, and the maximum distance between each group of streamers should be 5m.

Starting from 2013, fishermen should take appropriate mitigation measures according to the NPOA-Seabirds along with the institution of the following actions:

Each vessel should install two tori line when operating south of 30° S or north of 23° N in the WCPFC Convention area and should be equipped with at least four tori line.

From July 1, 2014, TLVs operating south of 30° S in the WCPFC Convention area should use at least two mitigation measures, one of which should be the use of bird-scaring line and the other could be either be the use of weighted branch-line or night setting.

TLVs operating south of 30° S, north of 23° N, between 2° N and 15° S, along the coastline westward to 95° W, 15° S to 30° S, and along the coastline westward to 85° W in the IATTC Convention area should use two different mitigation techniques (Figure 9), one of which is the use of bird-scaring line and the other could either be night setting, weighted branch-lines, management of discarded offal, or use of line setters. These mitigation measures should be conducted in accordance with the IATTC resolutions.

SSTLVs operating in the Indian and Pacific Oceans

SSTLVs operating in the Indian Ocean and south of 30° S or north of 23° N in the Pacific Oceanic the WCPFC Convention areas should install two tori line. Starting from July 1, 2014, SSTLVs operating in waters south of 30 ° S in the WCPFC Convention area are required to adopt at least two mitigation measures of three measures: weighted branch lines, night setting and tori lines.

SSTLVs fishing in waters south of 30° S, north of 23° N, between 2° N and 15° S, along the coastline westward to 95° W, between 15° S and 30° S, and along the coastline westward to 85 ° W in the IATTC Convention area are required to use two different mitigation measures (Figure 9), which should include the use of tori line and either night setting, use of weighted branch-lines, management of discarded offal, the use of line setters, or the use of blue-dyed baits.

SSTLVs operating in waters south of 25° S in the Indian Ocean are required to use

at least two mitigation measures. One measure is the use of tori line and the other is night setting, weighted branch-line, management of discarded offal, or the use of line setters. The measures used shall follow the Recommendation of IOTC 10-06. Starting from July 1, 2014, vessels will be required to use tori line and one chosen from night setting with the lights on deck dimmed to the greatest extent practicable, or weighted branch-lines.

For reducing the incidental catch of seabirds, fishing vessels operating outside the abovementioned areas should take appropriate measures in accordance with the NPOA-Seabirds.

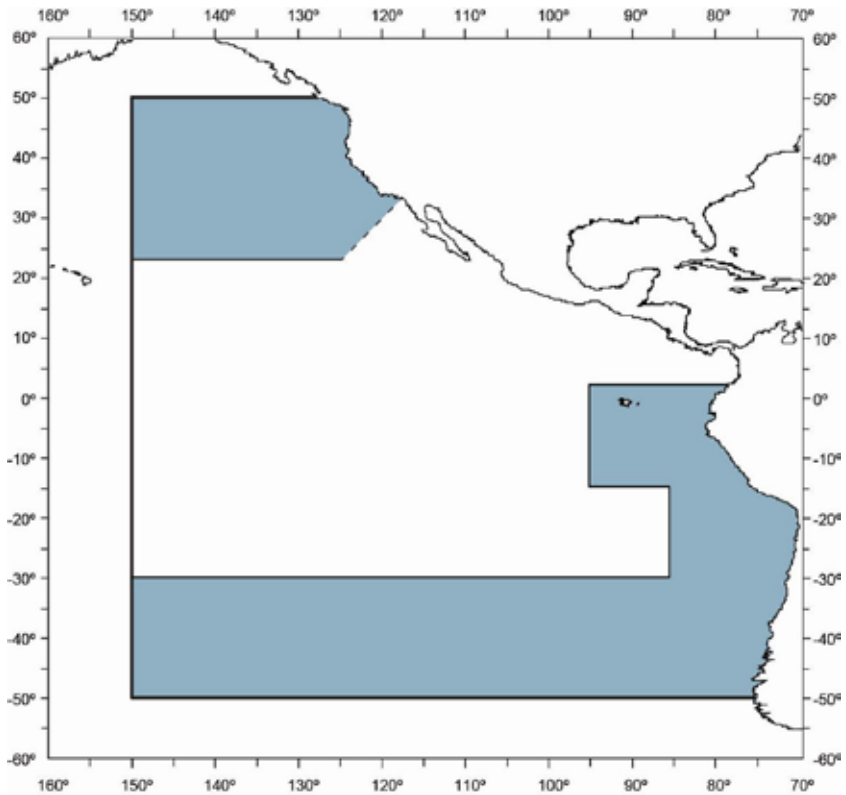

Figure 9 Areas (shaded) within the Eastern Pacific Ocean in which the use of at least two mitigation measures

Table 13 Legislation of mitigation measures of seabird's incidental catch for TLVs

Year enacted	Oceans	Legislation (Date adopted and code)	Note
2005	Three	Regulations for fishing vessels catching southern bluefin tuna in three oceans of 2004 (2003.11.28. Code 0921331476)	Tori line for vessels operating in South of 30° S.
2007	Pacific	Regulations for fishing vessels over 100 gross registered tonnages catching tunas and tuna-like species in the Pacific Ocean of 2007 (2007.3.28. Code 0961330634)	Mitigation measures in areas south of 30° S.and north of 23° N.
2008	Atlantic	Regulations for fishing vessels over 100 gross registered tonnages catching tunas and tuna-like species in the Atlantic Ocean of 2008 (2008.2.1. Code 0971330185)	Mitigation measures in south of 20° S.
2008	Indian	Regulations for fishing vessels over 100 gross registered tonnages catching tunas and tuna-like species in the Indian Ocean of 2008 (2008.2.25. Code 0971330020)	Mitigation measures in south of 28° S.
2009	Indian	Regulations for fishing vessels over 100 gross registered tonnages catching tunas and tuna-like species in the Indian Ocean of 2009 (2009.2.13. Code 0981330064)	Multi-mitigation measures in south of 28° S.
2010	Indian	Regulations for fishing vessels over 100 gross registered tonnages catching tunas and tuna-like species in the Indian Ocean of 2010 (2010.1.21. Code 0991330000)	Multi-mitigation measures in south of 25° S.
2013	Atlantic	Regulations for fishing vessels over 100 gross registered tonnages catching tunas and tuna-like species in the Atlantic Ocean (2013.2.27. Code 1021330341)	Multi-mitigation measures in south of 25°
2013	Pacific/ Indian	Regulations for fishing vessels less than 100 gross registered tonnages catching tunas and tuna-like species in the Pacific and Indian Ocean (2013.6.18. Code 1021330922)	
2013	Indian	Regulations for fishing vessels over 100 gross registered tonnages catching tunas and tuna-like species in the Indian Ocean (2013.8.21. Code 1021331227)	
2013	Pacific	Regulations for fishing vessels over 100 gross registered tonnages catching tunas and tuna-like species in the Pacific Ocean (2013.6.18. Code 1021330730)	

3.6 Education, training and outreach

A mechanism should be established to induce the interest of fishers, industry, fishing gear manufacturers, and other relevant organizations in the issues associated with the incidental catch of seabirds by longline fisheries and further attract academia, industry, fishing gear manufacturers, and other organizations to continue working to improve the seabird mitigation measures and equipment used in longline fisheries.

The persons who could benefit from continuing education include fishers and fishery managers. The promotion methods include holding training courses and extension classes as well as publishing and distributing cards, handbooks, posters, brochures, compact discs (CDs), video tapes, stationery, and films. Because TLVs operate far away from home, crew training is not easy; therefore, CDs concerning seabird conservation and measures for the reduction of seabird incidental catches will be forwarded to crew members on pelagic vessels through fishery companies to achieve educational advocacy.

Information concerning the IPOA-Seabirds, Taiwan's NPOA-Seabirds, and other documents related to the incidental catch of seabirds by longline fisheries will be distributed and posted on the websites. The guidelines regarding seabird mitigation measures will be provided and announced.

Appropriate staff in the central government, local government, and overseas representative offices will conduct educational advocacy on seabird conservation and longline fisheries and will cooperate with relevant conservation organizations, scholars, and foreign conservation organizations to hold advocacy meetings in important foreign fishery base ports for captains and crews entering into the ports.

The specific measures implemented since 1996 include a number of actions.

- In 1996, the "Catching Fish, not Birds—Incidental Catch of Seabirds" mitigation technology handbook, published by the Tasmania Park of Australia, was compiled and translated under the authorization of the publisher. Five hundred copies of the Chinese edition were sent to the relevant fishery organizations and major TLVs foreign base ports for provision to vessels' captains and crews for operation references, in order to minimize the chance of, baits snatched by seabirds and establishment of a win-win situation between fishers and seabirds.
- In 1996, the FA funded TLVs to install 100 automatic bait shooters. Because the use of automatic bait shooters in the wind may casein changing the direction of bait line whereby jeopardizing the safety of crew members on vessels, depending on the direction of the wind, the automatic machines are not used throughout the entire operations.
- In 2000, the FA funded 50 TLVs operating in high-latitude waters to install tori line.
- In 2000, 3,000 copies of promotional material with the title "Catching Fish but Not Catching Birds—Peaceful Coexistence between Fisheries and

Seabirds" were printed. For promotional purposes, the current commonly used mitigation measures are depicted in cartoons to provide TLV captains, crews, fishery companies, fishermen's organizations, and domestic conservation organizations with seabird conservation concepts.

- Since 2000, seabird conservation has been included in training courses for the crew members of vessels to strengthen the concept of seabird conservation among domestic crew members and cadres.

- In 2003, 1000 posters regarding "safely releasing seabirds and avoiding bird capture" were obtained from Birdlife International and sent to Taiwanese vessel captains, fishery associations, fishery companies, and conservation organizations to promote the concept of seabird conservation.

- In 2003, the Taiwan Tuna Association cooperated with the Organization for Promotion of Responsible Fisheries (OPRT) to produce 1000 copies of a seabird protection poster to emphasize the necessity of seabird protection. These posters were sent to members for reference.

- In 2004, FA cooperated with the CCSBT, for producing the Chinese editions of the seabird conservation advocacy handbooks. These handbooks were sent to Taiwanese vessels operating in the waters of the Indian Ocean and to related organizations for promotional and educational use.

- In 2005, the Chinese Birds Association was funded with expenses for sending members to Port Louis of Mauritius, a major foreign base port in the western Indian Ocean, to conduct workshops, training, experiences in implementation measures and international conventions for the reducing of seabird bycatch by Taiwanese TLV crews.

- In 2013, FA commissioned scholars to collaborate with South Atlantic albacore targeting vessels to perform studies on the effectiveness of combined mitigation measures, such as use of tori line, weighted branch-lines, and night setting.

Images from Fisheries Agency

Images from Fisheries Agency

3.7 International cooperation

Due to political reasons, Taiwan cannot participate as a member in the conferences on incidental catch of seabirds by longline fisheries held by the FAO and some RFMOs. However, Taiwan will fulfill the responsibility of international conservation and continue to collect relevant seabird conservation information as references for formulating fisheries management policies. Taiwan will also actively participate in international conferences related to seabird conservation and exchange data related to the incidental catch of seabirds by longline fisheries to strengthen interactions with international organizations and conservation groups. International cooperation and interactions in seabird conservation by Taiwan are summarized below.

- Between 2000 and 2012, Taiwan sent scholars to continue active participation in RFMO conferences and ecology-related species working group meetings to formulate seabird conservation measures in relevant areas in cooperation with other countries.
- In 2001, the Taiwan Tuna Association and South Africa signed a cooperative agreement regarding TLV fisheries cooperation. The TLVs participating in the agreements are required to install equipment, including tori line, to avoid the incidental catch of seabirds.
- The 12th meeting of the Conference of the Parties (COP) to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was held in Chile in 2002. The FA sent experts to the conference and exchanged opinions on seabird issues with specialists and scholars from participating countries.
- In 2011, representatives were sent to participate in the ACAP seabird incidental catch working group meeting during which the results of relevant studies on Taiwanese TLV seabird bycatch were reported. Since 2010, the Chinese Wild Bird Federation has also been sending representatives to attend a number of ACAP conferences as observers of non-governmental organizations, including conferences in Argentina in 2010, Ecuador in 2011, Peru in 2012, and France in 2013.

- Taiwan also actively attended seminars on seabird related issues held by the International Fishers Forum (IFF), including the first meeting in New Zealand in 2000, the second meeting in the USA in 2002, the third meeting in Japan in 2004, and the fourth meeting in Costa Rica in 2007, and exchanged opinions with experts from relevant countries for use as a reference for preventing the incidental catch of seabirds by TLVs. Furthermore, the 5th IFF was held in Taipei from August 3-5 in 2010. The conference was co-hosted by the US Western Pacific Regional Fisheries Management Council (WPRFMC) and the FA. More than 300 delegates from fishery-related industry, government, academia, and conservation organizations participated the meeting. The participants passed the Taipei Declaration in support of a plan to provide the fishing industry an equitable voice in marine spatial planning and ecological system management.

The Fifth IFF, Taipei, Taiwan, 2011

- In 2004, the FA, the Chinese Wild Bird Federation, and Birdlife International held a conference in Kaohsiung on the reduction of longline seabird bycatch and exchanged opinions with representatives from the USA, Japan, and Birdlife International, among others.

Roundtable discussion between experts and FA in seabirds bycatch reducing workshop, 2004

- In 2013, FA cooperated with Birdlife International, the Chinese Wild Bird Federation, and the International Seafood Sustainability Foundation (ISSF) during a "mitigation of seabird bycatch workshop" held in Kaohsiung. Experts from the United Kingdom, the USA, and Japan were invited to extensively exchange experiences and opinions with representative from the industry, government, and academia in Taiwan on issues regarding methodology to avoid seabird bycatch by TLVs and on possible directions for future cooperation.

Taiwan Seabirds Bycatch Workshop, Kaohsiung, 2013

4. Further Actions

4.1 Issues to be solved

Overall, the results of the analysis concerning the condition of the interactions between the Taiwanese TLVs and seabirds in the three oceans based on data collected by observers, especially the incidental catch rates and amount of incidental catch, can be divided into four categories according to the temporal and spatial conditions.

The first category comprises the tropical waters of the three oceans. The observed seabird species include frigatebirds, boobies, and shearwaters. These species are mostly middle- and small-sized seabirds that do not follow vessels for food. These seabirds mostly belong to the LC status in IUCN Red List. The amount of incidental catch is low and does not cause any impact on their populations. Therefore, there is less ecological concern.

The second category includes waters in the North Atlantic. Because there are few vessels, efforts are low, and there little information on observations. Therefore, the data may be insufficient, and more data are needed for cross-checking. However, because endangered albatross species are not distributed in these waters, there are low threats.

The third category includes waters in the South Pacific. The efforts here are relatively low and vary greatly; therefore, both the frequency of observer dispatches and the availability of observer records are low. More data are needed to make any conclusions. In these waters, in particular, different species of albatrosses are found, and more focuses on the scale of incidental catchier needed.

The fourth category includes waters with higher incidental catch rates, such as the North Pacific and the South Atlantic. Especially in the North Pacific, the number of incidentally caught black-footed and Laysan albatrosses is high in the first and the fourth quarters. There is also a higher albatross incidental catch, which includes wandering albatrosses in the South Atlantic Ocean and waters around South Africa. Thus, more attention on these areas is needed and mitigation measures should be strengthened.

4.2 Implementation plans

For the reasons stipulated above, the government of Taiwan will continue the aforementioned efforts to perform scientific data collection and analysis of the

information collected. The following topics will be discussed from three aspects: educational advocacy, monitoring and management of vessels, and international cooperation.

1. To maintain the evaluation system and the methods for assessing the incidental catch of seabirds, the existing vessel management system and observer data will continue to be used for the establishment of a databank on incident seabird catches through the observer and experimental vessel plans. In addition, supplementing to the latest international research methods, the mortality of seabirds from incidental catch can be obtained.

2. The data to be collected continuously include basic data on the TLVs and the catch statistics. In addition, related seabird incidental catch statistics will be strengthened. For example, the record of detailed implementation of mitigation measures and observer education will be improved to strengthen the species identification of the seabird incidental catch.

3. To promote the implementation of mitigation measures, vessels are required in accordance with the regulations of the RFMOs to adequately exercise mitigation actions to reduce the seabird incidental catch to the lowest possible level.

4. Promotion and training efforts regarding conservation measures is continued, including cooperation with relevant groups and the continuous gathering of international information to perform educational advocacy and support.

5. For areas with fewer data, observers should be increased where possible to strengthen the observation coverage rates.

6. The analysis of the seabird incidental catch information and relevant issues, such as the efficacy of mitigation measures, will be continued, and the cooperation with RFMOs and conservation organizations will be strengthened.

7. Academic research will be continued. Domestic scholars will be invited to study the relationship between TLVs and seabirds, the foot rings of marked birds and specimens of seabirds incidentally caught will be collected, and research in cooperation with international academic institutions will be conducted.

4.3 Schedule

The above measures will be exercised continuously and will be reviewed from time to time. An assessment report concerning the incidental seabird catch by Taiwanese TLVs will be presented and the NPOA will be updated when necessary in line with the requirement of international conservation and the fulfillment of the flag state responsibility for resource conservation.

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Appendix 1 Data collected by distant water tuna longline observers

Category	Variables
Temporal	Date gear deployed
	Start time of gear deployment
	End time of gear deployment
	Date gear retrieved
	Start time of gear retrieval
	End time of gear retrieval
Spatial	Latitude at beginning of gear deployment
	Longitude at beginning of gear deployment
	Latitude at beginning of gear retrieval
	Longitude at beginning of gear retrieval
	Latitude at end of gear retrieval
	Longitude at end of gear retrieval
Physical and Environmental	Sea state (Beaufort Scale)
	Moon phase
	Wind strength and direction
Fishing operation	Unique vessel identifier
	Unique observer identifier
	Vessel length
	Setting speed (knots)
	Total number of hooks deployed
	Total number of hooks observed
	Target species
	Bait species
	Composition of bait used (%)
	Bait status (live/fresh/frozen/thawed/whole/cut)
	Mass of added weight (describe size and position of weight)
Fishing gear	Groundline/mainline length
	Branchline/ganglion length
	Distance between weight and hook on ganglion (when used)
	Distance between branchlines
	Line setter used (Y/N)

	Hook size
	Hook type
Catch	Total catch, actual or estimated (number and/or weight)
	Catch by species (number and/or weight)
Mitigation Measure	Tori line used (yes/no)
	Number of tori lines used
	Dumping of bait/offal (yes/no; also describe if dumping of offal took place during setting and hauling and whether offal was dumped on the opposite side of the hauling bay)
	Bait caster used (yes/no)
	Other mitigation measures used (provide details)
Bycatch	Species identification
	Number of each species captured
	Type of interaction (hooking/entanglement)
	Disposition (dead/alive/injured)
	Description of condition/viability of animal upon release (if released alive)
	Bycatch Location
	Bycatch Time(during setting or haling)
	Information of label
	Length of wings
	Take specimen
	Take photos
Other	Seabird abundance counts

Appendix II: Seabird species regularly recorded from Taiwanese fishing vessels operating in the three oceans

No	Species	English Name		IUCN	CMS	ACAP
1	Northern Royal Albatross	*Diomedea sanfordi*	EN	App 2	Y	
2	Southern Royal Albatross	*Diomedea epomophora*	VU	App 2	Y	
3	Wandering Albatross	*Diomedea exulans*	VU	App 2	Y	
4	Antipodean Albatross	*Diomedea antipodensis*	VU	App 2	Y	
5	Amsterdam Albatross	*Diomedea amsterdamensis*	CR	App1	Y	
6	Tristan Albatross	*Diomedea dabbenena*	EN	App 2	Y	
7	Sooty Albatross	*Phoebetria fusca*	EN	App 2	Y	
8	Light-mantled Sooty Albatross	*Phoebetria palpebrata*	NT	App 2	Y	
9	Waved Albatross	*Phoebastria irrorata*	VU	App 2	Y	
10	Black-footed Albatross	*Phoebastria nigripes*	VU	App 2	Y	
11	Laysan Albatross	*Phoebastria immutabilis*	NT	App 2	Y	
12	Short-tailed Albatross*	*Phoebastria albatrus*	VU	App1	Y	
13	Atlantic Yellow-nosed Albatross	*Thalassarche chlororhynchos*	EN	App 2	Y	
14	Indian Yellow-nosed Albatross	*Thalassarche carteri*	EN	App 2	Y	
15	Grey-headed Albatross	*Thalassarche chrysostoma*	VU	App 2	Y	
16	Black-browed Albatross	*Thalassarche melanophris*	EN	App 2	Y	
17	Campbell Albatross	*Thalassarche impavida*	VU	App 2	Y	
18	Buller's Albatross	*Thalassarche bulleri*	NT	App 2	Y	
19	Shy albatross	*Thalassarche cauta*	NT	App 2	Y	
20	White-capped Albatross	*Thalassarche steadi*	NT	App 2	Y	
21	Chatham Island Albatross	*Thalassarche eremita*	CR	App 2	Y	
22	Salvin's Albatross	*Thalassarche salvini*	VU	App 2	Y	
23	Southern Giant Petrel	*Macronectes giganteus*	VU	App 2	Y	
24	Northern Giant Petrel	*Macronectes halli*	NT	App 2	Y	
25	White-chinned Petrel	*Procellaria aequinoctialis*	VU	App 2	Y	
26	Spectacled Petrel	*Procellaria conspicillata*	CR	App 2	Y	
27	Black Petrel	*Procellaria parkinsoni*	VU	App 2	Y	
28	Westland Petrel	*Procellaria westlandica*	VU	App 2	Y	
29	Grey Petrel	*Procellaria cinerea*	NT	App 2	Y	
30	Balearic Shearwater	*Puffinus mauretanicus*	CR	APP 1	Y	

Northern Royal Albatross
(Diomedea sanfordi)

Distribution

Occurs in the southern oceans in widespread, breeding mainly on Chatham Islands offshore southern New Zealand. Forms mixed pairs with Southern Royal Albatross on Auckland Islands and hybrids recorded breeding Taiaroa Head. Forages widely in high-latitude waters of the southern oceans during breeding season, most common between 30 and 52° S. In non-breeding season, may circumnavigate the Antarctic on prevailing westerly winds.

Behaviour

Usually in solitude at sea and seldom observed in large numbers except in food-rich areas. Attracted to fishing vessels, but perhaps shyest among the large albatrosses, only alighting to feed after vessel has departed the area.

Size

Large albatross, with total body length of 115 cm and wingspan of 320 cm. Generally smaller than Southern Royal Albatross.

Plumage

Both adults and immatures are contrastingly black and white. Bill huge and pink with thin black line along cutting edges. Adult birds have head, neck, back, rump and underbody white, with occasionally traces of black in predominantly white tail. Upperwing predominantly black, with some white admixed in shoulders. Underwing white, with narrow black trailing edge and black wing tip and black leading edge from carpal to wing tip. Immatures similar to adults, but with black markings on head, lower back, rump and tail which gradually disappear in the course of age.

Separation from similar species

Readily separated from smaller albatrosses by enormous size, black and white plumage and huge pink bill. Similar species include adults of wandering albatross group and Southern Royal Albatross in certain plumages.

(1) **Wandering Albatross (group):** Immatures of both wandering albatross group and Northern Royal Albatross have wings largely black, but immature wanderers can be readily separated by entirely black tail or tail with at most only traces of white. Under optimal viewing conditions, the black cutting edges on the bill of Northern Royal Albatross can be seen, whereas wanderers have entirely pink bill.

(2) **Southern Royal Albatross:** Juvenile and immature Southern Royal Albatross have entirely black upperwings, but Southern Royal has "beetle-shaped" marks on inner upperwing coverts and some white in greater coverts, making upperwing appear more mottled. Immature Southern Royal Albatross has head, lower back and uppertail entirely white, whereas in Northern Royal Albatross these areas have a varying amount of dark feathers admixed.

Observations

Only recorded with certainty by Taiwanese researchers in the Indian Ocean. Given its distribution, likely occurs in albacore fishing regions in the South Atlantic and albacore, southern bluefin tuna an doilfish fishing regions in the Indian Ocean. Body size and plumage need to be carefully assessed to eliminate similar wandering and Southern Royal Albatrosses.

Southern Royal Albatross
(Diomedea epomophora)

Distribution

Occurs in southern oceans, breeding mostly on Campbell Islands south of New Zealand, probably also on Auckland Islands forming mixed pairs with Northern Royal Albatross, with hybrids recorded breeding Taiaroa Head. Forages widely in high-latitude waters of southern oceans during breeding season, most common between 36 and 63° S. In non-breeding season, may circumnavigate the Antarctic along with prevailing westerly winds. Reportedly more frequently observed than Northern Royal Albatross in the South Atlantic and Indian Oceans.

Behaviour

Usually in solitude and seldom observed in large numbers outside of food-rich areas. Attracted to fishing vessels, but generally much shyer than wandering albatrosses.

Size

Large albatross, with total body length of 110-122 cm and wingspan of 350 cm. Generally larger than Northern Royal Albatross.

Plumage

Both adults and immatures are contrastingly black and white. Bill huge and pink with thin black line along cutting edges. Adult birds have head, neck, back, underbody, rump and tail white. Upperwing black, with white leading edge, scapulars and triangular-shaped area on inner wing coverts. Underwing white, with narrow black trailing edge and black wing tip and black leading edge from carpal to wing tip. Immatures have largely black upperwing, with grey vermiculations on white scapulars. Outer tail may contain traces of black, otherwise rest of plumage similar to adult. Leading edge of upperwing whitens in the course of age, and traces of black in tail disappear.

Separation from similar species

Readily separated from smaller albatrosses by its enormous size, black and white plumage and huge pink bill. Similar species include adults of wandering albatross group and Northern Royal Albatross.

(1) **Wandering Albatross (group):** Immatures of both the wandering albatross group and Southern Royal Albatross have wings largely black, but wanderers readily separated by almost entirely dark upperparts from nape to rump, with at most sparse white vermiculations on mantle, unlike entirely white upperside of Southern Royal Albatross. Adult plumage similar in both species, but birds with white bases to coverts and secondaries are more likely wanderers, as Southern Royal Albatross generally has extensive black admixed with these feathers. The safest way of separating adult wanderers from Southern Royal albatross is by bill colour, which is entirely pink in wanderers but has black cutting edges in Southern Royal Albatross.

(2) **Northern Royal Albatross:** Adult Northern Royal Albatross has entirely black upperwings, whereas immature Southern Royal Albatross has "beetle-shaped" marks on inner upperwing coverts and some white in greater coverts, making upperwing appear more mottled. Immature Northern Royal Albatross has a varying amount of dark-centered feathers on head, lower back and uppertail, whereas in Southern Royal Albatross these areas are entirely white.

Observations

Probable individuals of this species have been observed by Taiwanese researchers in the South Atlantic only. Given its distribution, may be expected to occur in albacore fishing regions in the South Atlantic and albacore, southern bluefin tuna and oilfish fishing regions in the Indian Ocean. Body size and plumage need to be carefully assessed to distinguish from similar wandering and Northern Royal Albatrosses.

Adult Southern Royal Albatross: All-white tail, white leading edge and contrast with predominantly black flight feathers help distinguish from wandering albatross group. (Photo: Huan-Chang Liao)

Adult Southern Royal Albatross: Under optimal viewing conditions, black cutting edges to bill can be seen, which provides the most reliable means of separation from wandering albatross group (whose bill is entirely pink). (Photo: Huan-Chang Liao)

Wandering Albatross
(Diomedea exulans)

Distribution

Found at high latitude areas in the southern oceans, where widely distributed, breeding mainly on islands in the South Atlantic and southern Indian Oceans, but also in the south-west Pacific on Macquarie Island. Will travel long distances to find food during breeding season. Circumpolar south of 22° S, and may occur anywhere in Antarctic waters, though generally rare offshore New Zealand.

Behaviour

Wandering Albatross forages in solitude or in small groups. Readily attracted to fishing vessels, and feeds behind them by picking fresh fish bait and other fish scraps from surface and occasional shallow dives. Also observed snatching food from other seabirds.

Size

Large albatross, with total body length of 110-135 cm and wingspan of 250-350cm. Due to differences in classification, the above measurements cover all populations of wandering albatross sensu lato, but Wandering Albatross sensu stricto is the largest member of this group. Bill length 160-180 mm, the longest bill of all the members of this group.

Plumage

Wandering Albatross goes through several different plumage stages, with acquisition of adult plumage taking several years. Younger immatures are largely dark brownish, unlike older immatures and adults, which are contrastingly black and white. Older adults are almost entirely white. At all ages, underwing predominantly white with blackish tip, and narrow blackish trailing edge and leading edge beyond carpal. Bill huge and entirely pink or pinkish-flesh.

(1)**Juvenile:** Cheeks, throat, and underwing coverts white, with remainder of plumage brown.

(2)**Immature:** Immatures acquire white in mantle, rump and especially below, with majority white-bellied and appearing rather mottled. Older immatures have upperwing coverts and tail blacker-brown than younger immatures. Lower back and underbody are white. Head, neck and upper mantle have vertical brownish lines or fine horizontal vermiculations. The older the individual the whiter it is, with vermiculations limited to mantle.

(3)**Adult:** Adults are contrastingly black and white. With age, upperparts become progressively whiter, vermiculations disappear, dark outer tail feathers are replaced by white feathers, and leading edge and upperwing coverts become predominantly white. Full adults have upper and underbody completely white, lacking dark markings, entirely white tail and white upperwing except for black primaries and a few black-tipped outer wing coverts.

Separation from similar species

(1)**Amsterdam Albatross:** May be confused with Wandering Albatross at juvenile and young immature plumage stages. Under optimal sighting conditions, darker tip to lower mandible of Amsterdam Albatross, together with dark cutting edges which form a dark line on bill, to distinguish this species from Wandering. In addition, Amsterdam Albatross is confined to the southern Indian Ocean and all individuals are banded. Hence, presence of a band and distribution are supplementary aids to identification.

(2)**Tristan and Antipodean Albatrosses:** Both Antipodean and Tristan Albatrosses show similar range of plumage variation to Wandering and are therefore difficult to distinguish in the field. However, Wandering Albatross is the largest of the three, with largest wingspan and bill length. Tristan overlaps with Wandering in seas off eastern South America and Antipodean in waters offshore New Zealand. In areas of overlap, larger size and longer bill may aid identification.

(3)**Northern Royal Albatross:** Both adult and immature Northern Royal Albatrosses may be confused with that of older immature stage and young adult Wandering Albatrosses. Both have largely black upperwing coverts, but Northern Royal at this stage has tail almost entirely white, whereas tail of Wandering is entirely black or at most with a few white feathers admixed. In addition, young Wandering Albatross often has orange feathers on ear coverts, but not on Northern Royal. Under optimal sighting conditions, black cutting edges of Northern Royal Albatross can be seen, but not in Wandering Albatross which has entirely pink bill.

(4)**Southern Royal Albatross:** Both juvenile and young immature Southern Royal Albatrosses and older-stage immature Wandering Albatrosses have largely black upperwing coverts. However, Southern Royal can be readily identified by its all-white rump and uppertail, which differs from black tail and vermiculated rump of Wandering. Adults of Southern Royal and of Wandering are also similar. In general, an individual with large amounts of white in greater coverts and secondaries is likely to be Wandering, as Southern Royal has extensive black in these areas. Additionally, Wandering often shows orange in ear coverts, lacking in Southern Royal. Under optimal viewing conditions, black cutting edges of Southern Royal Albatross can be seen, but not in Wandering Albatross which has entirely pink bill.

Observations

Recorded on numerous occasions from fishing vessels operating in all three of the southern oceans, both as sighting records and as incidental catch. However, due to the absence of reliable field criteria for distinguishing the various members of the group, Antipodean or Tristan Albatrosses may also have been misidentified. Based on distribution, vessels operating in albacore fishing regions in the southern oceans and in southern bluefin tuna and oilfish fishing regions of the south-west Indian Ocean should have a high probability of recording this species.

Juvenile Wandering Albatross (group): With the exception of cheeks, throat, and underwing coverts, entirely dark brown at this stage. The possibility of this individual being misidentified as Amsterdam Albatross can be excluded by its uniform bill colour. (Photo: Huan-Chang Liao)

Young Immature Wandering Albatross: Head, neck, mantle and especially lower belly fade, resulting in more mottled appearance. (Photo: Huan-Chang Liao)

Older Immature Wandering Albatross: Upperwing coverts and tail become blacker-brown, upper body and underbody turn predominantly white and head, neck and back acquire brown vertical stripes or horizontal vermiculations. (Photo: Huan-Chang Liao)

Adult Wandering Albatross: Dark tail feathers are replaced by white feathers from outer pair inwards and leading edge and inner wing coverts become predominantly white. (Photo: Huan-Chang Liao)

Older Immature or Young Adult Wandering Albatross: In the course of age, becomes increasingly white and more contrastingly black and white, with fewer dark vermiculations above. (Photo: Huan-Chang Liao)

Older Adult Wandering Albatross: Entirely white above and below, with white tail, but without vermiculations,. Wing entirely white, except for black primaries and primary coverts, secondaries and a few wing coverts. (Photo: Huan-Chang Liao)

Antipodean Albatross
(Diomedea antipodensis)

Distribution

Found at high latitudes in the South Pacific, where two sub-species. D.a. antipodensis breeds south-east of New Zealand on Antipodes Island, with smaller numbers on Campbell Island and on Chatham Islands. In non-breeding season disperses widely, ranging from Tasman Sea south-east of Australia in west to waters offshore Chile and perhaps as far as Patagonian Shelf in the east. D.a. gibsoni ("Gibson's Albatross") breeds on the Auckland Islands south of New Zealand. During breeding season, females forage mainly in the Tasman Sea, with males foraging in areas to north-east at lower latitudes in the South Pacific.

Behaviour

Habits like Wandering Albatross. Generally seen in solitude or in small groups. Readily attracted to fishing vessels, and feeds behind them by picking fresh fish bait and other fish scraps from surface and occasional shallow dives. Rather shyer than Wandering Albatross when competing for food.

Size

Large albatross, with total body length of 110 cm and wingspan of 250-300cm. Bill length 132-155 mm. Both sub-species similar in size and both generally smaller than Wandering Albatross.

Plumage

Antipodean Albatross goes through several different plumage stages, with acquisition of adult plumage taking several years. Immatures are often dark brownish, unlike adults, which are contrastingly black and white. Underwing predominantly white with blackish tip, and narrow blackish trailing edge and leading edge beyond carpal. Juveniles have cheeks, throat and underwing white, with remainder of plumage dark brown. Immatures acquire white in mantle, rump and especially below, with majority white-bellied and appearing rather mottled. Female of nominate race may commence breeding in this plumage. Adults have upperwing coverts and tail blacker-brown than immatures. Lower back and underbody are white. Head, neck and upper mantle have thin brownish vertical marks or horizontal vermiculations. Both sub-species are sexually mature when this plumage is acquired. The older the individual, the fewer the vermiculations above, but tail and upperwing coverts retain a large amount of black, unlike Tristan and Wandering Albatrosses which acquire an almost entirely white plumage. Huge bill entirely pink or pinkish-flesh, but a small number of immature gibsoni may have dark bill tip and dark cutting edges to bill like Amsterdam Albatross. Nominate race adult is darker on wing than gibsoni, with a greater amount of dark vermiculations. Adult gibsoni somewhat paler and with fewer dark markings.

Separation from similar species

1)**Amsterdam Albatross:** Nominate race Antipodean Albatross may be confused with Amsterdam Albatross in adult female, immature male, and at all immature plumage stages, and juveniles and immatures of gibsoni may also be confused with Amsterdam Albatross. Under optimal viewing conditions, dark bill tip and cutting edges of Amsterdam Albatross can be used to separate the two. However, distribution may be a more reliable means of separation.

(2)**Tristan Albatross:** Both Antipodean and Tristan Albatrosses show similar range of plumage variation and are similar in size and are therefore difficult to distinguish in the field. However, Tristan Albatross occurs in the South Atlantic and the two species do not overlap in natural range.

(3)**Wandering Albatross:** Wandering Albatross is the largest member of the Wandering Albatross group, with largest body and longest wingspan and bill length. Nominate race Antipodean is very similar in all plumages to Wandering. Where the two overlap in New Zealand waters, Wandering can be distinguished by its relatively larger body and bill length.

(4)**Northern Royal Albatross:** Both adult and immature Northern Royal Albatross may be confused with older-stage immature Antipodean Albatross. Both have largely black upperwing coverts, but Northern Royal at this stage has tail almost entirely white, whereas tail of Antipodean is entirely black or at most with a few white feathers admixed. In addition, young Antipodean Albatross often has orange ear coverts, but not on Northern Royal. Under optimal sighting conditions, black cutting edges of Northern Royal Albatross can be seen, but not on Antipodean Albatross, which has entirely pink bill.

(5)**Southern Royal Albatross:** Both juvenile and young immature Southern Royal Albatrosses and older immature stage of Antipodean Albatross have largely black upperwing coverts. However, all-white rump and uppertail of Southern Royal can be used to distinguish from the two, unlike black tail and vermiculated rump of Antipodean. Adults of Southern Royal and Antipodean Albatrosses also look similar. In general, if median coverts, greater coverts and secondaries of an individual are predominantly white then it is a "wandering albatross", as Southern Royal has large amounts of black feathers admixed in these areas. Additionally, it has orange feathers in ear coverts, but not for Southern Royal, point to wanderer. Under optimal viewing conditions, black cutting edges of Southern Royal Albatross can be seen, but not on Antipodean Albatross which has entirely pink bill.

Observations

"Wandering" albatrosses have occasionally been recorded by Taiwanese observers in the South Pacific. Due to the absence of reliable field criteria for distinguishing various members of the group, Antipodean Albatross is likely overlooked. Based on its distribution, vessels operating in albacore fishing regions south of 25° S in the South Pacific should have a higher probability of recording this species. In future, bill lengths of individuals collected from incidentally caught birds will be taken to help determine which member of the wandering albatross group is involved.

Adult Antipodean Albatross: Race gibsoni by location. Similar in size and plumage to Tristan Albatross, but differs in distribution. Similar to much larger Wandering Albatross, which has larger body, larger wingspan, and longer bill, but differs by presence of horizontal vermiculations or vertical marks on upper side in areas which are entirely white in Wandering. (Photo: Huan-Chang Liao)

Amsterdam Albatross
(Diomedea amsterdamensis)

Distribution

Rarest of all albatross species, breeding only on the French territory of Amsterdam Island in the Indian Ocean. Has an estimated total population of 180 birds according to surveydataof2011, with around 26 pairs breeding annually. Restricted to the southern Indian Ocean, but unconfirmed records from Australia, Tasmania and New South Wales suggest that it may disperse eastwards into waters offshore south-east Australia.

Behaviour

No data regarding foraging behaviour and diet, but presumably behaves as other wandering albatrosses and will be attracted to and follow fishing vessels.

Size

Large albatross, with total body length of 115 cm and wingspan of 300cm. Similar in size to Tristan and Antipodean Albatrosses and slightly smaller than Wandering Albatross.

Plumage

Juvenile like other wandering albatrosses, entirely dark brown except for white cheeks, throat and underwing. In the course of age, upper and underbody become paler. Adults may have entirely white bellies, with only a small amount of dark brown feathers admixed, creating a strong contrast with upper breast band. Neck and mantle acquire some white and plumage generally appears mottled. Its pink bill has a darker tip (both above and below) and dark cutting edges forming a horizontal line, thus its bill resembles that of the royal albatrosses.

Separation from similar species

Given its plumage and size, only likely to be confused in juvenile and immature stage with Wandering, Tristan and Antipodean Albatrosses. Under optimal sighting conditions, dark bill tip and cutting edges can be used for distinguishing Amsterdam Albatross from similar species. In addition, Amsterdam Albatross is confined to the southern Indian Ocean and all individuals are banded. Thus, location of observation and presence of band also aid the identification process.

Observations

Observed only once by Taiwanese observers in the Indian Ocean. Given its distribution, encounter to this species by albacore, southern bluefin tuna and oilfish targeting vessels operating in the southern Indian Ocean is likely. Identifications must be made with care and good photographs may be required to confirm records.

Amsterdam Albatross:A typical individual, which strongly resembles juveniles and immatures of other members of the wandering albatross group. Under optimal sighting conditions, dark-tipped bill and cutting edges form principal means of distinguishing from other species.(Photo: Huan-Chang Liao)

Amsterdam Albatross: In addition to bill characteristics, distribution (restricted to southern Indian Ocean) also helps identifying this species. Moreover, allAmsterdam Albatrosses are banded, helping scientists understanding their biology and behaviour. (Photo: Huan-Chang Liao)

Tristan Albatross
(Diomedea dabbenena)

Distribution

Found at high latitude areas in the South Atlantic, breeding only on Tristan da Cunha and Gough Islands. In non-breeding season, ranges between 23 and 42° S in the South Atlantic, reaching the west coast of Africa and occasionally the Indian Ocean.

Behaviour

Tristan Albatross forages in solitude or in small groups. Readily attracted to fishing vessels, and feeds behind them by picking fresh fish bait and other fish scraps from surface and occasional shallow dives. Also observed snatching food from other seabirds.

Size

Large albatross, with total body length of 110 cm and wingspan of around 300cm. Bill length 132-155 mm. Smaller than Wandering Albatross in overall size, wingspan and wing length.

Plumage

Like Wandering Albatross, Tristan Albatross goes through several different plumage stages, with acquisition of adult plumage taking several years. Younger immatures are largely dark brownish, unlike older immatures and adults, which are contrastingly black and white. At all ages, underwing predominantly white with blackish tip and narrow blackish trailing edge and leading edge beyond carpal. Bill huge and entirely pink or pinkish-flesh, with a darker tip in a small number of immatures.

(1)Juvenile: Cheeks, throat, and underwing coverts white, with remainder of plumage brown.

(2)Immature and adult: Immatures acquire white in mantle, rump and especially below, with majority white-bellied and appearing rather mottled. Female may commence breeding in this plumage. Older immatures and adults have upperwing coverts and tail blacker-brown than younger immatures. Lower back and underbody are white. Head, neck and upper mantle have vertical brownish spots or thin vermiculations. Males are sexually mature when this plumage is acquired. The older the individual, the fewer vermiculations above, and the stronger the contrast between black and white. White tail feathers, starting from the outer pairs, replace darker ones, and upperwing coverts and greater coverts acquire more white. Tristan Albatross rarely acquires almost entirely white plumage of Wandering Albatross.

Separation from similar species:

(1)**Amsterdam Albatross**: Overlaps slightly in range with Tristan Albatross in the southwestern Indian Ocean. Both show similar range of variation in juvenile and young immature plumages, and cause confusion. The most reliable feature for identification is darker tip to lower mandible of Amsterdam Albatross, together with dark cutting edges which form a dark line on bill, both of which can be seen under optimal sighting conditions.

(2)**Antipodean Albatross:** Both Antipodean and Tristan Albatrosses show similar range of plumage variation and are similar in size, and are therefore difficult to be distinguished in the field. However, Antipodean Albatross occurs in the South Pacific, and the two species do not overlap in natural range.

(3)**Wandering Albatross:** Both species show similar range of age-related plumage variation and distinguishing from the two in the field is difficult. Both also overlap in natural range off the east coast of South America. Wandering Albatross can be distinguished from Tristan by its larger size and larger wingspan and bill length. Furthermore, an individual with predominantly white plumage (except for black primaries, primary coverts and a limited number of upperwing coverts and secondaries) is likely to be Wandering Albatross.

(4)**Northern Royal Albatross:** Both adult and immature Northern Royal Albatross may be confused with older-stage immature Tristan Albatross. Both have largely black upperwing coverts, but Northern Royal at this stage has tail almost entirely white, whereas the tail of Tristan is entirely black or at most with a few white feathers admixed. In addition, young Tristan Albatross often has orange feathers in ear coverts, but not on Northern Royal. Under optimal sighting conditions, black cutting edges of Northern Royal Albatross can be seen, but not on Tristan Albatross which has entirely pink bill.

(5)**Southern Royal Albatross:** Both juvenile and young immature Southern Royal Albatrosses and older immature stage of Tristan Albatrosses have largely black upperwing coverts. However, Southern Royal can be readily identified by its all-white rump and uppertail, which differs from black tail and vermiculated rump of Tristan. Adults of Southern Royal and of Tristan look similar. In general, Tristan retains some black feathers on the tail and often with orange feathers on ear coverts. Under optimal sighting conditions, black cutting edges of Southern Royal Albatross can be seen, but not on Tristan Albatross which has entirely pink bill.

Observations

Due to difficulties in their identification, only a few individuals of large albatrosses which were recorded as incidental catch from fishing vessel operating in the South Atlantic were identified (from bill measurements) as Tristan Albatross, while others not identified to species level. Given its distribution, vessels operating in albacore fishing regions in the South Atlantic and the southwestern Indian Oceans and in southern bluefin tuna and oilfish fishing regions of the southwest Indian Ocean should begin recording this species. Bill lengths of individuals caught incidentally collected need to be taken to determine which species of albatross is involved.

Adult Tristan Albatross: Very similar to Wandering Albatross. If both species are seen side-by-side, smaller size, shorter wingspan and shorter bill length can be used to distinguish between the two. (Photo courtesy of Ross Wanless)

Adult Tristan Albatross: Very similar to Wandering Albatross. If both species are seen side-by-side, smaller size, shorter wingspan and shorter bill length can be used to distinguish between the two. (Photo courtesy of Ross Wanless)

Sooty Albatross
(Phoebetria fusca)

Distribution

Occurs in warmer waters of the Atlantic and Indian Oceans, breeding on numerous islands in the region. Forages during breeding season south of 33°S, travelling up to 1200 km, but rare in shallow waters of continental shelf. Disperses in non-breeding season east to waters south of Australia and west to waters off southeast coast of South America. Rarely found in the Pacific Ocean.

Behaviour

Often follows fishing vessels, usually solitarily or occasionally in pairs or small groups. Feeds by picking fish bait and fish scraps from surface, but may also (rarely) dive to just under surface. Reportedly associates with whales and dolphins.

Size

Small albatross, with total body length of 84-89 cm and wingspan of 203-207 cm. Slightly smaller than Light-mantled Albatross.

Plumage

Adult birds uniform chocolate-brown, with cheek and ear coverts occasionally washed lighter but not contrastingly so. Black bill with yellow stripe on lower mandible. White eye-ring broken before eye. Juvenile and immatures similar to adult, but nape, neck sides and upper mantle slightly paler, creating collar. Eyes pale brownish or greyish, not contrasting with face. Bill initially dark brown, with yellow stripe on lower mandible not acquired until fifth year.

Separation from similar species

(1)**Light-mantled Albatross:** Both adult and immature Light-mantled Albatrosses have greyish back when viewed from above, which contrasts strongly with dark brown head, neck and tail. In addition, under optimal sighting conditions, stripe on lower mandible can be seen to be blue in Light-mantled Albatross, rather than yellow.

(2)**Southern and Northern Giant Petrels:** Immatures of both giant petrel species are similar in plumage colour to Sooty Albatross. However, both giant petrels have thicker neck, fatter body and broader wings than Sooty Albatross, and have short, rounded tails, unlike the pointed tail of Sooty Albatross. At close range, huge pale bill with thick nasal tube is obviously different from slender bill of Sooty Albatross.

Observations

Recorded from albacore vessels operating in the South Atlantic and albacore, southern bluefin tuna and oilfish targeting vessels operating in the Indian Ocean, both as sighting records and as incidental catch. Given its distribution, this species can rarely been countered by Taiwanese vessels operating in the South Pacific.

Adult Sooty Albatross: Uniform dark body lacking any significant contrast. Under optimal sighting conditions, the yellow stripe on the lower mandible can be seen. (Photo: Huan-Chang Liao)

Adult Sooty Albatross: Shares long, pointed tail with Light-mantled Albatross. Can be distinguished from other albatross species and similar-plumaged giant petrels on this feature alone. (Photo: Huan-Chang Liao)

Light-mantled Albatross
(Phoebetria palpebrata)

Distribution

Occurs in all three southern oceans in colder waters of the Antarctica and sub-antarctic, breeding on numerous islands in the region, with largest numbers on South Georgia in the South Atlantic, Kerguelen Islands in the Indian Ocean, and Auckland Islands in the South Pacific. Forages during breeding season at considerable distance from breeding grounds, to as far as Antarctic pack ice. Disperses southwards in non-breeding season, south of 35° S, and generally occurs in areas of higher latitudes than Sooty Albatross occurs.

Behaviour

Reportedly it does not follow fishing vessels, but found to do so by Taiwanese observers. It may follow fishing vessels for a considerable length of time, but seldom observed feeding behind trawlers.

Size

Small albatross, with total body length of 78-90 cm and wingspan of 180-220 cm. Generally larger than Sooty Albatross.

Separation from similar species

Differs substantially from all other albatross species except Sooty Albatross in dark plumage and long, pointed tail. Sooty Albatross is, however, uniformly dark at all ages without any significant areas of contrast. Under optimal viewing conditions, stripe on lower mandible can be seen to be blue, unlike yellow stripe of Sooty Albatross.

Observations

Recorded from albacore vessels operating in the South Atlantic and albacore, southern bluefin tuna and oilfish vessels operating in the Indian Ocean, with most records relating to immatures. Frequency of sightings far lower than that for Sooty Albatross, and no incidental catch has been recorded.

Observations

Recorded from albacore vessels operating in the South Atlantic and albacore, southern bluefin tuna and oilfish vessels operating in the Indian Ocean, with most records relating to immatures. Frequency of sightings far lower than that for Sooty Albatross, and no incidental catch has been recorded.

Adult Light-mantled Albatross: Pale mantle and upper-back which contrast strongly with rest of the plumage. (Photo: Huan-Chang Liao)

Adult Light-mantled Albatross: Under optimal sighting conditions, stripe on lower mandible can be seen to be blue. (Photo: Huan-Chang Liao)

Waved Albatross
(Phoebastria irrorata)

Distribution

The only tropical albatross species, breeding mainly on Española Island in the Galapagos, with a smaller number breeding on islands off Ecuador. During breeding season, forages east to the coasts of Ecuador and Peru along the continental shelf. Disperses eastwards in non-breeding season to waters between 4 and 12° S.

Behaviour

Waved Albatross is shy in nature and is not attracted to fishing vessels. Due to light winds in the tropics, flaps wings more often than other albatrosses and rarely soars. Often associates with foraging groups of Blue-footed Boobies Sula nebouxii.

Size

Medium-sized albatross, with total body length of 89 cm and wingspan of 230-240cm.

Plumage

Adults have head, throat and upper-breast with white feathers and lemon yellow feathers on forehead, crown and nape. Mantle to tail and upperwing largely brown, paler on rump. Lower neck, chest, rump and vent have brownish bars, resembling silverfish. Belly dark brown. Underwing brown adjacent to body, white distally. Has proportionately longest bill of all albatross species, which is uniformly bright yellow. Juvenile and immature look similar to adult, but without yellow feathers on its white head and has coloured bill horn.

Separation from similar species

Largest seabird within its natural range, with no species of similar plumage found in the region.

Observations

Not recorded by Taiwanese observers, either as sight records or as incidental catch. In recent years, Taiwanese fishing vessels do not operated within the natural range of this species, hence there is little chance of record of its sighting.

Adult Waved Albatross: The only albatross species found in tropical waters, with no other seabird species similar in size or plumage. Has proportionately longest bill of all albatross species. (Photo courtesy of BirdLife International)

Black-footed Albatross
(Phoebastria nigripes)

Distribution

One of the three albatross species in the North Pacific, breeding mostly in the northwest areas of the Hawaiian Islands. Small numbers also breed Japan, on Ogasawara, Izuand southernmost of Ryukyu Islands. Ranges between 30 and 56° N, from the East China Sea in the west to Bering Sea in the north and to Pacific coast of North America in the east. Occasionally observed in waters around Taiwan.

Behaviour

Based on experience from albacore targeting vessels operating in the North Pacific, often follows fishing vessels. Feeds by picking freshfish bait and other fish scraps from the sea surface and occasional shallow dives.

Size

Small albatross, with total body length of 64-74cm and wingspan of 193-216cm.

Plumage

Body entirely dark brown, with underbody slightly paler than upperparts. Adults have area immediately behind eye, area surrounding bill base, uppertail and undertail coverts white. Bill pinkish-grey with darker tip. Immature similar to adult, but uppertail and undertail coverts dark brownish and the white area surrounding its bill base is narrower.

Separation from similar species

Identification of this species from most other seabirds can readily be made from its small size, dark plumage and range. The only possible confusing species is juvenile Short-tailed Albatross prior to its first moult, which can be distinguished by larger size, longer bill and absence of white surrounding at bill base.

Observations

Both observed and recorded as incidental catch from albacore targeting vessels operating in the North Pacific. Only one record was made from South Pacific waters close to the Equator.

Adult Black-footed Albatross: Dark brown above and paler below. (Photo: Huan-Chang Liao)

Adult Black-footed Albatross: This species often follows fishing vessels, picking up fresh fish bait and other fish scraps close to trawlers. (Photo: Huan-Chang Liao)

Laysan Albatross
(Phoebastria immutabilis)

Distribution

Occurs in the North Pacific, as the most common albatross, breeding mostly on Midway, Laysan and other islands north-west of Hawaii. Ranges between 28° N and 55° N, from Sea of Japan in the west to Bering Sea in the north and to the Pacific coast of North America in the east. Wanders widely across the North Pacific in non-breeding season, with individuals occasionally reaching the Southern Hemisphere. At least four records were made by Taiwan.

Behaviour

Based on experience from albacore vessels operating in the North Pacific, often follows fishing vessels. Feeds by picking fresh fish bait and other fish scraps from sea surface, and makes occasional shallow dives.

Size

Small albatross, with total body length of 79-81cm and wingspan of 195-203cm. Smallest of the three North Pacific albatrosses.

Plumage

Adult birds with head, neck, lower rump and body white. Greyish-black lores and ear coverts form "goggles", most prominent before eye. Back to upper rump, upperwing and tail deep dark brown. Underwing coverts mostly white, but with black feathers intermixed close to body, forming solid blocks or stripes. Under primaries black. Bill pink, turning blue-grey towards tip. Immatures similar to adults, but with duller bill and weaker/smaller greyish goggles.

Separation from similar species

No similar species within natural range.

Observations

Frequently recorded from albacore vessels operating in the North Pacific. This species is also the albatross species most frequently recorded as incidental catch in the North Pacific.

Adult Laysan Albatross: Most similar to Black-browed Albatross due to black back, but differs from that species on range, with Laysan Albatross in the North Pacific and Black-browed occurring in the southern oceans. For seabirds, distribution can also be used as an aid to identification. (Photo: Huan-Chang Liao)

Short-tailed Albatross
(Phoebastria albatrus)

Distribution

One of the three albatross species in the North Pacific, very rare, with a total global population estimated at around 2000 individuals. Breeds mainly on Torishima Island in the Izu Islands, with a small breeding population on the Senkaku Islands in southernmost Ryukyus. Ranges mostly north of 20° N in the Pacific, north to Bering Sea and east to the Pacific coast of North America. Occasionally observed along the northeastern coast of Taiwan.

Behaviour

According to literatures, and limited observational experience, this species is not attracted to fishing vessels, only occasionally following trawlers for short periods or simply flying-by.

Size

Largest of the three North Pacific albatrosses, with total body length of 84-94cm and wingspan of 215-230cm. Uniquely among the three North Pacific albatross species, also called giant albatross due to heavy body and large, long bill.

Plumage

Short-tailed Albatross acquires adult plumage in a series of stages, unlike those of wandering-type albatrosses. All-brown juveniles become progressively paler in the course of age, with adult birds largely white but having yellow wash across head and neck. Juveniles are entirely dark brown, the majority with all-dark feathering around bill base but with a narrow white surrounding in some. Following its first moult, immatures become chocolate-brown and pale flesh bill acquires bluish tip. Chin, face and underbelly are the areas to first turn white in immatures. In the course of age, face, mantle, underbody and underwing become predominantly white, with brownish mottling on mantle and rump replaced and head and neck acquiring yellow. Uppertail and upper flight feathers black. Full adult has head and neck white, but with golden-yellow wash on crown, face-sides and nape, and white mantle, rump and inner upperwing coverts. Underwing coverts also white, with black wing tip and trailing edge and black undertail.

Separation from similar species

Both adults and juveniles can be distinguished from other large seabirds in the region by its large size, huge pink bill and range. Juvenile may be confused with Black-footed Albatross, but the latter is smaller and has white surrounding on the bill at bill base.

Observations

Taiwanese offshore fishing observers have yet to record this species, but, given its range, it is likely to be encountered by albacore vessels operating in the North Pacific.

Immature Short-tailed Albatross: Largest albatross in the North Pacific. Easily identified by large pink bill with pale blue tip. (Photo: Huan-Chang Liao)

Immature Short-tailed Albatross: Immature gradually acquires white in the course of age, with moult progression from all-dark juvenile to largely white adult. Full adults have head and neck washed yellow. (Photo: Huan-Chang Liao)

Atlantic Yellow-nosed Albatross *(Thalassarche chlororhynchos)*

Distribution

Occurs in the South Atlantic, breeding on Tristanda Cunha island group and Gough Island. During breeding season, forages around breeding islands to as far as continental shelf of western South Africa. Disperses more widely during non-breeding season, northwards to 15° Sin West African waters and westwards to the coasts of UruguayandArgentinanorthof45° S. Occasionally seen in the Indian Ocean and offshore waters of Australia/New Zealand.

Behaviour

Often follows fishing vessels. Feeds by picking fresh fish bait and other fish scraps from the sea surface and occasional shallow dives. Competes with others during feeding, snatching food from smaller shearwaters and petrels. Often loses out in squabbles with larger albatrosses due to smaller size.

Size

Small albatross, with total body length of 71-82cm and wingspan of 180-200cm. Slightly larger than Indian Yellow-nosed Albatross.

Plumage

Adult birds have dark blackish-brown mantle, upperwing and tail. Headand neck was hedlight grey, most obvious on ear coverts and nape, forming a hood. Lores with dark triangular-shaped spot, creating dark eye patch. Under parts white. Underwing mostly white, with only narrow black leading/trailing edges and black wingtip. Bill black, with yellow stripe along culmen and brighter orange tip. Juveniles and immatures similar to adults, but acquire dark eye patch and grey hood in the course of age (both absent in juveniles). Bill entirely black at the age of3-5 years, after which acquires yellow.

Separation from similar species

(1)**Indian Yellow-nosedAlbatross:** Adult Indian Yellow-nosed Albatross has entirely white head and neck, with traces of grey restricted to cheeks in only a small number of individuals, and comparatively small dark eye patch. Juveniles and immatures of both Yellow-nosed species are very similar and practically indistinguishable.

(2)**Grey-headed Albatross:** Adult Grey-headed Albatross has darker and more uniform greyhood than Atlantic Yellow-nosed Albatross. Black bill has yellow stripes on both upper and lower mandibles. In flying motion, width of black leading edge to underwing significantly wider than in either Yellow-nosed species. Juveniles and immatures have more uniform dark-washed head and neck, dark underwing coverts and bill tip darker than rest of the bill.

(3)**Buller's Albatross:** Adult Buller's Albatross has slightly darker and more uniform hood than Atlantic Yellow-nosed Albatross. Black bill has yellow stripes on both upper and lower mandibles and bill tip has no orange tones. In flight, black leading edge of underwing slightly wider than in both Yellow-nosed species. Juveniles and immature have head and neck slightly darker and more uniform than Atlantic Yellow-nosed Albatross, leading edge to underwing slightly wider and brownish and bill tip darker than rest of bill.

Observations

This species is one of the seabird species most frequently recorded from albacore vessels operating in the South Atlantic, both as sighting records and as incidental catch. It is occasionally reported from albacore and oilfish fishing regions in the south-western Indian Ocean, near the waters of South Africa, where it has been both observed and recorded as incidental catch. It is, however, recorded in this area at far lower frequencies than Indian Yellow-nosed Albatross.

Adult Atlantic Yellow-nosed Albatross: Compared to Indian Yellow-nosed Albatross, Atlantic has more extensive greyish hood and larger dark eye patch.(Photo: Huan-Chang Liao)

Adult Atlantic Yellow-nosed Albatross: Both Yellow-nosed Albatross species have narrower black leading edges to underwing than Grey-headed and Buller's Albatrosses of similar size.(Photo: Huan-Chang Liao)

Indian Yellow-nosed Albatross
(Thalassarche carteri)

Distribution

Occurs in the Indian Ocean, breeding on temperate islands in the south, although a small number of individuals have recently been found breeding on Chatham Islands (New Zealand) in the Pacific. Forages around breeding islands during breeding season. Disperses widely during non-breeding season, more abundant in waters south and east of South Africa, also commonly to western and southeastern Australia, and occasionally New Zealand.

Behaviour

Often follows fishing vessels. Feeds by picking fresh fish bait and other fish scraps from surface and occasional shallow dives. Competes with others during feeding, snatching food from smaller shearwaters and petrels. Often loses out in squabbles with larger albatrosses due to smaller size.

Size

Small albatross, with total body length of 70-80cm and wingspan of 176-200cm. Slightly smaller than Atlantic Yellow-nosed Albatross, making it the smallest albatross species in the Southern Hemisphere.

Plumage

Adult birds have dark blackish-brown mantle, upperwing and tail. Head white with grey wash restricted to cheek in a few individuals. Lores with smaller dark patch than Atlantic Yellow-nosed, thus eye patch smaller/less obvious. Underparts white. Underwing mostly white, with only narrow black leading/trailing edges and black wingtip. Bill black, with yellow stripe along culmen and bright orange tip. Juveniles and immatures similar to adults, but all-white head has no dark eye patch. Bill entirely black at the age of 3-5 years, turns yellow when it grows older.

Separation from similar species

(1)Atlantic Yellow-nosed Albatross: Adult Atlantic Yellow-nosed Albatross has head and neck was hedlight grey, most obvious on ear coverts and nape, and larger dark spot on lores. Juveniles and immatures of both Yellow-nosed species are very similar and practically indistinguishable.

(2)Grey-headed Albatross: Both adult and immature Grey-headed Albatross have extensive uniform grey on head and neck. The all-white head of Indian Yellow-nosed Albatross is readily distinguishable at all ages.

(3)Buller's Albatross: Both adult and immature Buller's Albatross have extensive uniform grey in head and neck. The all-white head of Indian Yellow-nosed Albatross is readily distinguishable at all ages.

Observations

This species is one of the most frequently recorded seabird species from albacore, oilfish and southern bluefin tuna fishing vessels operating in the Indian Ocean, both as sighting records and as incidental catch. It is occasionally reported from the albacore fishing regions in the southeastern Atlantic, near the waters of South Africa, where it has been both observed and recorded as incidental catch. However, it is recorded in this area at far lower frequencies than Atlantic Yellow-nosed Albatross.

Juvenile Indian or Atlantic Yellow-nosed Albatross: At this age, both species have entirely white heads, all-black bills, without dark spot on lores. Juveniles of the Yellow-nosed Albatross are indistinguishable on plumage and the identification of this species is best made based on the location of occurrence.(Photo: Huan-Chang Liao)

Adult Indian Yellow-nosed Albatross: Head is largely white, though some individuals show some light greyon cheeks. Lores have only a small dark spot. Bill is black with yellow culmen and orange tip.(Photo: Huan-Chang Liao)

Grey-headed Albatross
(Thalassarche chrysostoma)

Distribution

Has circumpolar distribution at high latitudes in all three southern oceans, breeding on a number of islands in region. Forages south of breeding islands during breeding season. Disperses northwards during non-breeding season, rarely north of 45° S, except off the southwest coast of South America where may follow Humboldt Current as far north as 15° S.

Behaviour

Often follows fishing vessels, sometimes for lengthy periods. Feeds by picking fresh fish bait and fish scraps from the sea surface.

Size

Small albatross, similar in size to Black-browed, with total body length of 70-85cm and wingspan of 220cm.

Plumage

Adult birds have dark greyish-brown mantle, upperwing and tail. Underparts and rump white. Leading edge to underwing black and relatively broad, therefore white stripe on centre of underwing narrow. Trailing edge and wingtip also black. Head and neck grey to dark grey, slightly paler on forehead. Black bill with yellow stripes on both mandibles: on upper, culmen yellow with orange tip; on lower, yellow stripe does not extend for entire length of mandible. Juvenile has grey and brownish head. Underwing coverts mostly dark butturns white gradually in the course of age. Bill initially dark brownish with black tip, gradually turns black and acquires yellow.

Separation from similar species

(1)**Indian Yellow-nosed Albatross:** Both adult and immature Indian Yellow-nosed Albatross have head and neck entirely white. The greyish head of Grey-headed Albatross is readily distinguishable at all ages.

(2)**Atlantic Yellow-nosed Albatross:** Adult Atlantic Yellow-nosed Albatross has head and neck washed much lighter grey and has yellow stripe on upper mandible only. In flying motion, leading edge of underwing is narrower than in Grey-headed Albatross. Immatures of Atlantic Yellow-nosed Albatross can readily be distinguished from all ages of Grey-headed Albatross by all-white head.

(3)**Buller's Albatross:** Adult Buller's Albatross has head and neck washed much lighter grey and is silvery on forehead and crown. Under optimal viewing conditions, broader base to yellow stripe of upper mandible can be seen as well as lack of orange tip to bill. In flying motion, Buller's Albatross has black leading edge to underwing narrower than that of Grey-headed. Juvenile and immature Buller's Albatrosses have pale underwings, unlike predominantly dark underwing of Grey-headed Albatross.

(4)**Black-browed Albatross:** Juvenile and immature Black-browed Albatrosses have grey markings restricted to nape and neck sides, forming collar. In Grey-headed Albatross, grey is more widely and uniformly distributed across head. Bill of immature Grey-headed Albatrosses also deeper and more uniform grey than Black-browed, which may be paler brown.

Observations

This species has occasionally been observed from albacore vessels operating in all three southern oceans, and from albacore, oilfish and southern bluefin tuna vessels operating in the Indian Ocean. Most records relate to immatures.

Adult Grey-headed Albatross: Similar to other smaller albatrosses, but with broader black leading edge to underwing.(Photo: Huan-Chang Liao)

Immature Grey-headed Albatross: In flying motion, readily distinguished from Atlantic and Indian Yellow-nosed and Buller's Albatrosses by dark underwing coverts. (Photo: Huan-Chang Liao)

Black-browed Albatross *(Thalassarche melanophris)*

Distribution

The commonest of all albatrosses. Occurs in the southern oceans, where widely distribute in high-latitude waters, breeding on numerous islands in sub-polar region. Forages north of breeding islands during breeding season. Disperses northwards in non-breeding season to shallow waters of continental shelf and can reach sub-tropical waters along the southwest coast of Africa and west coast of South America. Recorded several times in the Northern Hemisphere.

Behaviour

Often follows fishing vessels, and may gather in large numbers. Feeds by picking fish bait and fish scraps mostly from sea surface, but also makes shallow dives and may occasionally plunge-dive to take food from below surface. Frequently seen snatching food from smaller albatrosses, shearwaters and petrels.

Size

Small to medium-sized albatross, with total body length of 80-96 cm and wingspan of 210-250cm. Largest small albatross of Southern Hemisphere in terms of body length and wingspan, but slightly smaller than those in medium-sized class.

Plumage

Black-browed Albatross goes through a number of plumage stages before it reaches maturity.

Juvenile: Largely white-headed with indistinct dark eyebrow. Dark feathers of breast-sides and neck form distinctive greyish collar. Mantle and upperwing greyish-black. Underwing appears all-dark from distance, but at closer range central part can be seen to be lighter. Rest of underparts white. Bill all-dark upon fledging, becomes paler grey in the course of age, but its tip remains black.

Immature: Lores and eye stripe darken with age to create eyebrow. Collar also fades and becomes less obvious. Underwing coverts become progressively whiter. Bill becomes paler and gradually attains yellow base.

Adult: Strikingly greyish-black and white. Head entirely white with contrasting dark eyebrow. Upperwing and tail greyish-black. Underparts white. Underwing white with black leading/trailing edges and wing tip. Bill pink or orange-pink, becomes red at tip during breeding season.

Observations

Recorded from albacore vessels operating in all three oceans of the Southern Hemisphere, both as sight records and as incidental catch, and from oilfish and southern bluefin tuna vessels operating in the Indian Ocean. Probably the albatross species most frequently recorded as incidental catch. However, records from New Zealand and southwestern Australia may relate to very similar Campbell Albatross.

Adult Black-browed Albatross: Plumage strongly contrasting greyish-black and white with marked dark eyebrow. Bill pink or orange-pink. Underwing largely white, in black frame. (Photo: Huan-Chang Liao)

Immature Black-browed Albatross: Amount of white in underwing increases in the course of age and bill colour becomes increasingly pale from base. (Photo: Huan-Chang Liao)

Juvenile Black-browed Albatross: Has a greater amount of dark in underwing, greyish collar and dark bill. (Photo: Huan-Chang Liao)

Campbell Albatross
(Thalassarche impavida)

Distribution

Occurs commonly in areas off New Zealand, breeding only on islands in Campbell Islands group. Disperses in non-breeding season to waters of the southwestern Pacific Ocean and Tasman Sea, between 24 and 48° S, with occasional records from the Indian Ocean. Considered by some to be conspecific with Black-browed and hybridization with the species recorded on Campbell Islands.

Behaviour

Often follows fishing vessels, in large numbers. Feeds by picking fish bait and fish scraps from surface. Foraging behaviour essentially similar to Black-browed Albatross.

Size

Small to medium-sized albatross, with total body length of 78-90 cm and wingspan of 210-246cm. Slightly smaller than Black-browed, but still larger than other small albatross species.

Plumage

Campbell Albatross goes through a number of plumage stages before it reaches maturity. Development of plumage stages similar to Black-browed Albatross, from which immatures not distinguishable by plumage. Adults distinguishable from Black-browed Albatross by its pale eye.

Juvenile: Largely white-headed with indistinct dark eyebrow. Dark feathers of breast-sides and neck form distinctive greyish collar. Mantle and upperwing greyish-black. Underwing appears all-dark from distance, but at closer range central part can be seen to be lighter. Rest of underparts white. Bill all-dark upon fledging, becomes paler greyish in the course of age, but tip remains black.

Immature: Lores and eye stripe darken with age to create eyebrow. Collar also fades and becomes less obvious. Underwing coverts become progressively whiter. Bill becomes paler and gradually attains yellow base.

Adult: Strikingly greyish-black and white. Head entirely white with contrasting dark eyebrow. Upperwing and tail greyish-black. Underparts white. Underwing white with black leading/trailing edges and wing tip. Bill pink or orange-pink, becoming red at tip during breeding season. Iris pale yellow.

Separation from similar species

Campbell Albatross and Black-browed Albatross are essentially identical in terms of plumage, with immatures being especially difficult to separate. Under optimal viewing conditions, iris of adult Black-browed Albatross can be seen to be dark brown, whereas iris of Campbell Albatross is pale yellow.

Observations

Campbell Albatross has been recorded from southern bluefin tuna targeting vessels operating in the eastern Indian Ocean. Campbell Albatross is more numerous than Black-browed Albatross around New Zealand and offshore southeast Australia and care needs to taken when distinguishing these two from one another whilst at sea.

Adult Campbell Albatross: Essentially identical to Black-browed Albatross on plumage, the only difference being iris colour: dark in Black-browed Albatross and yellow in Campbell Albatross. (Photo: Chen Wei-min)

Buller's Albatross
(Thalassarche bulleri)

Distribution

Occurs in the South Pacific, breeding mainly on Snares and Chatham Islands south and east of New Zealand, respectively. Ranges widely in subtropical and subantarctic in the South Pacific. Disperses chiefly eastwards in non-breeding season, to the west coast of South America, with individuals occasionally reaching Falkland Islands and South Africa in the South Atlantic.

Behaviour

Usually follows fishing vessels. Feeds by picking fresh fish bait and fish scraps from surface.

Size

Small albatross, with total body length of 76-81cm and wingspan of 200-213cm. Slightly smaller than Grey-headed Albatross and slightly larger than Atlantic and Indian Yellow-nosed Albatrosses.

Plumage

Adult birds have dark greyish-brown mantle, upperwing and tail. Underparts and rump white. Underwing largely white with relatively broad black leading edge. Head and neck grey, with forehead and crown silvery-toned. Black bill with yellow stripes on both mandibles, especially broad at base on upper. Juvenile and immatures similar to adult, but with greyish-brownish tones to head less evenly distributed. Bill initially dark brown with black tip, which gradually turns black and acquires yellow in the course of age.

Separation from similar species

(1)**Indian Yellow-nosed Albatross:** Both adult and immature Indian Yellow-nosed Albatrosses have head and neck entirely white. Buller's Albatross is readily distinguishable by its greyish head at all ages.

(2)**Atlantic Yellow-nosed Albatross:** Adult Atlantic Yellow-nosed Albatross has head and neck washed much lighter grey and has narrower yellow stripe on upper mandible only, together with orange bill tip. In flying motion, leading edge of underwing is narrower than in Buller's. Immatures of Atlantic Yellow-nosed Albatross can readily be distinguished from all ages of Buller's Albatross by all-white head.

(3)**Grey-headed Albatross:** Adult Grey-headed Albatross has head and neck washed much darker grey without silvery forehead and crown. Yellow stripe of upper mandible narrow at base in Grey-headed Albatross, and tip of bill orange. In flying motion, Grey-headed Albatross has widest black leading edge to underwing of similar small albatross species. Juvenile and immature Grey-headed Albatrosses have predominantly dark underwings, unlike pale underwing of Buller's.

Observations

Taiwanese observers have only recorded single individuals from southern bluefin tuna vessels operating in the Indian Ocean. In view of the geographical distribution of species, albacore tuna vessels operating in the Pacific should have a greater chance of recording this species, though care will be required in distinguishing this species from the similar Grey-headed Albatross.

Adult Buller's Albatross: In flying motion, black leading edge of underwing is slightly wider than on both Atlantic and IndianYellow-nosed Albatrosses and significantly narrower than that on Grey-headed Albatross. (Photo: Chen Wei-min)

Adult Buller's Albatross: Has yellow stripes on both upper and lower mandibles. In good sighting conditions, yellow stripe on upper mandible can be seen to be wider at base than in other similar species.(Photo: Huan-Chang Liao)

Shy Albatross
(Thalassarche cauta)

Distribution

Occurs offshore Tasmania, breeding on islands to the south. Forages around breeding islands during breeding season. Presumed to disperse into the southern Indian Ocean in non-breeding season, between 15 and 60° S. Banded individuals recovered in South Africa, Namibia, and New Zealand.

Behaviour

Often follows fishing vessels. Feeds by picking fresh fish bait and other fish scraps from surface and occasional shallow dives. Often snatches food from smaller birds.

Size

Medium-sized albatross, similar in size to White-capped, with total body length of 90-100cm and wingspan of 210-260cm. Bill, leg and tail lengths are marginally shorter than in White-capped Albatross.

Plumage

Largely dark greyish above and whitish below. Few differences in plumage between juvenile, immature and adult, with principal differences relating to colors of head and bill. Adults have head and neck white, with pale greyish wash below eyes and on sides of face and black spot on lores. Mantle, upperwing and tail dark greyish-brown, though mantle somewhat lighter than rest of upperparts. Entirely white below, with only narrow black leading/trailing edges and tip to underwing. Bill pale grey, with yellow culmen and tip and narrow area of bare orange skin at base of lower mandible (easier to see when feeding). Juvenile has white crown, but face sides and neck in dark grey, grey on neck forming collar. Bill greyish-brown with black tip. Head and nape turn white in the course of age, and bill becomes paler, with black tip turning yellow and yellow extending along culmen. The four medium-sized albatrosses can be readily distinguished from other albatross species by the presence of a black "thumb mark" on the leading edge of the underwing where it meets the body.

Separation from similar species

Readily distinguished from larger albatrosses by size. Furthermore, black "thumb mark" on leading edge of underwing confirms membership of medium-sized albatross class. White head and bill colour readily distinguish adult birds from Salvin's and Chatham Island Albatrosses. Juveniles and immatures much more difficult to be distinguished, but Shy Albatross has a greater amount of white in underwing than either Salvin's or Chatham Island Albatrosses, with primary bases white and often a white "gap" in black leading edge at black "thumb mark". Almost impossible to be distinguished from White-capped Albatross in the field.

Observations

Albatrosses of this "type" have been recorded from albacore, oilfish and southern bluefin tuna targeting vessels operating in the South Atlantic and Indian Oceans, both as sighting records and as incidental catch. Given the distributions of both Shy and White-capped Albatrosses, the majority of these observations presumably relate to this species.

Adult Shy Albatross: Based on location, this individual is presumably this species. Second only in size to large (Wandering/Royal) albatrosses, both in terms of body size and wing length, Shy Albatross can be readily distinguished from smaller albatross species (especially an Atlantic Yellow-nosed) on size alone. (Photo: Huan-Chang Liao)

Immature Shy Albatross: Based on location, this individual is presumably this species. The grey feathers of its head and neck form a collar and the bill has a dark tip. Remainder of plumage similar to adult. (Photo: Huan-Chang Liao)

Adult Shy Albatross: Based on its location, individual is presumably this species. The black "thumb mark" at the base of the underwing where it meets the body is a means for the identification of medium-sized albatross species. (Photo: Huan-Chang Liao)

White-capped Albatross
(Thalassarche steadi)

Distribution

Occurs in waters offshore southern New Zealand, breeding on islands to south and east of South Island. Disperses widely throughout the southern oceans in non-breeding season between 10 and 65° S, as far as Chile. Common in the southeastern Pacific, with occasional individuals reaching South Atlantic.

Behaviour

Often follows fishing vessels. Feeds by picking fresh fish bait and other fish scraps from surface and occasional shallow dives. Often snatches food from smaller birds.

Size

Largest of the "medium-sized" albatrosses (a group which includes Shy, Salvin's and Chatham Island Albatrosses), with total body length of 90-100cm and wingspan of 210-260cm.

Plumage

Largely dark grey above and white below. Few differences in plumage between juvenile, immature and adult, with principal differences relating to the colour of head and bill. Adults have head and neck white, with pale grey wash below eyes and on sides of face and black spot on lores. Mantle, upperwing and tail dark greyish-brown, though mantle somewhat lighter than rest of upperparts. Entirely white below, with only narrow black leading/trailing edges and tip to underwing. Bill pale grey, with yellow culmen and tip and narrow area of bare orange skin at base of lower mandible (easier to see when feeding). Juvenile has white crown, but face sides and neck dark grey, grey on neck forming collar. Bill greyish-brownish with black tip. Head and nape turn whitish in the course of age and bill becomes paler, with black tip turning yellow and yellow extending along culmen. The four medium-sized albatrosses can be readily distinguished from other albatross species by the presence of a black "thumb mark" on the leading edge of the underwing where it meets the body.

Separation from similar species

Readily distinguished from larger albatrosses by size. Furthermore, black "thumb mark" on leading edge of underwing confirms membership of medium-sized albatross class. White head and bill colour of adult birds can readily be distinguished from Salvin's and Chatham Island Albatrosses. Juveniles and immatures much more difficult to distinguish, but White-capped Albatross has a greater amount of white feathers in underwing than either Salvin's or Chatham Island Albatrosses, with primary bases white and often a white "gap" in black leading edge at black "thumb mark". Almost impossible to be distinguished from Shy Albatross in the field.

Observations

Albatrosses of this "type" have been recorded from albacore, oilfish and southern bluefin tuna targeting vessels operating in the South Atlantic and Indian Oceans, both as sighting records and as incidental catch. However, given the distribution of the species, the majority of these records may relate to Shy Albatross.

Adult White-capped Albatross: Based on location, this individual is presumably an adult White-capped Albatross. Both this species and Shy Albatross are difficult to be distinguished from their plumage. (Photo: Huan-Chang Liao)

Adult White-capped Albatross: Based on location, this individual is presumably an adult White-capped Albatross. These birds show black "thumb mark" typical of medium-sized albatrosses. Both White-capped and Shy Albatrosses show black tips (not bases) to primaries and a white "gap" in leading edge on underwing. (Photo: Huan-Chang Liao)

Chatham Island Albatross
(Thalassarche eremita)

Distribution

Occurs in New Zealand, where an endemic breeder on The Pyramid (Chatham Islands), southeast of South Island. Forages south and east of Chatham Islands during breeding season, between 38 and 48° S. Disperses eastwards into the southeast Pacific during non-breeding season, to the coast of South America between Peru and Chile. Occasional observations from South Africa suggest that a small number of individuals may winter and return to breeding grounds via Indian Ocean.

Behaviour

Rarely recorded in large numbers outside breeding range and rarely recorded around fishing vessels, perhaps due to competition for food from larger and more aggressive Salvin's Albatross.

Size

Medium-sized albatross, with total body length of 90 cm and wingspan of 220cm. Smallest member of the medium-sized albatross class, but significantly larger than small albatross species.

Plumage

Adults have head and neck uniform dark grey, and dark greyish-brown upperwing and mantle which contrast strongly with white rump. Underbody and underwing white, with narrow black leading/trailing edges and black wing tip. Bill yellow, with black tip to lower mandible and narrow area of bare orange skin at base of lower mandible (easiest to see when feeding). Moult progression in juvenile and immature not yet fully understood, but immature generally similar to adult, but with lighter grey head and neck. Immature bill dirty yellow with black tip. Head and neck become darker grey in the course of age, and bill will turn yellow with black tip reducing in size to be present on lower mandible only. Together with the other medium-sized albatross species, can be readily distinguished from other albatrosses by the presence of a black "thumb mark" on the leading edge of the underwing where it meets the body.

Separation from similar species

Readily distinguishable from larger and smaller albatrosses by black "thumb mark" on leading edge of underwing. The uniform dark grey head and almost entirely yellow bill make distinction of adults from White-capped, Shy and Salvin's Albatrosses straightforward. Immatures less straightforward, but differ from other medium-sized albatrosses in combination of more uniform dark grey head and dirty yellow, not greyish, tone to bill.

Observations

Not yet recorded by Taiwanese researchers, either by sighting or as incidental catch.

Salvin's Albatross
(Thalassarche salvini)

Distribution

Occurs offshore southern New Zealand, breeding on islands to south and east of South Island. Forages north of breeding islands during breeding season. Disperses in non-breeding season into the south-west Indian Ocean and eastward as far as western South America, commonly between 14and50° S. Occasional stragglers reach South Atlantic.

Behaviour

Often follows fishing vessels. Feeds bypicking fish bait and fish scraps from surface and occasional shallow dives. Often snatches food from smaller birds.

Size

Medium-sized albatross, with total body length of 90 cm and wingspan of 250cm. Slightly smaller than similar White-capped Albatross, but larger than Chatham Island Albatross.

Plumage

Largely dark grey above and white below. Few differences in plumage between juvenile, immature and adult, with principal differences relating to changes in bill colour. Adults have forehead and crown white, with remainder of head and neck uniform pale grey. Black eye mask widest on lores and triangular in shape. Mantle, upperwing and tail dark greyish-brown, with mantle somewhat lighter than rest of upperparts. Entirely white below, with only narrow black leading/trailing edges and tip to underwing. Bill pale grey, with yellow culmen and tip and black spot distally on lower mandible. Narrow area of bare orange skin at base of lower mandible easier to see when feeding. Juvenile has white forehead and crown, but face sides and neck dark grey, grey on neck forming collar. Bill entirely dark greyish with black tip. Head and nape turn paler grey with age and bill becomes paler, with black tip turning yellow and yellow extending along culmen. The four medium-sized albatrosses can be readily separated from other albatross species by the presence of a black "thumb mark" on the leading edge of the underwing where it meets the body.

Separation from similar species

Readily distinguished from larger albatrosses by size. Furthermore, black "thumb mark" on leading edge of underwing confirms membership of medium-sized albatross class. Adult birds are readily distinguished by its grey head and bill colour from White-capped, Shy and Chatham Island Albatrosses. Juveniles and immatures much more difficult to be distinguished, but White-capped/Shy Albatross has a greater amount of white feathers in underwing than either Salvin's or Chatham Island Albatrosses, with primary bases white and often a white "gap" in black leading edge at black "thumb mark".

Observations

A small number of immatures have been recorded, both by sighting and as incidental catch, from oilfish and southern bluefin tuna targeting vessels operating in the southern Indian Ocean.

Adult Salvin's Albatross: The uniform light grey colour of the head and bill colour are important field marks.(Photo: Huan-Chang Liao)

Adult Salvin's Albatross: The black "thumb mark" at the base of the underwing where it meets the body is a means for identifying medium-sized albatross species. Black bases to primaries help distinguishing this species from both White-capped and Shy Albatrosses. (Photo: Huan-Chang Liao)

Southern Giant-Petrel
(Macronectes giganteus)

Distribution

Occurs in cold waters of the southern oceans, mostly in the Antarctic, breeding on several high-latitude islands and ice-free areas of Antarctic coast. Forages close to breeding grounds in breeding season. Disperses northwards in non-breeding season, to as far north as 20° S. Most recoveries of Indian Ocean breeders have been in Australian and New Zealand waters.

Behaviour

Usually forages in solitude or in small groups, but larger groups have been observed gathered behind fishing vessels. Vulnerable to injury from fishing activities. Feeds by picking fresh fish bait and other fish scraps from sea surface and occasional shallow dives. Aggressive when feeding, snatching food from smaller shearwaters and petrels and smaller albatross species.

Size

Larger of the two giant petrels, with total body length of85-100cm and wingspan of 150-210cm. Size and weight generally larger/heavier than Northern Giant Petrel, with size equivalent to small albatross species.

Plumage

Has albino, white and grey-brown morphs. Plumage varies greatly with age.

White morph (10% of the birds fledge on Macquarie Island in the Pacific): Adult and immature generally white, with dark brown spots on body and wings. Adults and immatures can be distinguished only by iris colour: pale in adult, dark in immatures.

Albino morph (1% of birds fledged on Macquarie Island in the Pacific): Adults and immatures entirely white. Bill entirely pink, without green tip.

Separation from similar species

(1)Northern Giant Petrel: Northern Giant Petrel has dark red tip on bill, a useful distinction even at far distance. A very small number of Southern and Northern Giant Petrels(especially recently fledged juveniles) have entirely pink bills and are indistinguishable. Adult Northern Giant Petrel has dark head and underwing which contrast with pale underparts, making it readily distinguishable from adult Southern Giant Petrel, which has whitehead and pale underwing.

(2)Sooty Albatross: Over moderate distances, slender body and longwedge-shaped tail of Sooty Albatross provides a means of distinction from juvenile Southern Giant Petrel. At closer range, slender dark bill of Sooty Albatross is quite different from the thick, pink, tube-nosed bill of Southern Giant Petrel.

Observations

Both observed and recorded as incidental catch from albacore, oilfish and southern bluefin tuna targeting vessels operating at high latitudes in all three southern oceans, but at far lower frequencies than more common species, such as Black-browed and Yellow-nosed Albatrosses.

White morph Southern Giant Petrel: Readily identified by its unique plumage. (Photo: Huan-Chang Liao)

Immature Southern Giant Petrel: Dark feathers gradually replaced by paler feathers in the course of age. Pink bill often has obvious pale green tip, unlike Northern Giant Petrel which has dark red tip. (Photo: Huan-Chang Liao)

Northern Giant-Petrel
(Macronectes halli)

Distribution

Occurs in temperate waters of the southern oceans, breeding on numerous islands in the region. In breeding season, forages further from breeding grounds than Southern Giant Petrel where two are sympatric. Disperses northwards to warmer waters in non-breeding season, with Indian Ocean breeders reaching Australian and New Zealand waters, and New Zealand breeders spending winter in the south-east Pacific along the west coast of Chile.

Behaviour

More gregarious than Southern Giant Petrel, with large groups frequently observed gathering behind fishing vessels. Vulnerable to injury from fishing activities. Feeds by picking fresh fish bait and other fish scraps from sea surfaceand occasional shallow dives. Aggressive when feeding, snatching food from smaller shearwaters and petrels and smaller albatross species.

Size

Smaller of the two giant petrels, with total body length of80-95cm and wingspan of 150-210cm. Size and weight smaller/lighter than Southern Giant Petrel, with size roughly equivalent to small albatross species.

Plumage

Juvenile uniform blackish-brown, with bill and feet flesh-pink. The majority of birds have bill with dark red tip. Immatures acquire white face, throat, belly and mottled body in the course of age. Adults have face and throat almost entirely white, contrasting with dark crown and nape, and pale-mottled underbody and vent, which contrast strongly with dark underwing.

Separation from similar species

(1)Southern Giant Petrel: Juveniles of Southern and Northern Giant Petrels identical, but Southern has pale green tip to bill (red in Northern), a useful distinction even at long range. A very small number of Southern and Northern Giant Petrels (especially recently fledged juveniles) have entirely pink bills, and are indistinguishable. Immatures difficult to be distinguished on plumage except where bill tip colouration apparent, but, at age 3-4 years, Northern Giant Petrels develops contrast between pale belly and dark underwing. Adult Southern Giant Petrel can be distinguished from adult Northern Giant Petrels by entirely white head and neck, and white underwing with darker leading and trailing edges.

(2)Sooty Albatross: Sooty Albatross is similar in size and plumage to immature Northern Giant Petrel, but, over moderate distances, slender body and long wedge-shaped tail of Sooty Albatross provides a means of separation. At closer range, slender dark bill of Sooty Albatross is quite different from the thick, pink, tube-nosed bill of Northern Giant Petrel.

Observations

Both observed and recorded as incidental catch from albacore fishing regions in all three southern oceans, and from oilfish and southern bluefin tuna targeting vessels operating in the Indian Ocean, at higher frequencies than Southern Giant Petrel. However, both number of observations and incidental catch records are significantly lower than those of other more common species, such as Black-browed and Yellow-nosed Albatrosses.

I**mmature Northern Giant Petrel:** Both juveniles and immatures are uniform dark brown, but contrasting red tip to pink bill is usually visible at long range and provides a means of separation from Southern Giant Petrel. (Photo: Huan-Chang Liao)

Immature (front)**and adult** (rear) **Northern Giant Petrel:** Cheeks, throat and belly of immature (front) gradually acquire white, to resemble adult (rear), in which these areas are much paler. Underwing and underwing coverts are darker than in Southern Giant Petrel of same age. (Photo: Huan-Chang Liao)

White-chinned Petrel
(Procellaria aequinoctialis)

Distribution

Occurs in southern oceans, where widely distributed, breeding on numerous high-latitude islands in the region. Forages south of breeding islands in breeding season, as far south as 65 ° S. Disperses northwards in non-breeding season as far as subtropics, following cold ocean currents northwards along the coasts of South America and Africa.

Behaviour

Gregarious and readily attracted to fishing vessels, behind which may gather in large groups. Feeds on fish bait and fish scraps, usually picked from surface, but may make shallow dives. Compared to albatrosses and giant petrels, may stay submerged for longer and dive deeper. May snatch food from smaller shearwaters and petrels, but may also be robbed of food by larger albatrosses, giant petrels and skuas.

Size

Medium to large petrel, with total body length of51-58cm and wingspan of 134-147cm. Second in size only to Southern and Northern Giant Petrels, slightly larger than both Westland and Spectacled Petrels and significantly larger than Parkinson's Petrel.

Plumage

Uniform dark brown, with majority of individuals having white chin patch which varies in size between populations; birds from New Zealand having least amount of white which is either absent or restricted to sparse white flecking on the chin area. Bill entirely pale yellowish-white, without contrasting dark tip. Feet largely black, but with variable yellow webbing between toes. About 10% of Indian Ocean population is made up of partial-albinos, frequently with white patches on belly. Adult and immature essentially identical.

Separation from similar species

(1)**Spectacled Petrel:** Similar in plumage and size to White-chinned Petrel and overlaps in range in the South Atlantic. Most Spectacled Petrels have extensive white patches on head sides, usually forming "spectacles", but a minority have only small amounts of white restricted to forehead and rear ear coverts and bear a stronger resemblance to partial-albino White-chinned Petrel. Such individuals require confirmation of bill and foot colour to be confidently identified. Spectacled Petrel has dark-tipped bill, whereas White-chinned Petrel has bill uniform pale yellowish-white. Furthermore, Spectacled Petrel has all-dark feet, and lacks yellow webbing between toes of White-chinned Petrel.

(2)**Westland Petrel:** Similar in plumage to White-chinned Petrel and overlaps in range in the South Pacific. Westland Petrel can be separated from White-chinned by absence of white on head and contrasting black-tipped bill, which is uniform pale yellowish-white in White-chinned Petrel.

(3)**Parkinson's Petrel:** Similar in plumage to White-chinned Petrel and overlaps in range during breeding season in waters offshore New Zealand. Parkinson's is smaller and has a shorter wingspan than White-chinned with no white on chin. Parkinson's Petrel also has dark-tipped bill, unlike uniform pale yellowish-white bill of White-chinned Petrel.

Observations

Regularly recorded, both as sighting records and as incidental catch, from albacore fishing regions in all three southern oceans, and from oilfish and southern bluefin tuna targeting vessels operating in the Indian Ocean. This species is one of the most frequently recorded seabirds in incidental catch.

White-chinned Petrel: Named for its white chin patch, which varies in size from large to small, White-chinned Petrel can be separated from Spectacled, Westland and Parkinson's Petrels on this feature and on uniform pale yellowish-white bill. (Photo: Huan-Chang Liao)

White-chinned Petrel: Yellow webbing between toes of White-chinned Petrel is a further supporting identification feature. (Photo: Huan-Chang Liao)

Spectacled Petrel
(Procellaria conspicillata)

Distribution

Occurs in the South Atlantic, breeding only on small islands between Tristan da Cunha and Gough Island. Disperses widely in the South Atlantic in non-breeding season, west to central Brazil and east to southwest South Africa, though some remain in breeding areas all year round. Occasionally reported sighting from Indian Ocean and vagrant as far as Australia.

Behaviour

Spectacled Petrel is readily attracted to fishing vessels, behind which may gather in large groups to feed. Feeds by picking fresh fish bait and other fish scraps from surface and occasional dives. Sometimes snatches food from smaller shearwaters and petrels and is often robbed of food by larger albatrosses, giant petrels and skuas. Foraging behaviour generally similar to White-chinned Petrel.

Size

Medium to large petrel, with total body length of55cm and wingspan of 134-147cm. On average smaller, lighter and with shorter wingspan than White-chinned Petrel, about the size of Westland Petrel but significantly larger than Parkinson's Petrel.

Plumage

Body entirely dark blackish-brown, with exception of head which has variable white markings, ranging from white patches limited to forehead and ear coverts to large white crescents which form bold spectacles. Billpale yellow or yellowish-white, with variably dark tip which contrasts somewhat with rest of the bill. Feetblack. Juvenile similar to adult.

Separation from similar species

(1)**White-chinned Petrel:** Similar in plumage to Spectacled Petrel and overlaps in range in South Atlantic. The majority of Spectacled Petrels have extensive white patches on head sides like a pair of spectacles. However, a small number have

white restricted to patches on forehead and ear coverts and may thus resemble albino White-chinned Petrel. Both have similarly-coloured bills, but Spectacled Petrel has variable dark tip, unlike uniform pale bill of White-chinned Petrel. Furthermore, feet of Spectacled Petrel are all-black and lack yellow webbing between toes of White-chinned Petrel.

(2)**Westland Petrel:** Westland Petrel occurs in the South Pacific and does not overlap in natural range with Spectacled Petrel. In addition, head of Westland Petrel is entirely dark and lacks white markings of Spectacled Petrel.

(3)**Parkinson's Petrel:** Parkinson's Petrel occurs in the South Pacific and does not overlap in natural range with Spectacled Petrel. In addition, head of Parkinson's Petrel is entirely dark and lacks white markings of Spectacled Petrel. Parkinson's Petrel is also more slightly built than Spectacled Petrel.

Observations

Both observed and recorded as incidental catch from albacore targeting vessels operating in the South Atlantic and albacore, oilfish and southern bluefin tuna fishing regions in the south-west Indian Ocean, by far the largest numbers in the South Atlantic.

Spectacled Petrel: A typical individual, the most striking feature being the white head markings like a pair of spectacles. (Photo: Huan-Chang Liao)

Spectacled Petrel (rear) **with White-chinned Petrels:** Spectacled Petrel overlaps in range with White-chinned Petrel in the South Atlantic and in the south-western Indian Ocean and both frequently forage together. In mixed flocks, the difference in plumage is obvious. (Photo: Huan-Chang Liao)

Spectacled Petrel: A small number of individuals have less white on the head, but can be distinguished from White-chinned Petrel by variable dark bill tip which contrasts with pale yellow or yellowish-white bill. (Photo: Huan-Chang Liao)

Black/Parkinson Petrel
(Procellaria parkinsoni)

Distribution

Occurs in the Pacific Ocean, where endemic breeder on Little and Great Barrier Islands of northern New Zealand. During breeding season, mainly forages around North Island, New Zealand, and more rarely in colder waters further south. Disperses north-eastwards in non-breeding season, crossing the equator to tropical and subtropical waters of the eastern Pacific. Forages mostly in deeper waters.

Behaviour

Parkinson's Petrel usually forages in solitude or in small mixed species groups. Vulnerable to fishing activities and readily attracted to fishing vessels, feeding on fresh fish bait and other fish scraps. In tropical and subtropical waters, often observed associating with dolphins and small whales.

Size

Medium-sized petrel, with total body length of46cm and wingspan of 115cm. Smallest of the four medium-sized all-dark Procellaria petrels.

Plumage

Body entirely dark blackish-brown. Billpale yellow or yellowish-white, with variably dark tip which contrasts somewhat with rest of bill. Feetblack. Juvenile similar to adult, but juveniles have paler-tipped and less contrasting bill.

Separation from similar species

(1)**Spectacled Petrel:** Spectacled Petrel occurs South Atlantic and south-west Indian Ocean and does not overlap in natural range with Parkinson's Petrel. Spectacled Petrels have variable white patches on head sides, unlike the all-dark head of Parkinson's Petrel.

(2)**White-chinned Petrel:** White-chinned Petrel is similarly-plumaged and overlaps with Parkinson's Petrel in the South Pacific. White-chinned Petrel has variable

white patch on chin and lacks dark bill tip; bill therefore appears uniform pale yellow or yellowish-white. White-chinned Petrel is also significantly larger than Parkinson's Petrel, both in terms of overall size and wingspan.

(3)**Westland Petrel:** Westland Petrel overlaps in range with Parkinson's Petrel in the breeding season offshore New Zealand. Although similar in plumage, Westland Petrel is significantly larger than Parkinson's Petrel, both in terms of size and wingspan. Under optimal viewing conditions, the bill tip of Westland Petrel can be seen to be darker than that of Parkinson's and the bill is thicker and longer with a shorter nasal tube.

Observations

Not recorded by Taiwanese observers, either as sighting record or as incidental catch. Based on seasonal distribution, it may be encountered by albacore targeting vessels operating near Australian waters between November and June and from bigeye tuna targeting vessels and purse seiners operating in the eastern Pacific between June and October. Care is required in distinguishing this species from similar Westland and White-chinned Petrels.

Parkinson's Petrel: Smallest and lightest of the four all-dark Procellaria petrels. Appears slender in flight, readily apparent when seen together with other seabirds or with extensive experience of the species. (Photo courtesy of Hadoram.Shirihai)

Parkinson's Petrel: Overlaps in range with other all-dark petrels, including Westland and White-chinned. Most White-chinned Petrels show white patches on the chin and large bill which is entirely yellow or yellowish-white. Almost identical in plumage to Westland Petrel, but Parkinson's is smaller with shorter wingspan and has shorter and more slender bill. (Photo courtesy of Karen Baird)

Westland Petrel
(Procellaria westlandica)

Distribution

Occurs in the South Pacific, breeding only in Paparoa Mountains of New Zealand. Forages in breeding season offshore South Island (New Zealand). Disperses eastwards in non-breeding season to the coast of Chile and the southeast Pacific, foraging mostly in shallow waters of continental shelf.

Behaviour

Readily attracted to fish bait, fish scraps and to fishing vessels, but mostly flying past and rarely alighting on water to feed.

Size

Medium to large petrel, with total body length of50-55cm and wingspan of 135-140cm. Similar in size to Spectacled Petrel Procellaria conspicillata and significantly larger than Parkinson's Petrel Procellaria parkinsoni.

Plumage

Uniform dark brown, with bill uniform pale yellowish-white for most of length except for contrasting dark tip. Feet blackish. Adult and immature essentially identical, but bill of immature somewhat smaller and paler.

Separation from similar species

(1)**Spectacled Petrel:** Spectacled Petrel occurs in the South Atlantic and the southwest Indian Ocean, and does not overlap with Westland Petrel in natural range. Additionally, Spectacled Petrel has extensive white patches on head sides, and head is obviously different from entirely dark head of Westland Petrel.

(2)**White-chinned Petrel:** Similar in plumage to Westland Petrel and overlaps in range in South Pacific. White-chinned Petrel can be distinguished from Westland by variable white chin patch and uniform pale bill lacking contrasting dark tip.

(3)**Parkinson's Petrel:** Overlaps in range with Westland Petrel during breeding season in waters offshore New Zealand. Although similar in plumage to Westland, Parkinson's Petrel has a shorter wingspan, and, at close range, bill can be seen to be much shorter and thinner than Westland but with a much longer nasal tube.

Observations

Recorded only once by Taiwanese observers as incidental catch in southern Indian Ocean. Presumably prefers foraging in shallower waters of continental shelf and rarely for scraps behind fishing vessels, hence the paucity of records. On distribution, would seem likely to be recorded from albacore targeting vessels operating in the South Pacific. However, care would be needed to distinguish this species from the more widely distributed White-chinned Petrel.

Westland Petrel: Similar to White-chinned Petrel in size and colour, but without white chin patch. Also has dark-tipped bill, with rest of bill uniform pale yellowish-white, unlike White-chinned Petrel. Almost identical in plumage to Parkinson's Petrel, but can be distinguished by larger size and longer wingspan and longer, thicker bill. (Photo: Huan-Chang Liao)

Grey Petrel
(Procellaria cinerea)

Distribution

Occurs in the southern oceans, where widely distributed in colder waters. Breeds on islands scattered throughout the region. During breeding season, forages around breeding islands to as far north as 25 ° S. Disperses southwards in non-breeding season, to as far as ice edge.

Behaviour

Based on observations, usually forages in solitude or in small groups. Vulnerable to fishing activities and readily attracted to fishing vessels where feeds on fresh fish bait and other fish scraps, often by diving under surface.

Size

Medium-sized petrel, with total body length of50cm and wingspan of 115-130cm. Body length and wingspan significantly smaller than the more commonly encountered White-chinned Petrel.

Plumage

Grey Petrel belongs to a group of five seabird species which do not have entirely brownish plumage. Upperparts largely greyish, with forehead, mask, nape and uppertail darker, dirtier grey. Mantle and upperwing coverts paler with scaly markings, giving mottled appearance. Bill beige with dark tip. Underparts entirely white, contrasting with dark grey underwing and under tail coverts.

Separation from similar species

Overlaps in range with similarly-plumaged and sized Great Shearwater Puffinus gravis and Cory's Shearwater Calonectris diomedea in the South Atlantic and the south-west Indian Ocean. More likely to be confused with these than with all-dark petrels and can be distinguished by the following:

(1)**Great Shearwater:** Great Shearwater has more slender and entirely dark bill. Upperparts darker brownish than Grey Petrel and neck and lower rump have distinct white bands. White underparts with variable brownish-greyish patches on belly and vent and predominantly white underwing are the most obvious differences between the two at distance.

(2)**Cory's Shearwater:** Cory's Shearwater has much browner upperparts than Grey Petrel, with obvious white rump. The most noticeable difference is the underwing, which is entirely white in Cory's with the exception of darker flight feathers. At closer range, the more slender, yellow bill of Cory's is an obvious difference.

Observations

Recorded only a couple of times, both as sighting records and as incidental catch, in the South Atlantic and Indian Oceans. Given its distribution, it should be encountered by albacore targeting vessels operating in all three southern oceans and by southern bluefin tuna and oilfish targeting vessels operating in the Indian Ocean.

Grey Petrel: Grey-brown back and contrasting white underparts are unique among its genus and make it readily distinguishable from other members (such as White-chinned Petrel (rear)) which are entirely dark brown. Can be separated from similar Great and Cory's Shearwaters by dark underwing. (Photo: Huan-Chang Liao)

Balearic Shearwater
(Puffinus mauretanicus)

Distribution

Occurs in the Mediterranean Sea, breeding only on several islands in the Spanish Balearic Islands. During non-breeding season, from November to February, majority migrates west to north-eastern Spain, between Valencia and Catalonia. Some enter the Atlantic, and regularly reach the English Channel, Channel Islands and elsewhere in south-west England. Vagrant to Senegal in West Africa and to South Africa.

Behaviour

Balearic Shearwaters often forage in large flocks and pick food from surface or by diving. Although not readily attracted to fishing vessels, may feed in vicinity of fishing operations, thus vulnerable and has been recorded as incidental catch by longline fishing vessels and purse seiners operating in the Mediterranean.

Size

Medium-sized shearwater, with total body length of34-38cm and wingspan of 89-93cm. Similar in size to Cape Petrel Daption capense.

Plumage

Juvenile similar to adult. Upperparts rather uniform tan, underparts dirty white with variable amount of brownish feathers admixed. Chest, flanks, vent and undertail coverts significantly darker than rest of underparts. Underwing similar to underbody, with mottled dirty white coverts and darker axillaries and flight feathers. Bill slender and brownish-greyish. Feet pinkish-flesh, but with brownish-edged tibia and webbing between toes.

Separation from similar species

(1)**Manx Shearwater Puffinus puffinus:** Manx Shearwater overlaps in range with Balearic Shearwater in the Atlantic waters of south-west Europe and north-west Africa. Manx is slightly smaller and has shorter wingspan, together with darker brownish-black upperparts and clean white underbody and undertail and underwing coverts.

(2)**Yelkouan Shearwater Puffinus yelkouan:** Overlaps in range with Balearic Shearwater in Mediterranean. Balearicis significantly larger and has longer wingspan than Yelkouan, which furthermore is more similar to Manx, but with a few brownish feathers admixed in the undertail coverts.

Observations

Not recorded by Taiwanese observers, either as sighting record or as incidental catch. In recent years, Taiwanese fishing vessels have not operated within the range of this species, which makes the probability of its recording minimal.

Balearic Shearwater: Small to medium-sized shearwater, confined to Western Europe, the Mediterranean and the North Atlantic. Largest of the three similar species in the region, with mostly brown feathers above and below.(Photo courtesy of Ben Lascelles)

Taiwan's National Plan of Action for Reducing Incidental Catch of Seabirds in Tuna Longline Fisheries

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Article Content

Title：	Wildlife Conservation Act CH
Amended Date：	2013-01-23
Category：	Council of Agriculture（行政院農業委員會）

CHAPTER I: GENERAL PRINCIPLES

Article 1 This act has been enacted to conserve wildlife, protect species diversity and maintain the balance of natural ecosystems. Whatever is not regulated by this act may be regulated by other compatible legislation.

Article 2 Responsible government authorities for the purpose of this act:
Central government level: the Council of Agriculture, Executive Yuan, henceforth referred to as the National Principal Authority (NPA).
Municipal level: the municipal governments.
County/city level: the county and city governments.

Article 3 Definition of terms:
1.Wildlife: in common circumstances, any animal living in a natural habitat, including mammals, birds, reptiles, amphibians, fish, insects and other kinds of animals;
2.Population size: the number of the same species of wildlife living in a particular space at a particular time;
3.Endangered Species: those wildlife species whose population size is at or below a critical level so that their survival is in jeopardy;
4.Rare and Valuable Species: endemic species or those species with a very low total population;
5.Other Conservation-Deserving Wildlife: species which do not necessarily have a very low total population, but their survival remains in jeopardy;
6.Wildlife products: animal carcasses, bones, horns, teeth, skin, hair, eggs or internal organs in whole, partial or processed form;
7.Habitat: the natural living environment necessary for the survival of plants and animals;
8.Conservation: any protection, restoration or management of wildlife based on the principles of species diversity and natural ecological balance;
9.Utilization: the use of wildlife for cultural, educational, academic or economic benefit in such a way or form scientifically determined not to be detrimental to the natural

ecological balance;
10.Disturbance: any behavior involving the use of drugs, tools or any other means so as to interfere with wildlife;
11.Abuse: the use of violence, unsuitable drugs or other methods to harm wildlife so they cannot maintain their normal physiological condition;
12.Hunting: the use of drugs, hunting equipment or other tools or methods to catch or kill wildlife;
13.Processing: the use of wildlife carcasses, bones, horns, teeth, skins, hair, eggs or organs in their whole or partial form as or to make other products;
14.Display: placement of wildlife or wildlife products in public areas for people to view.

Article 4 Wildlife shall be classified in two categories:
1.Protected Species: Endangered Species, Rare and Valuable Species and Other Conservation-Deserving Wildlife;
2.General Wildlife: all other wildlife not included in the previous category.
The Wildlife Conservation Advisory Committee is responsible for the determination of animals which belong in the first category. The NPA is responsible for compilation and announcement of the Schedule of Protected Species.

Article 5 The NPA shall establish a Wildlife Conservation Advisory Committee to assist with wildlife conservation.
Members of the advisory committee will not be paid. The regulations of establishing the committee will be determined by the NPA. Academic experts, private conservation organization members, aborigines and other non-governmental representatives should comprise not less than two-thirds of the total committee membership.

Article 6 To strengthen wildlife conservation, the NPA should establish a Wildlife Research Institute. The NPA may also invite academic institutions or private organizations to conduct wildlife surveys, studies, conservation, utilization, education or promotion, etc.

Article 7 To bring together society’s resources to help conserve wildlife, the NPA may establish a conservation donation account and accept private or artificial person donations. In addition, the NPA may issue wildlife conservation stamps.
The NPA shall determine the establishment of the donation account, the usage of the name and logo of the conservation stamps and their management and issue regulation.

CHAPTER II: CONSERVATION OF WILDLIFE

Article 8 Any construction and land use in Major Wildlife Habitats should be carried out in ways and areas which least affects the habitat, and the original ecological functions of the habitat should not be harmed. If necessary, the Authorities shall ask the owners, users or occupants of a land use project to conduct an Environmental Impact Assessment.
Any farming, forestry, fishery or animal husbandry development utilization; mine exploration, earth or rock removal or related works; repair or construction of railroads, public roads or other roads; construction; establishment of parks or cemeteries; utilization of land for recreation, sporting or forest recreation areas, waste disposal or other utilization of Major Wildlife Habitats may begin only after application to the proper local authorities and after approval by the NPA. Only then can an application for such development be made to the relevant target business authorities.
Existing facilities, land utilization or development activities have a significant impact on the wildlife in the area, the NPA may require the relevant person or target business authority to put forth a plan for improvements within a certain time limit.
The type and area of the Major Wildlife Habitats referred to above shall be determined and announced by the NPA, as shall any changes in designation.

Article 9 If land use proceeds before the Environmental Impact Assessment referred to in Article 8, Paragraph 1, the Authorities shall inform and consult immediately with other appropriate responsible government agencies to halt the project. If destruction of the wildlife habitat has taken place, the Authorities and other appropriate government agencies shall request the responsible parties to put forward a rehabilitation plan within a certain time limit and should monitor this process. If the responsible parties do not put forward a rehabilitation plan, or in case of emergency, the Authorities may require that any resultant costs of necessary rehabilitation procedures be borne by the responsible parties.

Article 10 Local authorities may establish Wildlife Refuges for Major Wildlife Habitats with special conservation needs, as well as formulate and carry out conservation plans in those areas. If necessary, they may commission other agencies or organizations to carry out the plans.
Establishment of a Wildlife Refuge, its modification or elimination shall be authorized and announced by the NPA after an on-site public hearing on the plan is held and the opinions of local residents have been heard and approval from the Wildlife Conservation Advisory Committee.
In emergency or necessary situations, the NPA may, with the

approval of the Wildlife Conservation Advisory Committee, designate or modify Wildlife Refuges.
In the conservation plan for the Wildlife Refuge, the Authorities may announce restrictive measures regarding the following:
1.Disturbance, abuse, hunting or killing of General Wildlife, etc.
2.Collection or cutting of plants, etc.
3.Pollution or destruction of the environment, etc.
4.Other prohibited or approved actions, etc.

Article 11 Upon announcement of the establishment of a Wildlife Refuge, land inside its boundaries may be purchased or expropriated by the Authorities according to the law, and subsequently managed by them.
For land not purchased or expropriated by the Authorities, the owner, user or occupant shall provide a suitable habitat for wildlife according to stipulations announced by the Authorities. Before the Authorities announce the stipulations, if the land in question is used or profited from in a way that is found to harm wildlife conservation, they may order the modification or elimination of such behavior. Important national construction works are exempt from the stipulations if they are based on the principle of not affecting the survival of wildlife and have received the approval of the Wildlife Conservation Advisory Committee and the NPA.
The Authorities shall compensate the owner or user of the land for any losses resulting from the above paragraph.

Article 12 To carry out wildlife resource inventories or conservation planning, the Authorities or commissioned organizations may send people with proper identification into public and private areas for investigation and application of conservation measures. The owners, users or managers of the public or private land shall not avoid, refuse of hinder, except when involving possible military secrets, then the investigation shall be carried out with the accompaniment of military authorities.
If the investigation runs into any obstructions, or before the application of conservation measures, the Authorities shall first inform the public or private owner, user or manager of the land. If there is no way of passing on the information, the Authorities may use a public announcement.
After the investigation, conservation authorities or personnel shall keep secret any industrial or military secrets they may have come across in the course of the investigation.
To carry out the investigation or conservation measures detailed in Paragraph 1, the owners or users of the public or private land shall be compensated for any losses. The amount of

compensation shall be decided by negotiation and if negotiations fail, higher-level Authorities shall set the amount.
The above-mentioned regulation for carrying out investigations or conservation measures shall be determined by the NPA.

Article 13 In areas which have received utilization approval per Article 8, Paragraph 2, but still experience damage to wildlife habitats, the Authorities shall order the developer to put forth a plan for rehabilitation within a certain time limit and monitor this process.
If the damage occurs in areas where utilization approval was not granted, in addition to measures in the above paragraph, the Authorities may use emergency methods, which are to be paid for by the party responsible for the damage.

Article 14 Lost or wild animals which are not endemic to Taiwan may be dealt with by the Authorities if found to be damaging Taiwan’s plant or animal habitats.
The NPA shall determine which animals are not endemic to Taiwan.

Article 15 Protected Wildlife which has no owner or is vagrant, or Protected Wildlife products which are ownerless shall be dealt with by the Authorities. The Authorities may commission a related agency or organization to take in, temporarily care for, administer first-aid to, protect or destroy the animals or products.

Article 16 Protected Wildlife shall not be disturbed, abused, hunted, killed, traded, exhibited, displayed, owned, imported, exported, raised or bred, unless under special circumstances recognized in this or related legislation.
Protected Wildlife products shall not be traded, exhibited, displayed, owned, imported, exported or processed, unless under special circumstances recognized in this or related legislation.

Article 17 With the exception of academic research or educational purposes, hunting of General Wildlife, including mammals, birds, reptiles and amphibians, shall be conducted in areas designated by the local authorities and only after obtaining the proper permit issued by local authorities or contracted organizations or groups.
The local authorities shall design a system for the designation, modification, elimination and control measures of above-mentioned hunting areas and species and shall submit this plan to the NPA for final approval, after which it shall be announced publicly.
The application fee, process and other related matters for the permit mentioned in Paragraph 1 shall be set by the NPA.

Article 18 Protected Wildlife should be conserved and shall not be disturbed, abused, hunted, killed or otherwise utilized, except in the following cases:
1.When population size exceeds the carrying capacity of the area; or
2.for academic research or educational purposes and with proper approval from the NPA.
The first condition for utilization listed above shall be approved by the local authorities and the species, location and range, as well as utilization number, season and method shall be announced by the NPA.
The application process, fee and other related matters for the second condition shall be set by the NPA.

Article 19 Hunting shall not be undertaken by the following methods:
1.Use of dynamite or explosives;
2.Use of poisons;
3.Use of electricity, narcotics or other paralysis methods;
4.Use of nets set up on land;
5.Use of firearms other than an authorized hunting rifle;
6.Use of traps, snares or other hunting equipment;
7.Use of other prohibited items or methods announced by the Authorities.
The Authorities may tear down or destroy any unapproved nets, snares, traps or other hunting devices. The owners, users or managers of the land on which such devices are located shall not avoid, refuse or hinder such actions.

Article 20 Those parties who wish to hunt General Wildlife or fish within the areas defined in Article 17 shall register with the commissioned management organization or group when entering the area and shall always carry their permit. Upon exiting, the hunters shall report the species and number hunted and pay a corresponding fee.
The fees shall be set by the NPA.

Article 21 Wildlife may be hunted or killed under one of the following circumstances, regardless of Article 17, Paragraph 1; Article 18, Paragraph 1; and Article 19, Paragraph 1; however, any such action taken against Protected Wildlife shall be first reported to the Authorities for handling, except in the case of emergency:
1.Danger to public safety or human life;
2.Damage to crops, poultry, livestock or aquaculture;
3.Being a disease vector of zoonoses or other pathogens;
4.Danger to the safety of air transportation;
5.(Abolished)
6.Other reasons approved by the Authorities.
When Protected Wildlife causes damage to crops, poultry,

livestock or aquaculture, and prior reporting to the Authorities for handling has not been made in case of emergency, Protected Wildlife may be hunted or killed using humane methods approved by the Authorities to prevent above-mentioned damage.

Article 21-1 Wildlife may be hunted or killed for traditional cultural or ritual hunting, killing or utilization needs of Taiwan aborigines, regardless of Article 17, Paragraph 1; Article 18, Paragraph 1; and Article 19, Paragraph 1.
Hunting, killing or utilizing wildlife in the condition listed above shall be approved by authorities. The application process, hunting method, hunted species, bag limit, hunting season, location, and other regulations shall be announced by the NPA and the national aborigine authority.

Article 22 A Conservation Police Force shall be established to help conserve wildlife.
Authorities or commissioned organizations or groups may use wildlife conservation or investigation personnel to conduct investigations, crackdowns or other conservation work in Wildlife Refuges. If necessary, local police may be called in to cooperate with the conservation work.
Authorities may give awards to law enforcement official, the common people or organizations that actively participate or assist authorities to crack down outlaw activities or report an offence to the authorities. The awards-related regulation shall be announced by the authorities.

Article 23 The Authorities may assist or encourage any non-government organization or individual to join or attend international wildlife conservation meetings or other related activities.

CHAPTER III: IMPORT AND EXPORT OF WILDLIFE

Article 24 No import or export of live wildlife or Protected Wildlife products is allowed without prior approval from the NPA.
The import or export of live specimens of Protected Wildlife is limited to academic research institutes, colleges or universities, public or licensed private zoos for education or academic research.
No import or export of live marine mammalian wildlife or products thereof is allowed without prior approval from the NPA.
The import or export of live marine mammalian wildlife or products thereof is limited to those hunted by indigenous people for their subsistence within their traditional territories from the country of origin.
To import live marine mammalian wildlife or products thereof, a relevant certificate must be submitted.
The management and penal provisions of this Act shall apply to

the import, export, trade, display or exhibit of live General marine mammalian wildlife or products thereof that unauthorized by the NPA. The subject live specimens or products may be confiscated.

Article 25 Academic research institutes, colleges and universities, public or licensed private zoos, museums or other wildlife exhibits shall receive the approval of the NPA for import or export of Protected Wildlife or their products.

Article 26 The NPA may for cultural, hygiene, ecological protection or policy reasons ask trade authorities to announce a list of wildlife or wildlife products which are forbidden from import or export under the Foreign Trade Act.

Article 27 In the case of exotic wildlife which is not endemic to Taiwan imported for the first time, the applicant shall provide the NPA with all relevant information concerning that species and an Impact Assessment Report to address that animal’s effect upon native fauna and flora. Such wildlife may be imported only after the approval of the NPA.
The municipal city or county (city) authorities of the areas where the above-mentioned wildlife is located shall investigate and monitor these imported wildlife regularly. If it is found that their importation has had an impact on the habitat of native fauna or flora, the authorities shall order the owners or users to put forth a plan for prevention or rehabilitation within a certain time limit and shall monitor this process. In addition, the situation shall be referred to the NPA for handling.

Article 28 Any academic research institute which cooperates with a foreign research institute and uses Protected Wildlife or their products for research, exchange, donation or display shall issue a report to the NPA within one year of import or export of the wildlife or product.

Article 29 The import or export of wildlife or wildlife products shall be inspected by customs and the products must match their customs declaration and shall be inspected and quarantined according to inspection and quarantine regulations by inspection or quarantine authorities or their commissioned organizations.

Article 30 Wildlife epidemic disease prevention and follow-up examinations shall be conducted by plant and animal epidemic disease authorities and according to relevant legislation.

CHAPTER IV. MANAGEMENT OF WILDLIFE

Article 31

Before the NPA announcement, all persons engaged in raising or breeding Protected Wildlife or exotic wildlife dangerous to the environment, people or animals, or those possessing Protected Wildlife products as determined by the NPA's Schedule of Protected Wildlife shall fill out a data card and keep records with their municipal or county (city) authorities and within a certain time limit update these records after any change in status.
After the NPA announcement, those who have legally imported, received through transfer or other legal means any of the above wildlife or wildlife products, shall take their documents to municipal or county (city) authorities to register within a certain time limit. Any changes in status shall also be registered in a similar manner.
Those who have registered according to the above two paragraphs may be allowed to continue to raise or hold their wildlife or wildlife products, but no breeding shall be allowed except for academic research or educational purposes and with the approval of the Authorities.
Those who are engaged in raising or breeding any of the wildlife listed in Paragraph 1 before promulgation of these amendments shall be assisted by the Authorities to cease raising or breeding the animals and change occupations within three years of the date of promulgation. If necessary, the animals may be purchased by the Authorities.
The purchase of wildlife shall be done in an appropriate and safe manner and any wildlife may be sent to domestic or foreign educational or academic institutes and zoos, or taken in and cared for by an organization considered appropriate by the Authorities and commissioned by them.
If necessary, the Authorities, or a commissioned organization or group, may mark the wildlife or wildlife products listed in Paragraph 1 and Paragraph 2. In addition, they may conduct regular or random investigations. The owner or keeper shall not avoid, refuse or hinder such investigations.
The NPA is responsible for announcing the wildlife or wildlife products which shall be marked.

Article 32 Wildlife raisers who do not have the permission of the Authorities shall not set their animals free.
The NPA shall announce a list of species which are regulated by the above paragraph.

Article 33 The Authorities may send a representative to investigate raised or bred Protected Wildlife or dangerous wildlife. The owner or keeper of the wildlife shall not avoid, refuse or hinder the investigation.

Article 34 Raising or breeding of Protected Wildlife or dangerous wildlife shall be cared for with appropriate husbandry, with attention given to safety and sanitation and the proper area and facilities. The NPA shall determine regulations for the captive care area, facility and care standards.

Article 35 Protected Wildlife and its products shall not be traded or displayed or exhibited in public areas without the permission of

the Authorities.
The NPA shall release a list of the types of Protected Wildlife and products regulated by the above paragraph.

Article 36 The for-profit raising, breeding, trading, processing, import or export of wildlife shall be approved by municipal or county (city) authorities and shall obtain a business license according to the law.
The NPA shall set regulations regarding the conditions, application process, permit contents and other measures governing the for-profit raising, breeding, trading or processing of wildlife.

Article 37 Endangered Species and Rare and Valuable Species shall be well managed during raising or breeding and shall not escape. If an escape occurs, the owner or keeper shall either themselves or with the assistance of local authorities recover the animal.

Article 38 Whenever an Endangered or Rare and Valuable Species dies of illness or for an unknown reason, the owner or keeper shall have a veterinarian prepare an autopsy report determining the cause of death and within 30 days after death send the autopsy report to municipal or county (city) authorities for reference. If the reason for death was not a contagious disease, then any academic research institute, public or licensed private zoo, museum, wildlife owner or keeper that wishes to use the carcass to make a specimen, after approval by the Authorities, may get a veterinarian to sign a death certificate in place of an autopsy report.

Article 39 If the carcass of a Protected Wildlife species is valuable for academic research or exhibition, then academic or scientific research institutions, public or licensed private zoos or museums may purchase it in priority from the owner or keeper.

CHAPTER V: PENAL PROVISIONS

Article 40 The following offenses shall be punished with imprisonment for not less than six months and not more than five years, and/or a fine of not less than NT$300,000 and not more than NT$1,500,000:
1.Violation of Article 24, Paragraph 1, unapproved import or export of live Protected Wildlife Species or products.
2.Violation of Article 35, Paragraph 1, trading, display or exhibiting with the intent to sell Protected Wildlife and its products.

Article 41 The following offenses shall be punished with imprisonment for not less than six months and not more than five years, and/or a fine of not less than NT$200,000 and not more than NT$1,000,000:
1.Violation of Article 18, Paragraph 1, Subparagraph 1, hunting

or killing of a Protected Wildlife species;
2.Violation of Article 18, Paragraph 1, Subparagraph 2, hunting or killing of a Protected Wildlife species without the approval of the NPA;
3.Violation of Article 19, Paragraph 1, use of prohibited methods to hunt or kill Protected Wildlife;
If any of the above offenses are committed in designated Wildlife Refuges, the offender shall be subjected to the penalty prescribed for such offense up to 1/3.
Any unsuccessful attempt to commit an offense specified in the above Subparagraph 1 is punishable.

Article 42 The following offenses shall be punished with imprisonment for not more than one year; detention; and/or a fine of not less than NT$60,000 and not more than NT$300,000; if the conducts cause the death of protected species, the offender shall be punished with imprisonment for not more than two years, detention, and/or a fine of not less than NT$100,000 and not more than NT$500,000:
1.Disturbance or abuse of Protected Wildlife as prohibited by Article 18, Paragraph 1, Subparagraph 1;
2.Violation of Article 18, Paragraph 1, Subparagraph 2, by disturbance or abuse of the Protected Wildlife without proper approval by the NPA.
If any of the above offenses are committed in a designated Wildlife Refuge, the offender shall be subjected to the penalty prescribed for such offense up to 1/3.

Article 43 In violation of Article 8, Paragraph 2, anyone who conducts unauthorized development projects shall be subjected to a fine of not less than NT$300,000 and not more than NT$1,500,000.
In violation of Article 8, Paragraph 3, Article 9 or Article 13, anyone who fails to submit a rehabilitation plan within a set time limit, or fails to carry out the rehabilitation plan shall be subjected to a fine of not less than NT$400,000 and not more than NT$2,000,000.
If the above offenses have caused habitat destruction and the habitat has become inhabitable for wildlife, the offender shall be punished with imprisonment for not less than six months and not more than five years and/or a fine of not less than NT$300,000 and not more than NT$1,500,000.

Article 44 In discharging his duty, if the representative of an artificial person, artificial person, the agent of natural person, employee or other staff violation any one of Articles 40, 41, 42, or Article 43, Paragraph 3, both the violators and their artificial person or natural person shall be subjected to the fine set out in relevant Articles.

Article 45 In violation of Article 7, Paragraph 2, anyone who uses the title of wildlife conservation stamps, uses its logo, or issues wildlife conservation stamps, the offender shall be subjected to a fine of not less than NT$500,000 and not more than NT$2,500,000. The unauthorized issue, sale or distribution of wildlife conservation stamps shall be prohibited. Illegal stamps which have been issued, sold or distributed shall be confiscated.

Article 46 In violation of Article 32, Paragraph 1, the violator shall be subjected to a fine of not less than NT$50,000 and not more than NT$250,000. If the violation resulted in damage to the ecosystem, violators shall be subjected to a fine of not less than NT$500,000 and not more than NT$2,500,000.

Article 47 In violation of Article 27, Paragraph 2, the owner or keeper of wildlife who fails to submit a prevention or rehabilitation plan or who fails to carry out the plans, the offender shall be subjected to a fine of not less than NT$300,000 and not more than NT$1,500,00.
In violation of Article 26, the offender shall be subjected to a fine of not less than NT$200,000 and not more than NT$1,000,000.

Article 48 A person who falsely labels merchandise as containing Protected Wildlife or its products shall be subjected to a fine of not less than NT$150,000 and not more than NT$750,000.

Article 49 Anyone who violates one of the following Articles shall be subjected to a fine of not less than NT$60,000 and not more than NT$300,000:
1.Violation of regulations detailed in Article 17, Paragraph 1 or Paragraph 2;
2.Violation of Article 19, Paragraph 1 by the use of prohibited items or methods in hunting General Wildlife;
3.Violation of Article 19, Paragraph 2, or Article 33 by avoiding, refusing or hindering searches, seizures or destruction;
4.Violation of Article 27, Paragraph 1;
5.Violation of Article 34 by failing to meet proper care area, facility and care standards;
6.Violation of Article 18, Paragraph 2 or Article 36 by not applying for the proper permits or approval.
In the case of the violation of one of Article 17, Paragraph 1 or Paragraph 2, or Article 19, Paragraph 1, the proper municipal or county (city) authorities may suspend the permits of concerned parties.

Article 50 Anyone who violates one of the following Articles shall be subjected to a fine of not less than NT$50,000 and not more than

NT$250,000:
1.Violation of Article 10, Paragraph 4, Subparagraph 1 by hunting or killing General Wildlife;
2.Violation of Article 10, Paragraph 4, Subparagraph 2, 3, or 4 Authorities' announced restricted items;
3.Violation of Article 11, Paragraph 2 by not adhering to Authorities' calls to modify or eliminate certain behavior.
In violation of Article 10, Paragraph 4, Subparagraph 1, disturbing or abusing General Wildlife, the offender shall be subjected to a fine of not less than NT$20,000 and not more than NT$100,000.

Article 51 Anyone who violates one of the following Articles shall be subjected to a fine of not less than NT$10,000 and not more than NT$50,000:
1.Violation of Article 12, Paragraph 1 by avoiding, refusing or hindering a wildlife resource investigation or the application of conservation plan measures;
2.Violation of Article 20, Paragraph 1;
3.Violation of Article 24, Paragraph 1 by import or export of General Wildlife without the approval of the NPA;
4.(Abolished)
5.Violation of Article 28;
6.Violation of Article 31, Paragraphs 1, 2, 3 or 6;
7.Violation of Article 35, Paragraph 1 by display or exhibition in a public area of Protected Wildlife, Endangered or Rare and Valuable Species products with no intent to sell but lacking the proper permission;
8.Violation of Article 37;
9.Violation of Article 38;
10.Any owner or keeper who refuses to sell their wildlife carcass according to Article 39.

Article 51-1 Taiwan aborigines, in violation of Article 21-1, Paragraph 2 without obtaining approval from the authorities, hunting, killing or utilizing of General Wildlife for traditional cultural or ritual hunting, killing or utilization needs, or not for trading purposes shall be subjected to a fine of not less than NT$1,000 and not more than NT$10,000. However, a pardon shall be given to the first offender.

Article 52 In the case of the violation of one of Article 40, Article 41, Article 42 or Article 43, Paragraph 3, the subject Protected Wildlife may be confiscated; the subject wildlife products, hunting equipment, drugs or other devices shall be confiscated.
Beside the punitive actions specified in Article 52, Paragraph 1, in the case of the violation of this act, the subject Protected Wildlife or products, hunting equipment, drugs or other devices may be confiscated.

If necessary, Authorities may publicly release, repatriate, keep or destroy the above-mentioned confiscated wildlife/items. The Authorities may request the violator to pay all the expenses incurred therefrom.
For lawfully confiscated or otherwise acted upon Protected Wildlife or products, customs or other law enforcement agencies may ask Authorities to take necessary measure according to the above paragraph.

Article 53 The administrative fines or confiscation described by this act shall be handled by authorities at all levels.

Article 54 If the administrative fines authorized herein are not paid in a timely manner after official notice, the Authorities shall initiate court proceedings.

CHAPTER VI: SUPPLEMENTARY PROVISIONS

Article 55 Captive-raised or bred wildlife governed by this act shall be determined and announced by the NPA.

Article 56 Enforcement rules shall be set by the NPA.

Article 57 This act takes effect upon promulgation.
The amendment of May 30, 2006 takes effect on July 1, 2006.
