

**REVIEW OF MEASURES TAKEN BY INTERGOVERNMENTAL  
ORGANIZATIONS TO ADDRESS SEA TURTLE AND SEABIRD  
INTERACTIONS IN MARINE CAPTURE FISHERIES**



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## **REVIEW OF MEASURES TAKEN BY INTERGOVERNMENTAL ORGANIZATIONS TO ADDRESS SEA TURTLE AND SEABIRD INTERACTIONS IN MARINE CAPTURE FISHERIES**

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## PREPARATION OF THIS DOCUMENT

Information was collected for this review in April-June 2007. Drafts of the report were distributed to all organizations included in this review, as well as other experts world-wide, for comments and corrections. We are very grateful for the extremely helpful contributions provided by these reviewers of multiple versions of drafts of the report. We continue to encourage comments on inadvertent omissions, updates and corrections. Please send information to lead author Eric Gilman of IUCN (The World Conservation Union) (Eric.Gilman@iucn.org), Thomas Moth-Poulsen (Thomas.Mothpoulsen@fao.org) of the Fishing Technology Service (FIIT) of the Food and Agriculture Organization of the United Nations (FAO) or Gabriella Bianchi (Gabriella.Bianchi@fao.org) of the Fisheries Management and Conservation Service (FIMF) of FAO.

This paper was prepared to help FAO determine the state of implementation of the FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operations and the FAO International Plan of Action for Reducing Incidental Capture of Seabirds in Longline Fisheries. Furthermore, this paper was prepared to assist FIIT to plan for an expert consultation on the incidental capture of seabirds in marine capture fisheries.

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### ABSTRACT

This document reviews actions taken by intergovernmental organizations (IGOs), including regional fisheries management organizations (RFMOs) and other relevant regional fishery bodies (RFBs), to address problematic sea turtle and seabird interactions in marine capture fisheries. Sea turtles and seabirds are subject to a number of natural and anthropogenic mortality sources, including fishing operations. As a result, all sea turtle species of known status are recognized as being endangered. All sea turtle species excluding the flatback are listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which regulates international trade. Of the 61 species of seabirds affected by longline fisheries, 26 are threatened with extinction, including 19 species of albatrosses. The Convention on Migratory Species, which has a broader remit than CITES in terms of its requirements for both domestic and multilateral conservation measures, lists all sea turtles, albatrosses, giant petrels and *Procellaria* petrels in its Appendices. Due to concern over the status of sea turtles and certain species of seabirds and the possible negative effects of fishing on these populations, several IGOs have taken measures to address these problems. Some of these organizations have begun examining seabird or sea turtle interactions, several have adopted voluntary measures to address problematic interactions, while five RFMOs have legally binding measures requiring the employment of seabird avoidance methods in pelagic and demersal longline and trawl fisheries. There currently are no legally binding measures in place by an IGO to manage turtle-fishery interactions or seabird interactions in coastal gillnet fisheries. Several IGOs, which lack fisheries management authority, serve as advisory mechanisms and conduct cooperative research, or have a primary responsibility of regional sea turtle or seabird conservation.

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## 1. INTRODUCTION

There are seven species of sea turtles worldwide, distributed mainly in tropical and subtropical areas. Sea turtles are impacted by a number of natural and anthropogenic factors, including fishing operations and, as a result, all sea turtle species of known status are endangered or critically endangered: The World Conservation Union (IUCN) lists six of the seven recognized marine turtle species as endangered, three of those critically endangered (leatherbacks [*Dermochelys coriacea*], Kemp's ridleys [*Lepidochelys kempii*] and hawksbills [*Eretmochelys imbricata*]), and another three as endangered (greens [*Chelonia mydas*], loggerheads [*Caretta caretta*] and olive ridleys [*Lepidochelys olivacea*]), while there is insufficient information to determine the conservation status of the seventh. FAO convened a Technical Consultation on Sea Turtles Conservation and Fisheries and produced "Guidelines to Reduce Sea Turtle Mortality in Fishing Operations" (FAO, 2005). In 2005 the twenty-sixth session of the FAO Committee on Fisheries (COFI) endorsed the Guidelines and called for their immediate implementation by members and regional fishery bodies (RFBs). FAO is now in the process of developing "Technical Guidelines for Responsible Fisheries: Reducing Sea Turtle Interactions and Mortality in Marine Capture Fisheries."

A worldwide review of the incidental catch of seabirds by longline fisheries published by FAO in 1999 showed that albatrosses (Family Diomedidae), giant petrels (*Marconectes* spp.) and petrels (*Procellaria* spp.) are severely affected by mortality caused by pelagic and demersal longline fishing (Brothers, Cooper, Lokkeborg, 1999). Mainly as a consequence of this mortality, all species belonging to these seabird taxa have now been listed in the Appendices of the Convention on the Conservation of Migratory Species of Wild Animals (CMS). At its twenty-third session in 1999, COFI unanimously adopted an "International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries" (FAO, 1999). Gillnet and trawl fisheries are also known to have problematic interactions with seabirds (Bartle, 1991; Strann, Vader, Barrett, 1991; Melvin, Parrish, Conquest, 1999; Darby and Dawson, 2000; CCAMLR, 2003; Sullivan, Read, Bugoni, 2006; Baker *et al.*, 2007; Bull, 2007; Davoren, in press).

This document reviews actions by intergovernmental organizations (IGOs), including regional fisheries management organizations (RFMOs, regional fishery bodies that have the competence to establish fisheries conservation and management measures) and other relevant RFBs, to address sea turtle and seabird interactions in marine capture fisheries. Because of the concern of the status of sea turtles and certain species of seabirds and the possible negative effects of fishing on these populations, several RFBs have taken measures to address these problems. These RFBs include the five RFMOs that manage fisheries targeting tuna and tuna-like species with problematic seabird and sea turtle interactions and two RFBs that manage demersal longline and trawl fisheries in higher latitudes where interactions with seabirds is problematic.

The relative commercial viability (economic viability and practicality) of alternative seabird and sea turtle avoidance methods may affect their efficacy. Experience has demonstrated that it is critical to account for the commercial viability of alternative bycatch avoidance methods to achieve requisite changes in fisher behaviour to abate bycatch, in particular, in fisheries with limited resources for enforcement (FAO, 2005; Gilman, Brothers, Kobayashi, 2005). Prescribed bycatch avoidance measures, such as fishing gear that is impractical for crew to alter once incorporated (i.e. hook lines with integrated weight) or avoidance measures that result in operational benefits (i.e. in some studies, required use of circle hooks and fish bait to avoid turtles increased catch rates of some target species) are likely to be most effective at reducing sea turtle and seabird catch rates. Conversely, measures that are inconvenient to employ or result in substantial adverse effects on economic viability may not be implemented as prescribed or at all.

## 2. INTERGOVERNMENTAL ORGANIZATIONS' MEASURES TO ADDRESS SEA TURTLE INTERACTIONS IN MARINE CAPTURE FISHERIES

Sea turtle interactions are known to occur in pelagic longline, gillnet, set-net, pot, trap, trawl, sea scallop dredge, pound net, purse seine and demersal longline fisheries operating in the range of sea turtles, primarily in the tropics and subtropics (Robins, 1995; Cheng and Chen, 1997; FAO, 2004; Eckert and Eckert, 2005; Molony, 2005; Koch *et al.*, 2006; Gilman *et al.*, 2006, 2007). FAO (2004) identified RFBs and other IGOs with the responsibility or interest in addressing sea turtle interactions in marine capture fisheries. FAO (2007) summarized progress made by IGOs towards implementing the FAO Guidelines (FAO, 2005). Table 1 provides an updated review of measures taken by RFBs and other IGOs to address sea turtle interactions in marine capture fisheries, and where information is available, presents the effectiveness and problems with specific initiatives. Table 1 includes only those IGOs that are known to have taken steps to address sea turtle interactions in marine capture fisheries. Appendix I lists all RFBs, categorized by type of body, provides a list of other IGOs responsible for regional sea turtle or seabird conservation, and identifies the subset of these organizations that have a mandate to address sea turtle or seabird bycatch in marine capture fisheries.

There are currently no legally-binding measures in place by any IGO that require fishing vessels to implement sea turtle avoidance methods. The major RFMOs with management responsibilities for fisheries that interact with sea turtles include the General Fisheries Commission for the Mediterranean (GFCM), the Indian Ocean Tuna Commission (IOTC), the Inter-American Tropical Tuna Commission (IATTC), the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Western and Central Pacific Fisheries Commission (WCPFC). Another RFMO, which manages tuna and tuna-like species, the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), has a Convention Area in higher latitudes outside the main range of sea turtles. Some of these bodies have begun examining sea turtle bycatch, or have adopted voluntary measures to address bycatch as part of their overall fisheries management schemes. The Northwest Atlantic Fisheries Organization (NAFO) and the South East Atlantic Fisheries Organization (SEAFO) are two additional RFBs whose mandates do not include fisheries for tunas and billfish. Other RFBs serve as advisory mechanisms to conduct cooperative scientific research and provide advice to members. Of these types of organizations, the Organización Latinoamericana de Desarrollo Pesquero (OLDEPESCA, the Latin American Organization for Fisheries Development) and the Organización del Sector Pesquero y Acuícola del Istmo Centroamericano (OSPESCA, Central American Organization of the Fisheries and Aquaculture Sector) have executed Memoranda of Understanding (MoUs) with the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC) to facilitate cooperation on sea turtle conservation and management initiatives.

There are three multilateral agreements with the primary responsibility of regional sea turtle conservation. They are the IAC, and two MoUs under the Convention on Migratory Species: the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA MoU) and the Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa (West Africa MOU). These three instruments address a range of sea turtle conservation and protection issues, and incorporate provisions to address interactions with fisheries. Though these agreements do not have fisheries management authority, they do carry obligations for member States to take bycatch-related actions for areas under their jurisdiction.

Illegal, unreported and unregulated (IUU) fishing may pose a threat to sea turtles, as IUU vessels are unlikely to employ measures to reduce sea turtle interactions and mortality. While it is beyond the scope of this report to review IGO measures to address IUU fishing, several RFBs have taken steps to effectively reduce IUU fishing, including instituting requirements for Vessel Monitoring Systems (VMS), managing lists of authorized (positive) and illegal (negative) vessels, port and at-sea inspection schemes, and catch documentation systems.

TABLE 1

**Actions by regional fishery bodies and other intergovernmental organizations to address sea turtle interactions in marine capture fisheries. Organizations are listed alphabetically in the following three categories: regional fisheries management organizations, regional fishery advisory bodies and other organizations with a responsibility of regional sea turtle conservation.**

INTERGOVERNMENTAL ORGANIZATIONS Initiatives to Address Sea Turtle Interactions in Marine Capture Fisheries	Evaluation
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**Regional Fisheries Management Organizations**

**GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN (GFCM)**

The GFCM region includes the Mediterranean and the Black Sea and connecting waters. GFCM's objectives include (i) promoting the development, conservation and management of living marine resources; (ii) formulating and recommending conservation measures; and (iii) encouraging training and cooperative projects. The GFCM Sub-Committee on Marine Environment and Ecosystems has not yet developed recommendations for sea turtle bycatch issues, and GFCM has not adopted measures to address sea turtle interactions in marine capture fisheries (FAO, 2007). However, at their most recent session in September 2006, the sub-committee discussed the issue of turtle bycatch and possible initiatives at the sub-regional level (GFCM, 2006a). Subsequently, the GFCM Scientific Advisory Committee, at its latest meeting in October 2006, endorsed extending current data collection on cetacean-fishery interactions to also include sea turtles (GFCM, 2006b). GFCM has taken incipient steps to assess sea turtle-fishery interactions and is conducting research and development to identify a suitable Turtle Excluder Device (TED) design for Mediterranean trawl shrimp fisheries.

**INDIAN OCEAN TUNA COMMISSION (IOTC)**

IOTC manages tuna and billfish stocks in the Indian Ocean. In 2005, IOTC adopted the non-legally-binding Recommendation 05/08 on Sea Turtles (IOTC, 2005), which recommends: (i) implementation of the FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operations (FAO, 2005) for vessels operating in the IOTC Convention Area to mitigate the impact of fishing operations targeting tunas and tuna-like species on sea turtles; and (ii) adoption of handling and release best practices, including specific turtle avoidance measures for purse seine and longline gear per the FAO guidelines. The Recommendation further encourages (iii) Contracting Parties and Cooperating non-Contracting Parties to voluntarily collect and provide the IOTC Scientific Committee with information on sea turtle interactions and other impacts on sea turtles in the IOTC Area such as threats to nesting sites and from marine debris. IOSEA MoU Resolution 3.1 formalizes collaboration with IOTC on marine turtle bycatch issues.

There is no requirement for onboard observer coverage in Member longline fisheries, and few Members supply observer data to the Commission.

**INTER-AMERICAN TROPICAL TUNA COMMISSION (IATTC)**

IATTC manages tuna and tuna-like stocks in the Eastern Pacific. In 2004, IATTC adopted Resolution C-04-07, Resolution on a Three-Year Program to Mitigate the Impact of Tuna Fishing on Sea Turtles (IATTC, 2004). The three-year programme calls for: (i) the collection and analysis of information on sea turtle fishery interactions in the eastern Pacific Ocean; (ii) review of the efficacy and effects on target species catch rates of sea turtle avoidance methods; (iii) education of industry; and (iv) establishment of a voluntary fund to augment the capacity of coastal developing countries to improve their conservation of sea turtles. Extension of the three year sea turtle programme will be considered at the June, 2007 meeting of the IATTC.

Programme activities have been implemented in collaboration with numerous partner organizations. Programme activities have included: (i) the exchange of circle hooks for J hooks, tuna hooks and narrower circle hooks; (ii) distribution of dehookers; (iii) placement of onboard observers to monitor hook trials; and (iv) training in data collection and database management for participants in the hook trials (IATTC, 2006b). The programme has been active in Ecuador, Peru, Colombia, Panama, Costa Rica and El Salvador. Reports on implementation of the three-year turtle programme were submitted by Members at the fifth meeting of the Bycatch Working Group in 2006. A report of the turtle programme was prepared for this meeting, which includes information from cooperative programs with coastal countries (IATTC, 2006b).

Trials of circle hooks have also been reported by Chinese Taipei, Japan, Korea, Spain and United States of America.

Resolution C-04-05 (Rev2), Consolidated Resolution on Bycatch, also identifies voluntary measures to address bycatches of sea turtles (IATTC, 2006a).

Preliminary results of the IATTC circle hook studies indicate that the use of wider circle hooks reduces sea turtle interactions in coastal longline fisheries (IATTC, 2006b). In the Ecuador longline tuna fishery, 10° offset 18/0 circle hooks significantly reduced turtle CPUE compared to J and tuna hooks, with a small 9.5 percent and non-significant reduction in tuna CPUE (Largacha *et al.*, 2005).

Of the IATTC Members, the United States of America requires turtle avoidance measures in the Hawaii-based longline swordfish

fishery, which operates within the IATTC Convention Area. Since the 2004 introduction of wider circle hooks and fish bait in place of narrower J hooks and squid bait in the Hawaii longline swordfish fishery, large and significant reductions in sea turtle capture rates and improved manner of turtle capture, without compromising target species catch rates, have been observed (Gilman *et al.*, 2007).

#### **INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS (ICCAT)**

ICCAT manages tuna and billfish fisheries in the Atlantic and Mediterranean. In 2003, ICCAT adopted Resolution 03-11, Resolution by ICCAT on Sea Turtles (ICCAT, 2003). The Resolution encourages the: (i) collection and voluntary provision of data on sea turtle interactions in ICCAT fisheries and other threats to sea turtles in the Convention Area, including threats to nesting sites and from marine debris; (ii) the live release of incidentally caught sea turtles; and (iii) the sharing of information on technical measures to reduce turtle incidental catch levels and handling and release practices. The Resolution also calls for (iv) the development of data collection and reporting methods for the incidental bycatch of sea turtles in fisheries for tuna and tuna-like species. In 2005, ICCAT adopted Resolution 05-08, Resolution by ICCAT on Circle Hooks, which encourages researching circle hooks in pelagic longline fisheries, and recreational and artisanal fisheries (ICCAT, 2005). The Resolution also encourages information exchange on ideas to improve the handling and release of incidentally caught sea turtles to improve post release survival prospects. The ICCAT Sub-Committee on Ecosystems, at its most recent meeting in February 2007, called for a review of ICCAT's data collection guidelines with respect to incidentally caught species, including sea turtles (ICCAT, 2007).

#### **NORTHWEST ATLANTIC FISHERIES ORGANIZATION (NAFO)**

NAFO is an intergovernmental fisheries management and scientific body. NAFO manages fishery resources of the Northwest Atlantic, excluding salmon, tunas, marlins, whales and sedentary species. In 2006, NAFO adopted the "Resolution to Reduce Sea Turtle Mortality in NAFO Fishing Operations." The resolution: (i) recognizes the important role that RFMOs can play in implementing the FAO Sea Turtle Guidelines; (ii) recognizes that the NAFO Convention Area includes critical foraging habitats for the leatherback turtle; and (iii) invites contracting parties to provide information on data collection and observer training efforts relating to sea turtle interactions in the NAFO-managed fisheries.

#### **SOUTH EAST ATLANTIC FISHERIES ORGANIZATION (SEAFO)**

SEAFO manages the Southeast Atlantic high seas area. SEAFO manages exclusively high seas fish stocks, including straddling fish stocks and discrete fish stocks not managed by other regional fisheries management organization, and does not manage tunas and billfish. SEAFO adopted the non-legally binding Resolution 01/06, "to Reduce Sea Turtle Mortality in Fishing Operations," in 2006. The Resolution calls on Members to: (i) implement the FAO Guidelines; and (ii) collect and provide the Secretariat with information on sea turtle interactions in SEAFO-managed fisheries (SEAFO, 2006a). Available information at the Secretariat indicates that there is no sea turtle bycatch reported in SEAFO fisheries.

#### **WESTERN AND CENTRAL PACIFIC FISHERIES COMMISSION (WCPFC)**

The WCPFC Convention Area covers the western and central Pacific and manages migratory fish stocks as defined under Annex I of the United Nations Law of the Sea to include tunas, billfish and sharks.

Consistent with language in the WCPFC Convention (Article 5), Resolution 2005-04, Resolution to Mitigate the Impact of Fishing for Highly Migratory Fish Species on Sea Turtles, which came into effect in 2006, calls for: (i) implementation of the FAO Guidelines to Reduce Sea turtle Mortality in Fishing Operations (FAO, 2005); (ii) voluntary provision of data on turtle interactions in WCPFC-managed fisheries; (iii) employment of specific turtle avoidance measures and research on avoidance methods for purse seine and longline gear; (iv) the review of observer programme data collection protocols to ensure they are collecting appropriate information on sea turtle interactions; and (v) beginning in 2006, Annual Reports to the Commission are to include information on steps taken to implement the Resolution (WCPFC, 2006). Additional work is required to ensure that Members and Cooperating Parties comply with the provisions of all the decisions of the Commission, including their reporting obligations such as for the sea turtle resolution. The Commission will consider the adoption of specific

Of the WCPFC Members and Cooperating Parties, the United States of America requires measures to manage turtle-longline interactions in the Hawaii-based longline swordfish fishery, which operates within the WCPFC Convention Area. These measures have been effective (Gilman *et al.*, 2007).

sea turtle interaction mitigation measures at its annual Session in 2007 based on the recommendations of its Scientific Committee and Technical and Compliance Committee.

### **Advisory Bodies**

#### **ORGANIZACIÓN DEL SECTOR PESQUERO Y ACUICOLA DEL ISTMO CENTROAMERICANO (CENTRAL AMERICAN ORGANIZATION OF THE FISHERIES AND AQUACULTURE SECTOR, OSPESCA)**

OSPESCA's aim is to consolidate the organization of fisheries and aquaculture industries in Central America. OSPESCA has an advisory function and no regulatory powers. OSPESCA has adopted an MoU with IAC to collaborate to identify joint policies, strategies and projects to reduce the incidental capture of sea turtles, as well as to implement specific actions that will be agreed upon and implemented through operative agreements by their technical and administrative bodies.

#### **ORGANIZACIÓN LATINOAMERICANA DE DESARROLLO PESQUERO (OLDEPESCA, THE LATIN AMERICAN ORGANIZATION FOR FISHERIES DEVELOPMENT)**

OLDEPESCA's aim is to attend the Latin American food needs using fisheries resources potential for common benefit & strengthening regional co-operation. OLDEPESCA has an advisory function and no regulatory powers. The organization has signed a memorandum of understanding with IAC, seeking to cooperate on sea turtle conservation and management.

### **Other Organizations with a Responsibility of Regional Sea Turtle Conservation**

#### **CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS (CMS)**

CMS is a global intergovernmental treaty with an aim of conserving migratory species throughout their range. The Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa and Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia are daughter Agreements to CMS (see below). CMS has adopted three resolutions on bycatch (Resolution 6.2, By-Catch, Recommendation 7.2, Implementation of Resolution 6.2 on By-catch, and Resolution 8.14, By-catch), the last of which, amongst other things, invited Parties to endorse the now in-development FAO Technical Guidelines for Reducing Sea Turtle Interactions and Mortality in Longline Fisheries, and called on Parties to agree to the appointment of a Scientific Councillor to coordinate the CMS Scientific Council's work on bycatch (CMS, 2006).

#### **CONVENTION ON MIGRATORY SPECIES (CMS) MEMORANDUM OF UNDERSTANDING CONCERNING CONSERVATION MEASURES FOR MARINE TURTLES OF THE ATLANTIC COAST OF AFRICA (WEST AFRICA MOU)**

The West Africa MoU does not have fisheries management authority, however, the non-binding MoU calls on its Signatory States to take bycatch-related actions for areas under their jurisdiction.

The MoU aims to safeguard six sea turtle species that are estimated to have rapidly declined in numbers during recent years due to excessive exploitation and degradation of essential habitats.

The West Africa MoU has not made decisions related to sea turtle-fishery interactions. However, the MoU Secretariat sponsored a satellite tracking study on leatherback turtles to improve the understanding of their distribution and migration routes in the Atlantic, in part, to help identify areas where they overlap with commercial fisheries. In January 2007, a workshop held at Dakar, Senegal established a general mid-term programme to be implemented by the newly established Coordination Unit, which will address bycatch problems through an invitation to FAO requesting the establishment of a Technical Cooperative Programme.

#### **CONVENTION ON MIGRATORY SPECIES (CMS) MEMORANDUM OF UNDERSTANDING ON THE CONSERVATION AND MANAGEMENT OF MARINE TURTLES AND THEIR HABITATS OF THE INDIAN OCEAN AND SOUTH-EAST ASIA (IOSEA MOU)**

This arrangement does not have fisheries management authority, however, the non-binding MoU calls on its 27 Signatory States to take bycatch-related mitigation actions in areas under their jurisdiction.

The IOSEA MoU applies to seven species of sea turtle, and has a comprehensive conservation plan that includes detailed provisions for conserving critical habitats, encouraging sustainable use and cooperating on by-catch reduction. Its online reporting system closely monitors implementation progress by

Signatory States, as well as a range of site-based threats and mitigation measures.

The IOSEA Online Reporting Facility serves also to monitor implementation of the FAO Sea Turtle Guidelines by documenting regional fisheries-turtle interactions, as well as measures and programmes in place to minimize incidental capture and mortality. IOSEA MoU Resolution 3.1 formalizes collaboration with IOTC on marine turtle bycatch issues.

#### **FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO)**

FAO convened a Technical Consultation on Sea Turtles Conservation and Fisheries and produced "Guidelines to Reduce Sea Turtle Mortality in Fishing Operations" (FAO, 2005). The twenty-sixth session of the Committee on Fisheries (COFI) of the FAO (2005) endorsed the Guidelines. FAO is now in the process of developing "Technical Guidelines for Responsible Fisheries: Reducing Sea Turtle Interactions and Mortality in Marine Capture Fisheries."

In 2005 and 2006, regional workshops were organized by FAO to assess the relative importance of fishery-related sea turtle mortality in fishing operations in the South West Indian Ocean region and to review management measures to reduce such impacts. Workshops on bycatch reduction in tropical shrimp trawl fisheries were held in 12 countries on three continents from 2003 to 2007, as part of the GEF-funded project, "Reduction of Environmental Impact from Tropical Shrimp Trawling" (FAO, 2007). FAO (2007) identifies other actions taken by FAO to address sea turtle-fishery interactions, including regional case studies, an international TED workshop at the North Sea Centre Flume Tank Centre (Hirtshals, Denmark), modeling studies and development of various guidelines to reduce turtle interactions in fishing operations. In addition, FAO facilitated the US Government TED certification of Nigeria in January 2007, permitting shrimp export to the US marketplace.

FAO (2007) found that, to date, there has been minimal progress towards implementation of the voluntary FAO Guidelines by most RFBs and other IGOs, however some member countries have made substantial progress towards addressing sea turtle-fishery interactions.

#### **INTER-AMERICAN CONVENTION FOR THE PROTECTION AND CONSERVATION OF SEA TURTLES (IAC)**

IAC does not have fisheries management authority. However, the international treaty obligates Parties to take bycatch-related actions for areas under their jurisdiction. Article IV(h) of the Convention text states that Parties shall reduce, to the greatest extent practicable, the incidental capture of sea turtles in fishing activities as well as the mandatory use of Turtle Excluder Devices (TEDs) pursuant to provisions in Annex III.

IAC has adopted several resolutions and MoUs related to reducing sea turtle interactions and mortality in fisheries. Resolution CIT/COP2/2004/R-1 for the Conservation of Leatherback Turtles, urges Parties to: (i) adopt fishing techniques that reduce incidental capture and mortality of leatherbacks; (ii) collect and provide information to the Convention regarding sea turtle incidental capture in longlines, gillnets, and other fishing gear used by artisanal and industrial fisheries; and (iii) establish agreements with countries fishing within international waters. Resolution CIT/COP3/2006/R-1 on the conservation of the hawksbill turtle urges the Parties to evaluate and mitigate the incidental capture of hawksbill turtles in their jurisdictional waters in accordance with recommendations emanating from FAO's Guidelines. Resolution CIT/COP3/2006/R-2 for the reduction of the adverse impacts of fisheries on sea turtles urges Parties to incorporate the FAO Guidelines and develop Memorandum of Understandings with regional fisheries management organizations. Resolution CIT/COP3/2006/R-6 establishes a Memorandum of Cooperation between the IAC and the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) and its Protocol Concerning Specially Protected Areas and Wildlife (SPAW Protocol).

IAC has also adopted an MoU with the Central American Organization of the Fisheries and Aquaculture Sector (OSPESCA) and the Latin American Organization for Fisheries Development (OLDEPESCA). Through these MoUs, the Parties agree to collaborate to identify joint policies, strategies and projects to reduce the incidental capture of sea turtles, as well as to implement specific actions that will be agreed upon and implemented through operative agreements by their technical and administrative bodies.

Each Party must prepare an Annual Report that provides IAC with information regarding compliance with the objective of the Convention. Information is requested on incidental capture and follow-up to Resolutions.

#### **UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP) REGIONAL SEAS PROGRAMMES**

None of the 18 Regional Seas Programmes have fisheries management authority, however, many have a legal framework that obligates Members to protect sea turtles, and other listed species of fauna, from incidental capture, mortality and commercial trade in such species.

One hundred forty countries participate in 13 Regional Seas programmes established under the auspices of UNEP: the Black Sea, Wider Caribbean, East Africa, south East Asia, ROPME Sea Area, Mediterranean, North-East Pacific, North-West Pacific, Red Sea and Gulf of Aden, South Asia, South-East Pacific, Pacific, and West and Central Africa. Furthermore, five partner programmes for the Antarctic, Arctic, Baltic Sea, Caspian Sea and North-East Atlantic Regions are members of the Regional Seas family. These 18 programmes cover issues ranging from chemical wastes and coastal development to the conservation of marine life and ecosystems. The Regional Seas programmes function through an Action Plan. For 14 of the programmes, the Action Plan is underpinned with a strong legal framework in the form of a regional Convention and associated Protocols, legal agreements on specific problems such as protected areas or land-based pollution.

### 3. INTERGOVERNMENTAL ORGANIZATIONS' MEASURES TO ADDRESS SEABIRD BYCATCH IN LONGLINE AND TRAWL FISHERIES

Seabird interactions are known to be problematic in pelagic and demersal longline, trawl and gillnet fisheries (Bartle, 1991; Strann, Vader, Barrett, 1991; Brothers, Cooper, Lokkeborg, 1999; FAO, 1999; Melvin, Parrish, Conquest, 1999; Darby and Dawson, 2000; CCAMLR, 2003; Gilman, Brothers, Kobayashi, 2005; Sullivan, Read, Bugoni, 2006; Baker *et al.*, 2007; Bull, 2007; Davoren, in press). Gilman (2001, 2006), Small (2005) and the Western and Central Pacific Fisheries Commission (WCPFC, 2006a) have reviewed actions taken by RFBs and other IGOs to address seabird bycatch problems in longline and trawl fisheries. Table 2 provides an updated review, and, where information is available, presents the efficacy and problems with specific initiatives. As is the case for Table 1, Table 2 only includes those IGOs that are known to have taken steps to address seabird interactions in marine capture fisheries. Appendix I lists all RFBs, categorized by type of body, provides a list of other IGOs responsible for regional sea turtle or seabird conservation, and identifies the subset of these organizations that have a mandate to address sea turtle or seabird bycatch in marine capture fisheries.

IUU fisheries, in particular IUU vessels targeting Patagonian Toothfish (*Dissostichus eleginoides*) in the Southern Ocean, pose a substantial threat to seabirds, as these IUU vessels do not employ seabird avoidance measures. For instance, Patagonian Toothfish IUU vessels in the Southern Ocean were estimated to kill 145 000 seabirds from 1996 to 2005, while the annual estimate for 2005 was 3 605 birds (CCAMLR, 2005c). Several RFBs have taken effective steps to reduce IUU fishing.

Of the RFBs, five RFMOs, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Commission for the Conservation of Southern Bluefin Tuna (CCSBT), Indian Ocean Tuna Commission (IOTC), South East Atlantic Fisheries Organization (SEAFO) and the Western and Central Pacific Fisheries Commission (WCPFC), require the employment of seabird avoidance methods. These measures are for pelagic and demersal longline fisheries and trawl fisheries. There have been no legally binding measures adopted by an IGO that require coastal gillnet fishing vessels to implement seabird avoidance methods. There is one multilateral agreement with the primary responsibility of regional albatross and petrel conservation: the Agreement on the Conservation of Albatrosses and Petrels (ACAP). ACAP, a daughter Agreement to CMS, addresses the range of albatross and petrel conservation and protection issues, including provisions to address interactions with fisheries. Currently the Annex 1 List of Species focuses on those species found in the Southern Hemisphere. Though this agreement lacks fisheries management authority, it carries obligations for Signatory States to address problematic seabird bycatch for areas under their jurisdiction.

Table 2

**Actions by regional fishery bodies and other intergovernmental organizations to address seabird bycatch in marine capture fisheries. Organizations are listed alphabetically in the following two categories: regional fisheries management organizations and other organizations with a responsibility of regional seabird conservation.**

INTERGOVERNMENTAL ORGANIZATIONS Initiatives to Address Seabird Bycatch in Longline and Trawl Fisheries	Evaluation
<b>Regional Fisheries Management Organizations</b>	
<p><b>COMMISSION FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES (CCAMLR)</b>            The CCAMLR area of application approximates the waters south of the Antarctic Convergence. CCAMLR first adopted mitigation measures in 1991 to reduce seabird bycatch (measure 29/X). CCAMLR's current seabird bycatch measures for longline fisheries are specified in Conservation Measures 24-02 and 25-02 (Appendix II). Conservation Measure 24-02, which applies in selected areas of the Convention Area, contains provisions to ensure a minimum longline sink rate of 0.3 m/s is achieved for gear on which weights are manually attached or 0.2 m/s for gear with internal weighting (CCAMLR, 2005a). Conservation Measure 25-02 applies to Contracting Party longline fisheries when fishing in all areas of the Convention Area, and includes a requirement for tori (bird scaring) lines, line weighting, a ban on the disposal of offal during setting or hauling gear, a requirement for night setting and restrictions on deck-lighting (CCAMLR, 2005b). The night setting requirement of Conservation Measure 25-02 does not apply when a vessel demonstrates the ability to comply with one of the protocols of Conservation Measure 24-02 (CCAMLR, 2005a). CCAMLR has also established seabird bycatch limits in exploratory fisheries and has delayed the opening of fishing seasons until the end of the breeding season of most albatrosses and petrels (CCAMLR, 2004, 2005). There is 100 percent coverage of longline fishing vessels by independent observers (of different nationality than the vessel's flag State). CCAMLR also has a fishery closure around South Georgia during the albatross breeding season.            CCAMLR has also adopted a measure to address seabird and marine mammal interactions in trawl fisheries (Conservation Measure 25-03, Appendix II) (CCAMLR, 2003). For trawlers operating in the Convention Area, excluding waters adjacent to the Kerguelen and Crozet Islands, the measure prohibits the use of net monitor cables, prohibits discharging offal during shooting and hauling gear, calls for minimizing lighting directed out from the vessel, cleaning trawls before shooting, minimizing the time the trawl remains on the sea surface, and minimizing bird access to parts of the trawl where they are most vulnerable.</p>	<p>The 2003 seabird bycatch levels in CCAMLR Member longline fisheries were reduced by 99 percent from 1997 levels (from 6 589 to 15 seabirds captured), prior to the institution of seabird conservation measures. Because only two seabird mortalities were recorded by legitimate CCAMLR vessels in the Convention Area during the 2005/2006 season, this suggests that the minimum sink rate measure has been effective.</p>
<p><b>COMMISSION FOR THE CONSERVATION OF SOUTHERN BLUEFIN TUNA (CCSBT)</b>            CCSBT manages Southern bluefin tuna stocks, a species that is most abundant between 30 – 50°S. latitude. Australia, Japan, Korea, New Zealand and Taiwan are CCSBT Members and the Philippines, South Africa and the European Community are cooperating non-members. Since 1997, under the auspices of CCSBT, Members have required the employment of bird scaring (tori) lines in their longline fisheries when operating at grounds south of 30°S. latitude (CCSBT, 1997, 1999). CCSBT adopted the requirement for tori lines in 1997 (CCSBT, 1997) and adopted guidelines for the use of tori poles in 1999 (Appendix III) (CCSBT, 1999). In 2001, CCSBT adopted a target of 10 percent observer coverage of Member's longline fisheries and data standards have been established. However, the collection of seabird bycatch data is voluntary and Members are not required to share observer data with CCSBT.</p>	<p>The selection of 30°S. latitude as the northern limit for employment of tori lines may be problematic: Australia has recognized that seabird bycatch avoidance methods are necessary further North to 25°S. latitude for the Australia eastern tuna and billfish pelagic longline fishery (Australia Department of Environment and Heritage, 2006).</p>
<p><b>INDIAN OCEAN TUNA COMMISSION (IOTC)</b>            IOTC manages tuna and billfish stocks in the Indian Ocean. IOTC adopted a non-binding Recommendation 05/09 on Reducing Incidental Bycatch of Seabirds in Longline Fisheries in 2005, which recommends: (i) if appropriate, implementation of the International Plan of Action for Reducing Incidental Catches of Seabirds in Longline Fisheries; (ii) reporting on the status of their National Plans of Action for Reducing Incidental Catches of Seabirds in Longline Fisheries; (iii) collection and voluntarily provision to the IOTC Scientific Committee of all available information on seabird interactions; (iv) when feasible and appropriate, presentation by the Scientific Committee to the Commission of an assessment of the impact of incidental catch of seabirds resulting from the activities of all the vessels fishing for tunas and tuna-like species in the IOTC Area; and (v) support to developing countries to implement the FAO IPOA-Seabirds (IOTC, 2005). In 2006 IOTC adopted the legally binding Resolution 06/04 on Reducing Incidental Bycatch of Seabirds in Longline Fisheries, which requires vessels fishing south of 30°S. latitude to use a bird scaring (tori) line, except that surface longline vessels targeting swordfish that use the "American longline system" equipped with a line-throwing device (main line shooter) are exempt from the tori</p>	<p>The IOTC seabird resolution exemption for longline swordfish vessels using the Lindgren-Pitman monofilament main line and main line spool-style of gear from complying with the tori line requirement may be problematic: There is evidence of problematic seabird interactions in fisheries employing this style of gear (Gilman, Brothers, Kobayashi, 2005, 2007). The selection of 30°S. latitude as the northern limit</p>



line requirement (Appendix IV) (IOTC, 2006).

There is no requirement for an onboard observer programme in Member longline fisheries. Few Members supply observer data to the Commission.

#### **INTER-AMERICAN TROPICAL TUNA COMMISSION (IATTC)**

IATTC manages tuna and tuna-like stocks in the Eastern Pacific. IATTC Resolution C-05-01 on the incidental mortality of seabirds, recommends: (i) implementation of the FAO International Plan of Action – Seabirds; (ii) the collection of information on seabird interactions, including bycatch in fisheries under the purview of IATTC; and (iii) for the Working Group on Stock Assessment to assess the impact of seabird bycatch in tuna fisheries operating in the eastern Pacific (IATTC, 2005). IATTC plans to consider adopting seabird bycatch mitigation measures at its annual meeting in 2007.

While IATTC has a regional observer programme for large purse seine vessels, there is no requirement for observer coverage in the longline fisheries.

#### **INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS (ICCAT)**

ICCAT manages tuna and billfish fisheries in the Atlantic and Mediterranean. In 2002, ICCAT adopted a resolution on reducing incidental mortality of seabirds (Resolution 02-14). This resolution encourages ICCAT Members to: (i) collect data on seabird interactions; (ii) urges members to implement FAO's IPOA-Seabirds; and (iii) resolves that the Scientific Committee will report to the Commission on the impact of incidental mortality on seabirds (ICCAT, 2002). The seabird assessment commenced in February 2007, at the first meeting of the Sub-Committee on Ecosystems. At this meeting, the Sub-Committee on Ecosystems agreed on a workplan to assess the impact of ICCAT fisheries on seabird populations (ICCAT, 2007). It will use a six-stage approach, developing the Ecological Risk Assessment methodology. The seabird assessment has collated existing seabird bycatch data for the ICCAT fisheries in the Atlantic and Mediterranean. Few bycatch data currently exist for the distant water fleets, but coastal states have submitted seabird bycatch data to ICCAT for several years. Results from the ICCAT seabird assessment will be available in 2008.

ICCAT encourages, and does not require, Members to establish onboard observer programs. Data collection on seabird bycatch is voluntary and not standardized, however, the ICCAT Sub-Committee on Ecosystems has called for a review of ICCAT's data collection guidelines with respect to incidentally caught species, including seabirds (ICCAT, 2007).

#### **INTERNATIONAL PACIFIC HALIBUT COMMISSION (IPHC)**

The United States of America and Canada are the two member nations of IPHC. IPHC manages demersal longline halibut fisheries in Convention waters, which are the territorial waters off the west coasts of Canada and the USA, including the southern and western coasts of Alaska (IPHC, 1998). IPHC prepared a report, "A Feasibility Study That Investigates Options for Monitoring Bycatch of the Short-tailed Albatross in the Pacific Halibut Fishery off Alaska", which recommended implementation of a combination of monitoring approaches (IPHC, 2000). IPHC staff have also co-authored additional reports concerning distribution of seabirds on longline fishing grounds (Melvin *et al.*, 2004, 2006) and the monitoring of compliance with bird avoidance regulations and seabird mortality in halibut fisheries (Ames, Williams, Fitzgerald, 2006). IPHC has no regulatory authority regarding seabird bycatch, but coordinates with the two member nations and conducts research to address the problem.

#### **SOUTH EAST ATLANTIC FISHERIES ORGANIZATION (SEAFO)**

SEAFO manages the Southeast Atlantic high seas area. In 2006, SEAFO adopted the legally-binding Conservation Measure 05/06 on Reducing Incidental By-catch of Seabirds in the SEAFO Convention Area (Appendix V) (SEAFO, 2006b). The measure requires: (i) all longline vessels fishing south of 30°S. latitude to carry and use bird-scaring (tori) lines; (ii) all longlines to be set at night; (iii) longline and trawl fisheries to manage offal discharge; (iv) minimization of the time that trawl nets lie on the sea surface with the mesh slack, and trawl nets to not be maintained in the water; and (v) Contracting Parties to withhold authorization to fish in the Convention Areas for vessels that are not configured for onboard processing, lack adequate capacity to retain offal onboard, or lack the ability to discharge offal on the opposite side of the vessel where hauling occurs (SEAFO, 2006b).

for employment of tori lines may be problematic: Australia has recognized that seabird bycatch avoidance methods are necessary further North to 25°S. latitude for the Australia eastern tuna and billfish pelagic longline fishery (Australia Department of Environment and Heritage, 2006).

IATTC (2006c) reviewed seabird interactions in Eastern Pacific Ocean fisheries and identified seabird species of concern, concluding that industrial and artisanal longline fisheries operating in the IATTC Convention Area may adversely affect some seabird species, including waved, Laysan and black-footed albatrosses. However, there is a dearth of empirical information to quantify the level and rates of seabird bycatch in these fisheries.

While IPHC cannot require seabird avoidance strategies, both Canada and the U.S. have prescribed seabird avoidance measures in longline fisheries operating in the IPHC area.

#### **WESTERN AND CENTRAL PACIFIC FISHERIES COMMISSION (WCPFC)**

The WCPFC Convention Area covers the western and central Pacific and manages migratory fish stocks as defined under Annex I of the United Nations Law of the Sea to include tunas, billfish and sharks. In 2005, WCPFC passed a non-binding resolution on seabirds, requesting members to undertake an NPOA where appropriate, and to collect data on seabird bycatch. The resolution assigns the Scientific Committee with the task of estimating seabird mortality in all the WCPFC fisheries. In December 2006, WCPFC adopted a legally binding Conservation and Management Measure to Mitigate the Impact of Fishing for Highly Migratory Fish Stocks on Seabirds (Conservation and Management Measure 2006-02, Appendix VI), which came into effect in February 2007 (WCPFC, 2006b). This measure requires longline vessels of Commission Members, Cooperating Non Members and participating Territories operating in areas south of 30°S. latitude and north of 23°N. latitude to employ two seabird avoidance methods selected from two lists of a total of eight alternative measures, with certain specifications (see Appendix VI for details) (WCPFC, 2006b). The Conservation and Management measure was designed to provide fisheries with flexibility in selecting mitigation measures. The requirement for the employment of seabird avoidance measures comes into effect for vessels  $\geq 24$  m in length on 1 January 2008 in areas south of 30°S. latitude, and on 30 June 2008 in areas north of 23°N. latitude. The measures come into effect for vessels  $< 24$  m in length on 31 January 2009 in areas south of 30°S. latitude. Vessels  $< 24$  m in length are not required to employ seabird avoidance measures in areas north of 23°N. latitude.

There can be substantial differences in the efficacy of some of the eight seabird avoidance measures included in the list of alternative measures from which vessels can select, as well as differences in commercial viability (economic viability and practicality) (Gilman, Brothers, Kobayashi, 2005, 2007). Excluding smaller vessels from employing seabird avoidance methods in areas N. of 23°N. latitude may be problematic, as high seabird bycatch rates have been documented by vessels in this size category in this area (Gilman, Brothers, Kobayashi, 2005, 2007). The long time period for the measure to come into effect, and different period of time for different vessel lengths, may not be necessary, i.e. there is no evidence that vessel length is a factor in difficulty for vessel uptake of any seabird avoidance methods.

#### **Other Organizations with a Responsibility of Regional Seabird Conservation**

##### **CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS (CMS)**

CMS is a global intergovernmental treaty with an aim of conserving migratory species throughout their range. The Agreement on the Conservation of Albatrosses and Petrels is a daughter Agreement to CMS (see below). CMS has adopted three resolutions on bycatch (Resolution 6.2, By-Catch, Recommendation 7.2, Implementation of Resolution 6.2 on By-catch, and Resolution 8.14, By-catch), the last of which, amongst other things, called on Parties to implement the FAO IPOA-Seabird and to agree to the appointment of a Scientific Councillor to coordinate the CMS Scientific Council's work on bycatch (CMS, 2006).

##### **CONVENTION ON MIGRATORY SPECIES (CMS) AGREEMENT ON THE CONSERVATION OF ALBATROSSES AND PETRELS (ACAP)**

The legally binding ACAP provides a comprehensive framework to conserve Southern Hemisphere albatrosses and petrels, and has the capability of expansion to cover the three North Pacific albatrosses (ACAP Interim Secretariat, 2001a). ACAP has identified fishery interactions as a key threat facing these seabird species, and recommended that collaboration with RFBs be pursued to reduce seabird bycatch in fisheries. A seabird bycatch working group was established in 2006 and will meet for the first time in 2007.

Several countries with major longline fisheries in the Southern Hemisphere did not participate in the process to develop or adopt ACAP (ACAP Interim Secretariat, 2001b). Of the North Pacific albatrosses, the short-tailed albatross is listed on CMS Appendix I and the Laysan and black-footed albatrosses are listed on Appendix II, although range states have not developed Agreements nor Memoranda of Understanding to protect these species.

##### **FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO)**

FAO's "International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries" (IPOA - Seabirds) calls on all States to implement the plan starting by conducting an assessment of longline fisheries to determine if a seabird bycatch problem exists. If a problem exists, States are then encouraged to develop a National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries (FAO, 1999). The FAO Committee on Fisheries will report biennially on the state of progress to implement the IPOA - Seabirds. The IPOA - Seabirds is voluntary and not legally binding. States were expected to begin to implement their national plans by the COFI Session in 2001 (FAO, 1999). The COFI 27th session informs FAO to develop a set of best practice guidelines to assist countries and RFMOs in implementing the IPOA-Seabirds.

Eight National Plans of Action have been adopted by Brazil, Canada, Chinese Taipei, Falkland Islands/Malvinas, Japan, New Zealand, Uruguay and USA. Argentina, Australia, Chile and South Africa are in various stages of plan development or near plan adoption. At the COFI twenty-seventh<sup>1</sup>

session held in 2007, of the 189 FAO Members, 79 (42 percent) indicated that they have assessed their longline fisheries for problematic seabird incidental interactions, and about half of these Members indicated that a National Plan was needed (FAO, 2007b). Sixty percent (113) of FAO Members indicated that they have implemented the IPOA-Seabirds (FAO, 2007b).

**UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP) REGIONAL SEAS PROGRAMMES**

None of the 18 Regional Seas Programmes have fisheries management authority, however, many have a legal framework that obligates Members to protect listed species of fauna from incidental capture, mortality and commercial trade in such species.

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## APPENDIX I

### Regional Fishery Bodies and other Intergovernmental Organizations with Mandates Relevant to Regional Sea Turtle and Seabird Conservation

A list follows of (i) all RFBs categorized by type of body (available at [http://www.fao.org/fi/body/rfb/chooseman\\_type.htm](http://www.fao.org/fi/body/rfb/chooseman_type.htm)), and (ii) list of other IGOs with a responsibility of regional sea turtle or seabird conservation. The subset of these organizations that have an interest in addressing sea turtle and seabird bycatch in marine capture fisheries are identified, where a '♦' before the acronym indicates actions have been taken related to sea turtle bycatch, and a '\*♦' before an acronym indicates actions have been taken related to seabird bycatch.

#### REGIONAL FISHERY BODIES (RFBs)

##### Regional Fisheries Management Organizations (RFMOs) – RFBs that have the competence to establish fisheries conservation and management measures.

- \* CCAMLR - Commission for the Conservation of Antarctic Marine Living Resources
- CCBSP - Convention on the Conservation and Management of the Pollock Resources in the Central Bering Sea
- \* CCSBT - Commission for the Conservation of Southern Bluefin Tuna
- (CEPTFA) - Council of the Central Eastern Pacific Tuna Fishing Agreement (not yet entered into force)
- ♦ GFCM - General Fisheries Commission for the Mediterranean
- ♦\* IATTC - Inter-American Tropical Tuna Commission
- IBSFC - International Baltic Sea Fishery Commission
- ♦\* ICCAT - International Commission for the Conservation of Atlantic Tunas
- ♦\* IOTC - Indian Ocean Tuna Commission
- \* IPHC - International Pacific Halibut Commission
- IWC – International Whaling Commission
- ♦ NAFO - Northwest Atlantic Fisheries Organization
- NASCO – North Atlantic Salmon Conservation Organization
- NEAFC - North East Atlantic Fisheries Commission
- NPAFC – North Pacific Anadromous Fish Commission
- PSC – Pacific Salmon Commission
- ♦\* SEAFO - South East Atlantic Fisheries Organization
- (SIOFA) - South Indian Ocean Fisheries Agreement (not yet entered into force)
- (SPRFMO) – South Pacific Regional Fisheries Management Organisation (not yet entered into force)
- ♦\* WCPFC - Western and Central Pacific Fisheries Commission

##### Advisory Bodies – RFBs that provide members with scientific and management advice

- APFIC – Asia-Pacific Fishery Commission
- BOBP-IGO – Bay of Bengal Programme Intergovernmental Organisation
- (CARPAS) – Regional Fisheries Advisory Commission for South-West Atlantic (abolished by FAO in 1997)
- CECAF – Fishery Committee for the Eastern Central Atlantic
- CIFA – Committee for Inland Fisheries of Africa
- COMHAFAT – Ministerial Conference on Fisheries Cooperation among African States Bordering the Atlantic Ocean
- COPESCAL - Comisión de Pesca Continental para América Latina (Commission for Inland Fisheries of Latin America)
- COFREMAR – Comisión Técnica Mixta del Frente Marítimo (Joint Technical Commission for the Argentina/Uruguay Maritime Front)
- COREP – Regional Fisheries Committee for the Gulf of Guinea
- CPPS – Comisión Permanente del Pacífico Sur (Permanent Commission for the South Pacific)
- EIFAC – European Inland Fisheries Advisory Commission
- FFA – Pacific Islands Forum Fisheries Agency
- LVFO – Lake Victoria Fisheries Organization
- MRC – Mekong River Commission
- NAMMCO – North Atlantic Marine Mammal Commission
- ♦ OLDEPESCA - Organización Latinoamericana de Desarrollo Pesquero (Latin American Organization for Fisheries Development)
- ♦ OSPESCA - Organización del Sector Pesquero y Acuícola del Istmo Centroamericano (Central American Organization of the Fisheries and Aquaculture Sector)
- RECOFI – Regional Commission for Fisheries
- SRCF – Commission Sous-Régionale des Pêches (Sub-Regional Commission on Fisheries)
- WECAFC – Western Central Atlantic Fishery Commission
- SEAFDEC – Southeast Asian Fisheries Development Center
- SWIOFC – South West Indian Ocean Fisheries Commission

##### Scientific Bodies – RFBs that provide scientific and information advice

**ACFR** – Advisory Committee on Fishery Research  
**CWP** – Coordinating Working Party on Fisheries Statistics  
**ICES** – International Council for the Exploration of the Sea  
**NACA** – Network of Aquaculture Centres in Asia-Pacific  
**PICES** – North Pacific Marine Science Organization  
**SPC** – Secretariat of the Pacific Community

**OTHER IGOS WITH MANDATES RELEVANT TO REGIONAL SEA TURTLE OR SEABIRD CONSERVATION**

- \* **ACAP** - Agreement on the Conservation of Albatrosses and Petrels
- ◆ **IAC** - Inter-American Convention for the Protection and Conservation of Sea Turtles
- ◆ **IOSEA MoU** - Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia
- ◆\***UNEP RSP** – United Nations Environment Programme Regional Seas Programmes
- ◆ **West Africa MOU** - Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa



## APPENDIX II

### Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)

- (i) Longline weighting for seabird conservation (Conservation Measure 24-02)
- (ii) Minimisation of the Incidental Mortality of Seabirds in the Course of Longline Fishing or Longline Fishing Research in the Convention Area (Conservation Measure 25-02)
- (iii) Minimisation of the Incidental Mortality of Seabirds and Marine Mammals in the Course of Trawl Fishing in the Convention Area (Conservation Measure 25-03)

#### (i) CCAMLR CONSERVATION MEASURE 24-02 (2005) Longline weighting for seabird conservation

In respect of fisheries in Statistical Subareas 48.6, 88.1 and 88.2 and Statistical Divisions 58.4.1, 58.4.2, 58.4.3a, 58.4.3b and 58.5.2, paragraph 4 of Conservation Measure 25-02 shall not apply only where a vessel can demonstrate its ability to fully comply with one of the following protocols.

Protocol A (for vessels monitoring longline sink rate with Time-Depth Recorders (TDRs) and using longlines to which weights are manually attached):

- A1. Prior to entry into force of the licence for this fishery and once per fishing season prior to entering the Convention Area, the vessel shall, under observation by a scientific observer:
- (i) set a minimum of two longlines with a minimum of four TDRs on the middle one-third of each longline, where:
    - (a) for vessels using the auto longline system, each longline shall be at least 6 000 m in length;
    - (b) for vessels using the Spanish longline system, each longline shall be at least 16 000 m in length;
    - (c) for vessels using the Spanish longline system, with longlines less than 16 000 m in length, each longline shall be of the maximum length to be used by the vessel in the Convention Area;
    - (d) for vessels using a longline system other than an autoline or Spanish longline system, each longline shall be of the maximum length to be used by the vessel in the Convention Area.
  - (ii) randomise TDR placement on the longline, noting that all tests should be applied midway between weights;
  - (iii) calculate an individual sink rate for each TDR when returned to the vessel, where:
    - (a) the sink rate shall be measured as an average of the time taken for the longline to sink from the surface (0 m) to 15 m;
    - (b) this sink rate shall be at a minimum rate of 0.3 m/s;
  - (iv) if the minimum sink rate is not achieved at all eight sample points (four tests on two longlines), continue the testing until such time as a total of eight tests with a minimum sink rate of 0.3 m/s are recorded;
  - (v) all equipment and fishing gear used in the tests is to be to the same specifications as that to be used in the Convention Area.
- A2. During fishing, for a vessel to be allowed to maintain the exemption to night-time setting requirements (paragraph 4 of Conservation Measure 25-02), regular longline sink monitoring shall be undertaken by the CCAMLR scientific observer. The vessel shall cooperate with the CCAMLR observer who shall:
- (i) attempt to conduct a TDR test on one longline set every twenty-four hour period;

- (ii) every seven days place at least four TDRs on a single longline to determine any sink rate variation along the longline;
  - (iii) randomise TDR placement on the longline, noting that all tests should be applied halfway between weights;
  - (iv) calculate an individual longline sink rate for each TDR when returned to the vessel;
  - (v) measure the longline sink rate as an average of the time taken for the longline to sink from the surface (0 m) to 15 m.
- A3. The vessel shall:
- (i) ensure that all longlines are weighted to achieve a minimum longline sink rate of 0.3 m/s at all times whilst operating under this exemption;
  - (ii) report daily to its national agency on the achievement of this target whilst operating under this exemption;
  - (iii) ensure that data collected from longline sink rate tests prior to entering the Convention Area and longline sink rate monitoring during fishing are recorded in the CCAMLR-approved format<sup>1</sup> and submitted to the relevant national agency and CCAMLR Data Manager within two months of the vessel departing a fishery to which this measure applies.

Protocol B (for vessels monitoring longline sink rate with bottle tests and using longlines to which weights are manually attached):

- B1. Prior to entry into force of the licence for this fishery and once per fishing season prior to entering the Convention Area, the vessel shall, under observation by a scientific observer:
- (i) set a minimum of two longlines with a minimum of four bottle tests (see paragraphs B5 to B9) on the middle one-third of each longline, where:
    - (a) for vessels using the auto longline system, each longline shall be at least 6,000 m in length;
    - (b) for vessels using the Spanish longline system, each longline shall be at least 16,000 m in length;
    - (c) for vessels using the Spanish longline system, with longlines less than 16,000 m in length, each longline shall be of the maximum length to be used by the vessel in the Convention Area;
    - (d) for vessels using a longline system other than an autoline or Spanish longline system, each longline shall be of the maximum length to be used by the vessel in the Convention Area;
  - (ii) randomise bottle test placement on the longline, noting that all tests should be applied midway between weights;
  - (iii) calculate an individual sink rate for each bottle test at the time of the test, where:
    - (a) the sink rate shall be measured as the time taken for the longline to sink from the surface (0 m) to 10 m;
    - (b) this sink rate shall be at a minimum rate of 0.3 m/s;
  - (iv) if the minimum sink rate is not achieved at all eight sample points (four tests on two longlines), continue the testing until such time as a total of eight tests with a minimum sink rate of 0.3 m/s are recorded;
  - (v) all equipment and fishing gear used in the tests is to be to the same specifications as that to be used in the Convention Area.

- B2. During fishing, for a vessel to be allowed to maintain the exemption to night-time setting requirements (paragraph 4 of Conservation Measure 25-02), regular longline sink rate monitoring shall be undertaken by the CCAMLR scientific observer. The vessel shall cooperate with the CCAMLR observer who shall:
- (i) attempt to conduct a bottle test on one longline set every twenty-four hour period;
  - (ii) every seven days conduct at least four bottle tests on a single longline to determine any sink rate variation along the longline;
  - (iii) randomise bottle test placement on the longline, noting that all tests should be applied halfway between weights;
  - (iv) calculate an individual longline sink rate for each bottle test at the time of the test;
  - (v) measure the longline sink rate as the time taken for the longline to sink from the surface (0 m) to 10 m.
- B3. The vessel shall:
- (i) ensure that all longlines are weighted to achieve a minimum longline sink rate of 0.3 m/s at all times whilst operating under this exemption;
  - (ii) report daily to its national agency on the achievement of this target whilst operating under this exemption;
  - (iii) ensure that data collected from longline sink rate tests prior to entering the Convention Area and longline sink rate monitoring during fishing are recorded in the CCAMLR-approved format<sup>1</sup> and submitted to the relevant national agency and CCAMLR Data Manager within two months of the vessel departing a fishery to which this measure applies.
- B4. A bottle test is to be conducted as described below.

#### Bottle Set Up

- B5. 10 m of 2 mm multifilament nylon snood twine, or equivalent, is securely attached to the neck of a 500–1,000 ml plastic bottle<sup>2</sup> with a longline clip attached to the other end. The length measurement is taken from the attachment point (terminal end of the clip) to the neck of the bottle, and should be checked by the observer every few days.
- B6. Reflective tape should be wrapped around the bottle to allow it to be observed in low light conditions and at night.

#### Test

- B7. The bottle is emptied of water, the stopper is left open and the twine is wrapped around the body of the bottle for setting. The bottle with the encircled twine is attached to the longline<sup>3</sup>, midway between weights (the attachment point).
- B8. The observer records the time at which the attachment point enters the water as  $t_1$  in seconds. The time at which the bottle is observed to be pulled completely under is recorded as  $t_2$  in seconds<sup>4</sup>. The result of the test is calculated as follows:

$$\text{Longline sink rate} = 10 / (t_2 - t_1).$$

<sup>1</sup> Included in the scientific observer electronic logbook.

<sup>2</sup> A plastic water bottle that has a 'stopper' is needed. The stopper of the bottle is left open so that the bottle will fill with water after being pulled under water. This allows the plastic bottle to be re-used rather than being crushed by water pressure.

<sup>3</sup> On autolines attach to the backbone; on the Spanish longline system attach to the hookline.

<sup>4</sup> Binoculars will make this process easier to view, especially in foul weather.

- B9. The result should be equal to or greater than 0.3 m/s. These data are to be recorded in the space provided in the electronic observer logbook.

Protocol C (for vessels monitoring longline sink rate with either (TDR) or bottle tests, and using internally weighted longlines with integrated weight of at least 50 g/m and designed to sink instantly with a linear profile at greater than 0.2 m/s with no external weights attached):

- C1. Prior to entry into force of the licence for this fishery and once per fishing season prior to entering the Convention Area, the vessel shall, under observation by a scientific observer:
- (i) set a minimum of two longlines with either a minimum of four TDRs, or a minimum of four bottle tests (see paragraphs B5 to B9) on the middle one-third of each longline, where:
    - (a) for vessels using the auto longline system, each longline shall be at least 6 000 m in length;
    - (b) for vessels using the Spanish longline system, each longline shall be at least 16 000 m in length;
    - (c) for vessels using the Spanish longline system, with longlines less than 16,000 m in length, each longline shall be of the maximum length to be used by the vessel in the Convention Area;
    - (d) for vessels using a longline system other than an autoline or Spanish longline system, each longline shall be of the maximum length to be used by the vessel in the Convention Area;
  - (ii) randomise TDR or bottle test placement on the longline;
  - (iii) calculate an individual sink rate for each TDR when returned to the vessel, or for each bottle test at the time of the test, where:
    - (a) the sink rate shall be measured as an average of the time taken for the longline to sink from the surface (0 m) to 15 m for TDRs and the time taken for the longline to sink from the surface (0 m) to 10 m for bottle tests;
    - (b) this sink rate shall be at a minimum rate of 0.2 m/s;
  - (iv) if the minimum sink rate is not achieved at all eight sample points (four tests on two longlines), continue the testing until such time as a total of eight tests with a minimum sink rate of 0.2 m/s are recorded;
  - (v) all equipment and fishing gear used in the tests is to be to the same specifications as that to be used in the Convention Area.
- C2. During fishing, for a vessel to be allowed to maintain the exemption to night-time setting requirements (paragraph 4 of Conservation Measure 25-02), regular longline sink rate monitoring shall be undertaken by the CCAMLR scientific observer. The vessel shall cooperate with the CCAMLR observer who shall:
- (i) attempt to conduct a TDR or bottle test on one longline set every twenty-four hour period;
  - (ii) every seven days conduct at least four TDR or bottle tests on a single longline to determine any sink rate variation along the longline;
  - (iii) randomise TDR or bottle test placement on the longline;
  - (iv) calculate an individual longline sink rate for each TDR when returned to the vessel or each bottle test at the time of the test;
  - (v) measure the longline sink rate for bottle tests as the time taken for the longline to sink from the surface (0 m) to 10 m, or for TDRs the average of the time taken for the longline to sink from the surface (0 m) to 15 m.
- C3. The vessel shall:

- (i) ensure that all longlines are set so as to achieve a minimum longline sink rate of 0.2 m/s at all times whilst operating under this exemption;
- (ii) report daily to its national agency on the achievement of this target whilst operating under this exemption;
- (iii) ensure that data collected from longline sink rate tests prior to entering the Convention Area and longline sink rate monitoring during fishing are recorded in the CCAMLR-approved format<sup>1</sup> and submitted to the relevant national agency and CCAMLR Data Manager within two months of the vessel departing a fishery to which this measure applies.

**(ii) CCAMLR CONSERVATION MEASURE 25-02 (2005)<sup>12</sup> Minimisation of the incidental mortality of seabirds in the course of longline fishing or longline fishing research in the Convention Area**

The Commission,

Noting the need to reduce the incidental mortality of seabirds during longline fishing by minimising their attraction to fishing vessels and by preventing them from attempting to seize baited hooks, particularly during the period when the lines are set,

Recognising that in certain subareas and divisions of the Convention Area there is also a high risk that seabirds will be caught during line hauling,

Adopts the following measures to reduce the possibility of incidental mortality of seabirds during longline fishing.

1. Fishing operations shall be conducted in such a way that hooklines<sup>3</sup> sink beyond the reach of seabirds as soon as possible after they are put in the water.
2. Vessels using autoline systems should add weights to the hookline or use integrated weight hooklines while deploying longlines. Integrated weight (IW) longlines of a minimum of 50 g/m or attachment to non-IW longlines of 5 kg weights at 50 to 60 m intervals are recommended.
3. Vessels using the Spanish method of longline fishing should release weights before line tension occurs; weights of at least 8.5 kg mass shall be used, spaced at intervals of no more than 40 m, or weights of at least 6 kg mass shall be used, spaced at intervals of no more than 20 m.
4. Longlines shall be set at night only (i.e. during the hours of darkness between the times of nautical twilight<sup>4</sup>). During longline fishing at night, only the minimum ship's lights necessary for safety shall be used.
5. The dumping of offal is prohibited while longlines are being set. The dumping of offal during the haul shall be avoided. Any such discharge shall take place only on the opposite side of the vessel to that where longlines are hauled. For vessels or fisheries where there is not a requirement to retain offal on board the vessel, a system shall be implemented to remove fish hooks from offal and fish heads prior to discharge.
6. Vessels which are so configured that they lack on-board processing facilities or adequate capacity to retain offal on board, or the ability to discharge offal on the opposite side of the vessel to that where longlines are hauled, shall not be authorised to fish in the Convention Area.
7. A streamer line shall be deployed during longline setting to deter birds from approaching the hookline. Specifications of the streamer line and its method of deployment are given in the appendix to this measure.
8. A device designed to discourage birds from accessing baits during the haul of longlines shall be employed in those areas defined by CCAMLR as average-to-high or high (Level of Risk 4 or 5) in terms of risk of seabird by-catch. These areas are currently Statistical Subareas 48.3, 58.6 and 58.7 and Statistical Divisions 58.5.1 and 58.5.2.
9. Every effort should be made to ensure that birds captured alive during longlining are released alive and that wherever possible hooks are removed without jeopardising the life of the bird concerned.
10. Other variations in the design of mitigation measures may be tested on vessels carrying two observers, at least one appointed in accordance with the CCAMLR Scheme of International Scientific Observation,

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<sup>1</sup> Except for waters adjacent to the Kerguelen and Crozet Islands

<sup>2</sup> Except for waters adjacent to the Prince Edward Islands

<sup>3</sup> Hookline is defined as the groundline or mainline to which the baited hooks are attached by snoods.

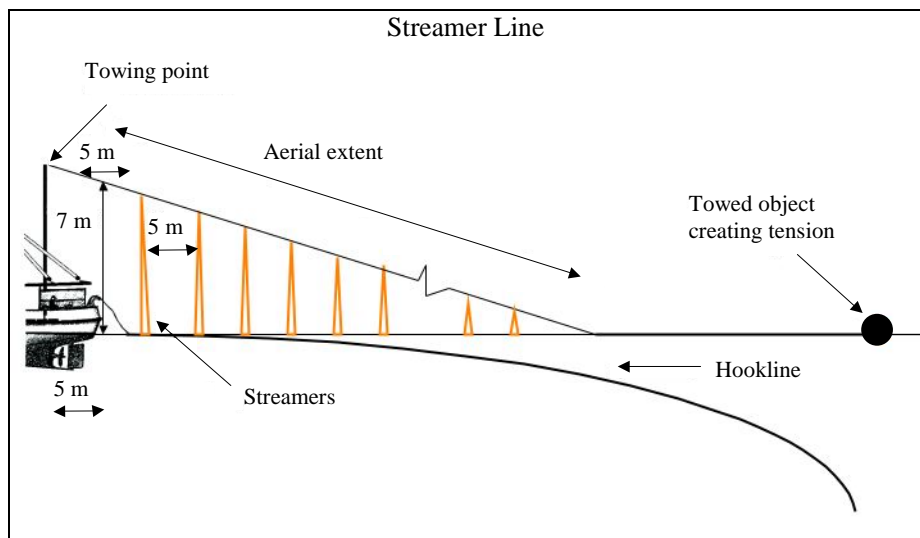
<sup>4</sup> The exact times of nautical twilight are set forth in the Nautical Almanac tables for the relevant latitude, local time and date. A copy of the algorithm for calculating these times is available from the CCAMLR Secretariat. All times, whether for ship operations or observer reporting, shall be referenced to GMT.

<sup>5</sup> Wherever possible, setting of lines should be completed at least three hours before sunrise (to reduce loss of bait to/catches of white-chinned petrels).

providing that all other elements of this conservation measure are complied with<sup>6</sup>. Full proposals for any such testing must be notified to the Working Group on Fish Stock Assessment (WG-FSA) in advance of the fishing season in which the trials are proposed to be conducted.

#### APPENDIX TO CONSERVATION MEASURE 25-02

1. The aerial extent of the streamer line, which is the part of the line supporting the streamers, is the effective seabird deterrent component of a streamer line. Vessels are encouraged to optimise the aerial extent and ensure that it protects the hookline as far astern of the vessel as possible, even in crosswinds.
2. The streamer line shall be attached to the vessel such that it is suspended from a point a minimum of 7 m above the water at the stern on the windward side of the point where the hookline enters the water.
3. The streamer line shall be a minimum of 150 m in length and include an object towed at the seaward end to create tension to maximise aerial coverage. The object towed should be maintained directly behind the attachment point to the vessel such that in crosswinds the aerial extent of the streamer line is over the hookline.
4. Branched streamers, each comprising two strands of a minimum of 3 mm diameter brightly coloured plastic tubing<sup>7</sup> or cord, shall be attached no more than 5 m apart commencing 5 m from the point of attachment of the streamer line to the vessel and thereafter along the aerial extent of the line. Streamer length shall range between minimums of 6.5 m from the stern to 1 m for the seaward end. When a streamer line is fully deployed, the branched streamers should reach the sea surface in the absence of wind and swell. Swivels or a similar device should be placed in the streamer line in such a way as to prevent streamers being twisted around the streamer line. Each branched streamer may also have a swivel or other device at its attachment point to the streamer line to prevent fouling of individual streamers.
5. Vessels are encouraged to deploy a second streamer line such that streamer lines are towed from the point of attachment each side of the hookline. The leeward streamer line should be of similar specifications (in order to avoid entanglement the leeward streamer line may need to be shorter) and deployed from the leeward side of the hookline.



<sup>6</sup> The mitigation measures under test should be constructed and operated taking full account of the principles set out in WG-FSA-03/22 ([the published version](#) of which is available from the CCAMLR Secretariat and website); testing should be carried out independently of actual commercial fishing and in a manner consistent with the spirit of Conservation Measure 21-02.

<sup>7</sup> Plastic tubing should be of a type that is manufactured to be protected from ultraviolet radiation.

**(iii) CCAMLR CONSERVATION MEASURE 25-03 (2003)<sup>1</sup> Minimisation of the incidental mortality of seabirds and marine mammals in the course of trawl fishing in the Convention Area**

The Commission,

Noting the need to reduce the incidental mortality of or injury to seabirds and marine mammals from fishing operations,

Adopts the following measures to reduce the incidental mortality of or injury to seabirds and marine mammals during trawl fishing.

1. The use of net monitor cables on vessels in the CCAMLR Convention Area is prohibited.
2. Vessels operating within the Convention Area should at all times arrange the location and level of lighting so as to minimise illumination directed out from the vessel, consistent with the safe operation of the vessel.
3. The discharge of offal shall be prohibited during the shooting and hauling of trawl gear.
4. Nets should be cleaned prior to shooting to remove items that might attract birds.
5. Vessels should adopt shooting and hauling procedures that minimise the time that the net is lying on the surface of the water with the meshes slack. Net maintenance should, to the extent possible, not be carried out with the net in the water.
6. Vessels should be encouraged to develop gear configurations that will minimise the chance of birds encountering the parts of the net to which they are most vulnerable. This could include increasing the weighting or decreasing the buoyancy of the net so that it sinks faster, or placing coloured streamers or other devices over particular areas of the net where the mesh sizes create a particular danger to birds.

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<sup>1</sup> Except for waters adjacent to the Kerguelen and Crozet Islands



## APPENDIX III

### Commission for the Conservation of Southern Bluefin Tuna (CCSBT)

Report of the Fourth Annual Meeting. First Part. (Section 10.2 Report from the Ecologically Related Species Working Group, and Attachment U, Paragraph 2 of Recommendations to the Commission Relating to Ecologically Related Species). 8-13 September 1997, Canberra, Australia. Commission for the Conservation of Southern Bluefin Tuna, Canberra, Australia.

#### **10.2 Report from the Ecologically Related Species Working Group**

The Chair invited Australia as chair of the Ecologically Related Species Working Group (ERSWG) to provide a summary of the Second Meeting of the Working Group (CCSBT/9709/Rep 2). The Commission agreed to adopt the recommendations in **Attachment U**.

New Zealand noted that the 1997 Scientific Committee recognised the necessity for improving the effectiveness of the ERSWG by strengthening its capacity for technical evaluations of information. New Zealand asked that the parties give serious consideration to this issue and endeavour to complete work on the draft technical papers, with the objective of allowing consideration of final versions of those papers at CCSBT5.

#### **Attachment U**

The Commission:

2. notes and supports the position of all Commission parties in using Tori poles in all long-line SBT fisheries below 30 degrees south;

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Report of the Fifth Annual Meeting. First Part. (Attachment 30, Guidelines for Design and Deployment of Tori Lines). 22-26 February 1999, Tokyo, Japan. Commission for the Conservation of Southern Bluefin Tuna, Canberra, Australia.

#### **Guidelines for Design and Deployment of Tori Lines**

##### **Preamble**

These guidelines are designed to assist in preparation and implementation of tori line regulations for long-line vessels.

While these guidelines are relatively explicit, they are not intended to inhibit improvement in tori line effectiveness through experimentation. The guidelines have taken into account environmental and operational variables such as weather conditions, setting speed and ship size, all of which influence tori line performance and design in protecting baits from birds. Tori line design and use may change to take account of these variables provided that line performance is not compromised. The working group envisages ongoing improvement in tori line design and consequently review of these guidelines should be undertaken in the future.

##### **Tori Line Design**

1. It is recommended that a tori line 150 m in length be used. The diameter of the section of the line in the water may be greater than that of the line above water. This increases drag and hence reduces the need for greater line length and takes account of setting speeds and length of time taken for baits to sink. The section above water should be a strong fine line (e.g. about 3 mm diameter) of a conspicuous colour such as red or orange.
2. The above water section of the line should be sufficiently light that its movement is unpredictable to avoid habituation by birds and sufficiently heavy to avoid deflection of the line by wind.
3. The line is best attached to the vessel with a robust barrel swivel to reduce line tangling.
4. The streamers should be made of material that is conspicuous and produces an unpredictable lively action (e.g. strong fine line sheathed in red polyurethane tubing) suspended from a robust three-way swivel (that again reduces tangles) attached to the tori line, and should hang just clear of the water.
5. There should be a maximum of 5-7 m between each streamer. Ideally each streamer should be paired.
6. Each streamer pair should be detachable by means of a clip so that line stowage is more efficient.
7. The number of streamers should be adjusted for the setting speed of the vessel, with more streamers necessary at slower setting speeds. Three pairs are appropriate for a setting speed of 10 knots.

### **Deployment of Tori Lines**

1. The line should be suspended from a pole affixed to the vessel. The tori pole should be set as high as possible so that the line protects bait a good distance astern of the vessel and won't tangle with fishing gear. Greater pole height provides greater bait protection. For example, a height of around 6 m above the water line can give about 100 m of bait protection.
2. The tori line should be set so that streamers pass over baited hooks in the water.
3. Deployment of multiple tori lines is encouraged to provide even greater protection of baits from birds.
4. Because there is the potential for line breakage and tangling, spare tori lines should be carried onboard to replace damaged lines and to ensure fishing operations can continue uninterrupted.
5. When fishers use a bait casting machine (BCM) they must ensure coordination of tori line and machine by:
  - a) ensuring the BCM throws directly under the tori line protection and
  - b) when using a BCM that allows throwing to port and starboard, ensure that two tori lines are used.
6. Fishers are encouraged to install manual, electric or hydraulic winches to improve ease of deployment and retrieval of tori lines.

A standard design is detailed in various educational material available to fishers eg. *Longline fishing dollars and sense*, *Catch fish not birds*, and *Fish the seas not the sky*.

## APPENDIX IV

### Indian Ocean Tuna Commission (IOTC)

Resolution 06/04 on Reducing Incidental Bycatch of Seabirds in Longline Fisheries

#### THE INDIAN OCEAN TUNA COMMISSION (IOTC),

RECALLING *Recommendation 05/09 On Incidental Mortality of Seabirds*;

RECOGNISING the need to strengthen mechanisms to protect seabirds in the Indian Ocean;

TAKING INTO ACCOUNT the United Nations Food and Agriculture Organisation (FAO) International Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries (IPOA-Seabirds), and the IOTC Working Party on Bycatch objectives;

ACKNOWLEDGING that to date some Contracting Parties and Cooperating non-Contracting Parties (hereinafter referred to as "CPCs") have identified the need for, and have either completed or are near finalising, their National Plan of Action on Seabirds;

RECOGNISING the concern that some species of seabirds, notably albatross and petrels, are threatened with global extinction;

NOTING that the Agreement on the Conservation of Albatrosses and Petrels, done at Canberra on 19 June 2001, has entered into force;

NOTING that the ultimate aim of the IOTC and the CPCs is to achieve a zero bycatch of seabirds, especially threatened albatross and petrel species, in longline fisheries;

ADOPTS, in accordance with paragraph 1 of Article IX of the IOTC Agreement, that:

1. The Commission shall, within a year, develop effective mechanisms to enable CPCs to record and exchange data on seabird interactions, including regular reporting to the Commission, and seek agreement to implement all mechanisms as soon as possible thereafter.
2. CPCs shall collect and provide all available information to the Secretariat on interactions with seabirds, including incidental catches by fishing vessels flagged to these CPCs.
3. CPCs shall seek to achieve reductions in levels of seabird bycatch across all fishing areas, seasons, and fisheries through the use of effective mitigation measures.
4. All vessels fishing south of the parallel of latitude 30 degrees South shall carry and use bird-scaring lines (tori poles):
  - Tori poles shall be in accordance with agreed tori pole design and deployment guidelines (provided for in Appendix A);
  - Tori poles are to be deployed prior to longlines entering the water at all times south of the parallel of latitude 30 degrees South;
  - Where practical, vessels are encouraged to use a second tori pole and bird-scaring line at times of high bird abundance or activity;
  - Back-up tori lines shall be carried by all vessels and be ready for immediate use.
5. Surface longline vessels, whilst targeting swordfish, utilising the "American longline system"<sup>1</sup> and equipped with a line-throwing device, shall be exempted from the requirements of paragraph 4 of this Resolution.
6. The Commission shall, upon receipt of information from the Scientific Committee, consider, and if necessary, refine, the area of application of the mitigation measures specified in paragraph 4.
7. The Commission shall consider adopting additional measures for the mitigation of any incidental catch of seabirds (including those applied and tested by the Convention on the Conservation of Antarctic Marine Living Resources) at its annual meeting in 2007.

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<sup>1</sup> "American longline system" shall be taken to mean the use of light monofilament gear components for both mainline and droplines, incorporating light sticks. By design, baits will sink rapidly when this gear is set.

## APPENDIX V

### South East Atlantic Fisheries Organization (SEAFO)

Conservation measure 05/06 on reducing incidental by-catch of seabirds in the SEAFO Convention Area. Report of the Third Annual Meeting of the Commission, 2006. The Secretariat, South East Atlantic Fisheries Organisation, Walvis Bay, Namibia.

#### The Parties to the SEAFO Convention :

RECOGNISING the need to strengthen mechanisms to protect seabirds in the South-East Atlantic Ocean;

TAKING INTO ACCOUNT the United Nations Food and Agriculture Organisation (FAO) International Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries (IPOA-Seabirds);

ACKNOWLEDGING that to date some Contracting Parties have identified the need for, and have either completed or are near finalising, their National Plan of Action on Seabirds;

RECOGNISING the concern that some species of seabirds, notably albatross and petrels, are threatened with global extinction;

NOTING that the Agreement on the Conservation of Albatrosses and Petrels, done at Canberra on 19 June 2001, has entered into force;

#### Have agreed as follows :

1. The Commission shall, within a year, develop effective mechanisms to enable Contracting Parties to record and exchange data on seabird interactions, including regular reporting to the Commission, and seek agreement to implement all mechanisms as soon as possible thereafter.

2. Contracting Parties shall collect and provide all available information to the Secretariat on interactions with seabirds, including incidental catches by fishing vessels, fishing for species covered by the SEAFO Convention, flagged to these Contracting Parties.

3. Each Contracting Party shall seek to achieve reductions in levels of seabird by-catch across all fishing areas, seasons, and fisheries through the use of effective mitigation measures.

4. All longline vessels fishing south of the parallel of latitude 30 degrees South shall carry and use bird-scaring lines (tori poles):

- Tori poles shall be in accordance with agreed tori pole design and deployment guidelines (provided for in Appendix A);

- Tori poles shall be deployed prior to longlines entering the water at all times south of the parallel of latitude 30 degrees South;

- Where practical, vessels shall be encouraged to use a second tori pole and bird-scaring line at times of high bird abundance or activity;

- Back-up tori lines shall be carried by all vessels and be ready for immediate use.

5. The Commission shall, upon receipt of information from the Scientific Committee, consider, and if necessary, refine, the area of application of the mitigation measures specified in paragraph 4.

6. Longlines shall be set at night only (i.e. during the hours of darkness between the times of nautical twilight<sup>1</sup>). During longline fishing at night, only the minimum ship's lights necessary for safety shall be used.

7. The dumping of offal is prohibited while gear is being shot or set. The dumping of offal during the hauling of gear shall be avoided. Any such discharge shall take place, where possible, on the opposite side of the vessel to that where the gear is being hauled. For vessels or fisheries where there is not a requirement to retain offal on board the vessel, a system shall be implemented to remove fish hooks from offal and fish heads prior to discharge. Nets shall be cleaned prior to shooting to remove items that might attract seabirds.

<sup>1</sup> The exact times of nautical twilight are set forth in the Nautical Almanac tables for the relevant latitude, local time and date. All times, whether for ship operations or observer reporting, shall be referenced to GMT.

8. Vessels shall adopt shooting and hauling procedures that minimise the time that the net is lying on the surface with the meshes slack. Net maintenance shall, to the extent possible, not be carried out with the net in the water.
9. Each Contracting Party shall encourage their vessels to develop gear configurations that will minimise the chance of birds encountering the part of the net to which they are most vulnerable. This could include increasing the weighting or decreasing the buoyancy of the net so that it sinks faster, or placing coloured streamer or other devices over particular areas of the net where the mesh sizes create a particular danger to birds.
10. Contracting Party shall not authorise vessels to fish in the Convention Area which are so configured that they lack on-board processing facilities or adequate capacity to retain offal on-board, or the ability to discharge offal on the opposite side of the vessel to that where gear is being hauled.
11. Every effort shall be made to ensure that birds captured alive during fishing operations are released alive and that whenever possible hooks are removed without jeopardising the life of the bird concerned.
12. The Commission shall review this measure at its 2009 Annual Meeting and shall consider adopting additional measures for the mitigation of any incidental catch of seabirds (including those applied and tested by the Commission for the Conservation of Antarctic Marine Living Resources).

### **SEAFO Conservation Measure Appendix A**

#### **Suggested guidelines for Design and Deployment of Tori Lines**

##### **Preamble**

These guidelines are designed to assist in the preparation and implementation of tori line regulations for longline fishing vessels. While these guidelines are relatively explicit, improvement in tori line effectiveness through experimentation is encouraged. The guidelines take into account environmental and operational variables such as weather conditions, setting speed and ship size, all of which influence tori line performance and design in protecting baits from birds. Tori line design and use may change to take account of these variables provided that line performance is not compromised. Ongoing improvement in tori line design is envisaged and consequently review of these guidelines should be undertaken in the future.

##### **Tori Line Design**

1. It is recommended that a tori line 150 m in length be used. The diameter of the section of the line in the water may be greater than that of the line above water. This increases drag and hence reduces the need for greater line length and takes account of setting speeds and length of time taken for baits to sink. The section above water should be a string fine line (e.g. about 3 mm diameter) of a conspicuous colour such as red or orange.
2. The above water section of the line should be sufficiently light that its movement is unpredictable to avoid habituation by birds and sufficiently heavy to avoid deflection of the line by wind.
3. The line is best attached to the vessel with a robust barrel swivel to reduce tangling of the line.
4. The streamers should be made of material that is conspicuous and produces an unpredictable lively action (e.g. strong fine line sheathed in red polyurethane tubing) suspended from a robust three-way swivel (that again reduces tangles) attached to the tori line, and should hang just clear of the water.
5. There should be a maximum of 5-7 m between each streamer. Ideally each streamer should be paired.
6. Each streamer pair should be detachable by means of a clip so that line stowage is more efficient.
7. The number of streamers should be adjusted for the setting speed of the vessel, with more streamers necessary at slower setting speeds. Three pairs are appropriate for a setting speed of 10 knots.

##### **Deployment of Tori Lines**

1. The line should be suspended from a pole affixed to the vessel. The tori pole should be set as high as possible so that the line protects bait a good distance astern of the vessel and will not tangle with the

fishing gear. Greater pole height provides greater bait protection. For example, a height of around 6 m above the water line can give about 100 m of bait protection.

2. The tori line should be set so that streamers pass over baited hooks in the water.
3. Deployment of multiple tori lines is encouraged to provide even greater protections of baits from birds.
4. Because there is the potential for line breakage and tangling, spare tori lines should be carried on board to replace damaged lines and to ensure fishing operations can continue uninterrupted.
5. When fishers use a bait casting machine (BCM) they must ensure co-ordination of the tori line and machine by:
  - a) ensuring the BCM throws directly under the tori line protection and
  - b) when using a BCM that allows throwing to port and starboard, ensure that two tori lines are used.
6. Fishers are encouraged to install manual, electric or hydraulic winches to improve ease of deployment and retrieval of tori lines.

## APPENDIX VI

### Western and Central Pacific Fisheries Commission (WCPFC)

Conservation and Management Measure to Mitigate the Impact of Fishing for Highly Migratory Fish Stocks on Seabirds (Conservation and Management Measure 2006-02)

*The Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean*

*Concerned* that some seabird species, notably albatrosses and petrels, are threatened with global extinction.

*Noting* advice from the Commission for the Conservation of Antarctic Marine Living Resources that together with illegal, unreported and unregulated fishing, the greatest threat to Southern Ocean seabirds is mortality in longline fisheries in waters adjacent to its Convention Area.

*Noting* scientific research into mitigation of seabird bycatch in surface longline fisheries has showed that the effectiveness of various measures varies greatly depending on the vessel type, season, and seabird species assemblage present.

*Noting the advice of the Scientific Committee* that combinations of mitigation measures are essential for effective reduction of seabird bycatch.

Resolves as follows:

1. Commission Members, Cooperating Non Members and participating Territories (CCMs) shall, to the extent possible, implement the International Plan of Action for Reducing Incidental Catches of Seabirds in Longline fisheries (IPOA-Seabirds) if they have not already done so.
2. CCMs shall report to the Commission on their implementation of the IPOA-Seabirds, including, as appropriate, the status of their National Plans of Action for Reducing Incidental Catches of Seabirds in Longline Fisheries.

*Adopts*, in accordance with Article 5 (e) and 10( i)(c ) of the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean the Commission the following measure to address seabird by-catch:

1. CCMs shall require their longline vessels to use at least two of the mitigation measures in Table 1, including at least one from Column A in areas South of 30 degrees South and North of 23 degrees North.

**Table 1: Mitigation measures**

<i>Column A</i>	<i>Column B</i>
<i>Side setting with a bird curtain and weighted branch lines<sup>1</sup></i>	<i>Tori line<sup>2</sup></i>
<i>Night setting with minimum deck lighting</i>	<i>Weighted branch lines</i>
<i>Tori line</i>	<i>Blue-dyed bait</i>
<i>Weighted branch lines</i>	<i>Deep setting line shooter</i>
	<i>Underwater setting chute</i>
	<i>Management of offal discharge</i>

2. In other areas, where necessary, CCMs are encouraged to employ one or more of the seabird mitigation measures listed in Table 1.
3. The Commission will at its 2007 Annual Meeting adopt minimum technical specifications for the mitigation measures, based on the advice and recommendations of SC3 and TCC3.
4. Guidelines for measures described in Column A, until future research suggests otherwise, are provided in Attachment 1.
5. Guidelines for technical specifications when applying mitigation measures in Column B are provided in Attachment 2.
6. For research and reporting purposes, CCMs that fish in the area south of 30°S and north of 23°N shall submit, to the Commission by 30 November 2007, the specifications of the mitigation measures listed in Columns A and B, that they will require their vessels to employ.
7. CCMs are encouraged to undertake research to further develop and refine measures to mitigate seabird bycatch including mitigation measures for use during the hauling process. Research should be undertaken in the fisheries and areas to which the measure will be used.
8. The SC and TCC will annually review any new information on new or existing mitigation measures or on seabird interactions from observer or other monitoring programmes. Where necessary an updated suite of mitigation measures, specifications for mitigation measures, or recommendations for areas of application will then be provided to the Commission for its consideration and review as appropriate.
9. CCMs are encouraged to adopt measures aimed at ensuring that seabirds captured alive during longlining are released alive and in as good condition as possible and that wherever possible hooks are removed without jeopardizing the life of the seabird concerned.
10. The inter-sessional working group for the regional observer programme (IWG-ROP) will take into account the need to obtain detailed information on seabird interactions to allow analysis of the effects of fisheries on seabirds and evaluation of the effectiveness of by-catch mitigation measures.
11. CCMs shall provide the Commission with all available information on interactions with seabirds, including by-catches and details of species, to enable the Scientific Committee to estimate seabird mortality in all fisheries to which the WCPF Convention applies.
12. Paragraph 1 of this Conservation and Management Measure shall be implemented by CCMs in the following manner:
  - In areas south of 30 degrees South, no later than 1 January 2008 in relation to large scale longline vessels of 24 meters or more in overall length and no later than 31 January 2009 in relation to smaller longline vessels of less than 24 meters in overall length. .
  - In areas North of 23 degrees North, and in relation to large scale longline vessels of 24 meters or more in overall length, no later than 30 June 2008.
13. CCMs shall as of 1 January 2007 initiate a process to ensure that vessels flying their flag will be able to comply with the provisions of paragraph 1 within the deadlines referred to in paragraph 12.
14. This Conservation and Management measure replaces Resolution 2005-01 which is hereby repealed.

<sup>1</sup> This measure can only be applied in the area north of 23 degrees north until research establishes the utility of this measure in waters south of 30 degrees south. If using side setting with a bird curtain and weighted branch lines from column A this will be counted as two mitigation measures.

<sup>2</sup> If tori line is selected from both Column A and Column B this equates to simultaneously using two (i.e. paired) tori lines.



### **Attachment 1: Guidelines for Column A mitigation measures.**

#### Tori Lines:

- Minimum length: 100 m
- Minimum aerial coverage: 90 m
- Must be attached so that the aerial extent is maintained over the sinking baited hooks.
- Streamers must be less than 5 m apart and be using swivels.
- Streamers must be long enough so that they are as close to the water as possible.
- If the tori line is less than 150 m in length, must have a drogue attached to the end that will create enough drag to meet the 90 meter coverage requirement.

#### Side setting with bird curtain and weighted branch lines:

- Mainline deployed from port or starboard side as far from stern as practicable (at least 1 m), and if mainline shooter is used, must be mounted at least 1m forward of the stern.
- When seabirds are present the gear must ensure mainline is deployed slack so that baited hooks remain submerged.
- Bird curtain must be employed:
  - Pole aft of line shooter at least 3 m long;
  - Min of 3 main streamers attached to upper 2 m of pole;
  - Main streamer diameter min 20 mm;
  - Branch streamers attached to end of each main streamer long enough to drag on water (no wind) – min diameter 10 mm.

#### Night setting:

- No setting between local sunrise and one hour after local sunset ; and
- Deck lighting to be kept to a minimum, noting requirements for safety and navigation.

#### Weighted branch lines:

- Weights attached to all branch lines:
  - minimum of 45 grams weight attached to all branch lines;
  - less than 60 grams weight must be within 1 meter of the hook;
  - greater than 60 grams and less than 98 grams must be within 3.5 meters of the hook; and
  - greater than 98 grams must be within 4 meters of the hook

### **Attachment 2: Guidelines for Column B mitigation measures.**

#### Weighted branch lines:

- Weights attached to all branch lines:
  - minimum of 45 grams weight attached to all branch lines;
  - less than 60 grams weight must be within 1 meter of the hook;
  - greater than 60 grams and less than 98 grams must be within 3.5 meters of the hook; and
  - greater than 98 grams must be within 4 meters of the hook

#### Blue dyed bait:

- The Commission Secretariat shall distribute a standardized color placard.
- All bait must be dyed to the shade shown in the placard.

Management of Offal Discharge:

- Either:
  - No offal discharge during setting or hauling; or
  - Strategic offal discharge from the opposite side of the boat to setting/hauling to actively encourage birds away from baited hooks.