Kobe II Bycatch Workshop Background Paper

Seabirds

1. Overview

Concern within the tuna RFMOs over interactions between longline fisheries and seabirds, particularly albatrosses and large petrels, has grown in recent years. All five tuna RFMOs have acknowledged the need to address the issue of seabird bycatch within their convention areas and have assigned this topic to one or more of their technical bodies for further consideration. Within each of the tuna RFMOs, particular attention has been paid to the spatial and temporal overlap of seabird at-sea distribution and fishing effort as a way to prioritize and target measures where the conservation need is greatest. For example, most of the seabird species most vulnerable to fisheries interactions are found to occur in greater numbers in higher latitudes, offering managers a way to prioritize conservation action.

Discussions have also been held in the tuna RFMOs regarding the identification and application of seabird bycatch mitigation measures. In the case of ICCAT, IOTC, and WCPFC, minimum technical specifications for use of bycatch mitigation measures have been adopted. In all cases, the tuna RFMOs are undergoing continued analysis and review of this issue. In order to continue to implement measures to assess and to efficiently reduce seabird interactions in all five tuna RFMOs, however, additional research on mitigation measures, risk assessment, increased at-sea observations of seabird-fisheries interactions, as well as collaboration with one another and other key organizations, are required.

2. Information and Resources for Addressing Bycatch

2.1 Type and Characteristics of Fishery Interactions

Seabird interactions have been documented via directed research and on onboard observer programs in both pelagic and demersal longline fisheries worldwide. Although there may be some fishery-specific and species-specific differences in seabird-fishery interactions, the basic factors involved in the interactions are generally very similar. Seabirds are attracted to fishing vessels either by sight or by smell and can locate a vessel from a considerable distance. Seabirds are hooked either in the mouth or other body parts (aka. foul hooked) when they attempt to ingest baited hooks either during the set or the haul. Seabirds hooked during the set are pulled underwater and drowned. Seabirds caught during the haul can sometimes be released safely, depending on the severity and timing of the hooking and the awareness of fishers of proper de-hooking techniques. The attractiveness and accessibility of bait are the primary factors for whether an interaction takes place. It is for this reason that most effective seabird bycatch mitigation measures in use and under development seek to make the vessel less attractive to birds (e.g., through effective offal discharge management) and to make bait less available (e.g., using effective tori lines and night-setting) and/or less accessible (e.g., weighted branch lines) to seabirds.

Information regarding the type and characteristics of seabird interactions with longline fisheries has been considered within each of the five tuna RFMOs, as well as within waters of the CCAMLR, where some of the most vulnerable seabird species breed and forage. As the general principles of seabird interactions with longline fisheries are relatively well understood, the tuna RFMOs have largely focused on the identification and adoption of effective bycatch mitigation measures within either binding or voluntary conservation measures.

Longline interactions with seabirds are the most relevant to the tuna RFMOs, however, seabirds are also known to be taken in gillnet fisheries. Coastal gillnetting for tuna occurs in portions of the IOTC convention area, although information is lacking on the extent of these fisheries or whether any seabird interactions that may be occurring. With respect to seabird interactions with artisanal longline fisheries, there have been discussions at the IATTC, although there are not yet sufficient data to determine how much of an impact these interactions are having on seabird populations. The IATTC concluded that basic information about how both industrial and artisanal longline fisheries operate, including that which can be derived from onboard observer programs, is required in order to better assess and address the issue of seabird bycatch. Although less is known about seabird interactions with other tuna fishing gear, some bycatch has been recorded in hook and line fisheries.

2.2 Species Population Status

Seabird population estimates are derived largely based on colony counts, noting that a substantial part of the population may be at sea for years at a time. Many seabirds are long-lived with a low reproductive rate, meaning that any increases in adult mortality can have particularly significant negative impacts on their populations. That some seabirds, particularly several albatross species, are in decline and at conservation risk is accepted worldwide. Of the 61 seabird species which interact with longline fisheries, it is estimated that nearly half of those are threatened with extinction, including 19 species of albatrosses worldwide.

Seabird population estimates and trends have been provided to all five tuna RFMOs by their members, as well as by representatives of the ACAP and the conservation organization, BirdLife International. Perhaps more importantly, the RFMOs have discussed declining trends in several seabird species and have acknowledged that interactions with fisheries may be responsible for such trends. It should be noted, however, that these population trends are not necessarily produced by the RFMOs, but require regular submissions of information from RFMO members and consideration of other sources of information. In 2009, for example, at a meeting held by the IATTC to inform its membership of the scientific and technical issues relevant to reducing seabird bycatch, the IATTC staff provided to participants the IUCN conservation status for albatrosses and petrels breeding or foraging within the EPO. Of the 18 seabird species in the EPO, 14 have an IUCN conservation status designation of vulnerable or worse.

2.3 Species Distribution

Seabirds travel great distances to forage, often on the high seas – some even circumnavigating the southern oceans. In recent years, data on at-sea distribution have been most often collected through the use of satellite transmitters and similar devices, although opportunistic fisheries-dependent sightings can also be useful for determining distribution and habitat use. Remote tracking data for albatrosses and petrels have been used widely by the tuna RFMOs in the analyses of spatial and temporal overlap of the distribution of seabirds and longline fisheries. Such analyses have been rigorously discussed in the WCPFC, IATTC, ICCAT, and IOTC, resulting in finer scale discussions of where to target conservation action. Where such information is unavailable, it can be difficult to prioritize and focus management action.

By using a combination of satellite and at-sea observational data, the tuna RFMOs have identified regions of importance for several albatross and petrel species within their convention areas in order to develop conservation measures based upon relative high risk of bycatch, particularly for

species with negative conservation status. In the case of the CCSBT, which does not have a convention area per se, the convention provides for the collection of information relevant to ecologically related species by members. To date, however, the CCSBT has largely relied on other organizations for species status assessments of seabird with which its fisheries interact.

2.4 Fishery Impacts

Before RFMOs can effectively mitigate seabird bycatch in fisheries, they must have sufficient information to determine the nature of the bycatch problem, such as the species involved and the spatial and temporal characteristics of the bycatch problem so that effective management actions can be adopted. Some tuna RFMO members and conservation organizations have estimated seabird mortality in national and regional fisheries and have provided this information to all five tuna RFMOs.

In RFMOs where onboard observers are not systematically required for longline fisheries, or where existing observers are not required to record seabird-fisheries interactions, estimating the seabird bycatch rates and subsequently assessing impacts to seabird populations is not possible. For example, it is known that albatrosses and petrels interact with IOTC longline fisheries in the southern regions of the IOTC convention area. Several IOTC members provide data to the IOTC regarding interactions, but without adequate levels of required observer coverage for all IOTC longline vessels, the IOTC is unable to estimate levels of bycatch or to make any robust conclusions about its fisheries' impacts on seabird populations. In 2009, the CCSBT encouraged its members to annually assess impacts of its fisheries on ecologically related species, including seabirds. To date, however, the CCSBT has not estimated the level of seabird bycatch for the entire southern bluefin tuna fishery. Nevertheless, based on the available data and overlap between seabirds and fishing effort there is concern that, given the population status of some seabird species, bycatch in southern bluefin tuna fisheries may be high enough to have significant impact on these seabird populations.

2.5 Effective Bycatch Mitigation Measures

Mitigating seabird bycatch typically includes: 1) avoiding fishing in areas where seabird interactions are most intense; 2) limiting seabird access to baited hooks; 3) deterring seabirds from taking baited hooks; and/or 4) reducing the attractiveness or visibility of baited hooks to seabirds. Further, it has been found that using a combination of mitigation measures is often more effective at bycatch reduction and provides more flexibility for fishers than the use of one measure alone.

All five tuna RFMOs have either adopted or are discussing the use of mitigation measures, most of which involve relatively straightforward and inexpensive changes to fishing gear and/or fishing operations. However, there are differences between the RFMOs in the mitigation measures and approaches to their usage. This is partly due to a belief that some mitigation measures considered effective in one fishery may not be effective elsewhere. Moreover, there is a lack of definitive information regarding the effectiveness of each individual mitigation measure to reduce bycatch. Indeed, the optimal way to configure fishing gear to reduce seabird bycatch can vary from fishery to fishery and from region to region.

Despite the urgency to reduce bycatch for species at conservation risk, there are different views among the tuna RFMOs about which mitigation measures, including any minimum technical specifications, represent "best practice". Fortunately, studies are being conducted by RFMO member nations and mitigation measures are being collectively agreed to within one or more of

the tuna RFMOs and by ACAP. This has afforded the RFMOs an opportunity to adopt potential mitigation measures, if only considered interim, until they are able to conduct testing within their own waters. For example, the IOTC has adopted seabird bycatch mitigation measures applied in other tuna RFMOs, despite the fact that few large-scale rigorous trials of such measures have taken place in IOTC waters. The CCSBT has also discussed a variety of seabird bycatch mitigation methods and minimum specifications for use. While it has not recommended best practices for its fisheries as a whole, it has adopted a recommendation to use IOTC and WCPFC mitigation measures when southern bluefin tuna fishing is conducted in those convention areas.

Moreover, the FAO recently published Best Practices to Reduce Incidental Catch of Seabirds in Capture Fisheries (BPTG-Seabirds) as a part of its series of Technical Guidelines for Responsible Fisheries. The BPTG-Seabirds aim to support the effective implementation of the IPOA–Seabirds and the FAO Code of Conduct for Responsible Fisheries and were developed through an Expert Consultation held in Norway 2008. The guidelines provide general advice and a framework for the development and implementation of strategies to address seabird bycatch at national, regional and subregional levels. They also provide general advice and a framework for measures to be taken in areas managed by RFMOs, including further elaboration of what were determined as best practices. The FAO also recently conducted an Expert Consultation to develop international guidelines on bycatch management and reduction of discards. The report of this meeting is anticipated for release later this year.

3. Research and Management Tools

3.1 Research and Management Objectives

Clearly identifying and adopting priorities for research and management objectives can lead to more efficient and focused conservation action. In 2009, the CCSBT sought to identify research priorities for seabird bycatch mitigation measures and assigned tasks to members for further work based upon their individual interests and/or fishing methods. However, only the WCPFC measure explicitly encourages members to collect data on seabird interactions and the usage of prescribed mitigation measures, as well as to provide information on the specifications of mitigation measures used for the purposes of researching and further refining measures already adopted.

In addition to the work of the tuna RFMOs, ACAP has developed a list of research priorities for seabird bycatch mitigation measures in pelagic longline fisheries. This list has been made available to several of the tuna RFMOs, including the WCPFC, IATTC, and ICCAT and has been recently updated to take into account recent research results and advice on best practices. CMS has also adopted a resolution which asks its members to report on bycatch mitigation measures proven to be effective and asks its Scientific Council to work to identify emerging and best practice bycatch mitigation techniques, including through the consideration of information submitted by its members and being discussed by other relevant international bodies. The FAO BPTG-Seabirds also includes considerations for RFMOs when setting priorities for research and further refining seabird bycatch mitigation measures. CCAMLR has worked closely with fishers to conduct research and to develop mitigation measures that are safe, practical, and effective. CCAMLR also encourages its members to have vessel operators from its fleet to participate in its bycatch discussions due to their familiarity with at-sea operations and practical expertise to assist in assessing the operational feasibility of proposed bycatch mitigation measures.

In terms of management objectives, agreeing a goal of either reducing bycatch to a specified catch rate or to a specified number of seabirds caught within a particular time frame can clarify for RFMO members the rationale for specific management action. None of the tuna RFMOs has

considered these options at length, and only ICCAT and the IOTC have adopted a general goal of achieving reductions in all seabird bycatch as a part of their conservation measures. This goal, although not specific in nature, is consistent with the FAO Code of Conduct, which calls for the minimization of waste, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species, as well as the minimization of fishery impacts on non-target species and the ecosystem generally.

3.2 Risk Assessment

All five tuna RFMOs are faced with making decisions regarding the adoption of seabird bycatch mitigation measures while lacking key information. In cases of uncertainty or lack of information, the BPTG-Seabirds recommend that RFMOs consider adopting a precautionary approach, particularly where species at significant conservation risk are concerned. ERA can assist managers in setting priorities for conservation action based upon issues of greatest need. Greatest need can be identified for species, geographic region, economic value, etc. ERA has been widely used by individual RFMO members of tuna RFMOs and has more recently been applied by the RFMOs themselves, specifically ICCAT and WCPFC. Assessments have been conducted by technical bodies in each of these organizations with a view toward developing conservation measures for reducing seabird bycatch based on science and on an ecosystem approach to fisheries management.

For example, since first convened in 2006, ICCAT's Subcommittee on Ecosystems has largely focused its efforts on conducting an ERA for seabirds interacting with ICCAT fisheries. ICCAT's assessment was conducted following a six-stage, hierarchical process, during which all species known to be bycatch or that might be bycatch in ICCAT fisheries were prioritized according to their relative risk. Lack of knowledge ranked high in terms of risk, and species at highest risk were upgraded for more quantitative, data intensive stock assessments. In doing so, the Subcommittee considered information on seabird biology, distribution, and vulnerability to interactions with longline fisheries within ICCAT waters, as well as in other parts of the world including in the waters of other RFMOs. This undertaking was the most comprehensive study of its kind for ICCAT, specifically in the identification and prioritization of species at risk from bycatch. Although the ERA methodologies were considered sound and well-received among ICCAT scientists, data gaps were evident throughout the assessment, pointing out the need for a more precise knowledge of bycatch rates by fishery in time and space, for a proper assessment of the impact of ICCAT fisheries on seabird populations.

The use of ERA methods for assessing bycatch continues to improve, and the sharing of information between tuna and non-tuna RFMOs is resulting in discussions of improving methodologies for future analyses. For example, CCAMLR risk assessment process helped its members improve decision-making and to take into account uncertainty when developing conservation measures to reduce seabird bycatch. The WCPFC is considering the CCAMLR's assessment methodologies as it refines the approaches used in its initial assessment for seabirds.

The IOTC plans to carry out an ERA of interactions between seabirds and IOTC tuna fisheries in 2011. Like ICCAT and the WCPFC, IOTC is considering working with other tuna RFMOs and others with experience in risk assessment in order to apply lessons learned. The CCSBT has not conducted an assessment of the global impact of the southern bluefin tuna fishery and seabirds. Until recently, assessment work has been dominated by individual assessments of each member's bycatch of seabirds, while attempts to produce scaled global assessments have been hindered by information compatibility issues and data limitations.

3.3 Monitoring and Reporting Schemes

At-sea observation of interactions between fishing operations and bycaught species is recognized as the most effective way to collect information needed to assess and mitigate bycatch. Indeed, information derived from national observer programs has been essential to understanding and estimating levels of seabird bycatch within all five tuna RFMOs. All four binding tuna RFMO conservation measures for reducing seabird bycatch require members to report information regarding seabird-fishery interactions as a way to gain insights into how and why interactions occur and how best to mitigate them. However, without RFMO-wide observer programs in place for longline vessels, these data often lack comparability and representativeness needed for further analyses of fishery-wide impacts, such as the estimation of total levels of bycatch.

Based upon discussions held within some tuna RFMOs, recommended minimum levels of observer coverage in order to estimate seabird bycatch range from 20-30%. While individual members within all five tuna RFMOs utilize some level of onboard observer coverage in longline fisheries, RFMO-wide scientific observers are not required in the CCSBT, IATTC, or the IOTC. ICCAT requires 20% observer coverage for a portion of all vessels fishing for bluefin tuna regardless of gear type, and a regional observer program for both purse seine and longline vessels within WCPFC waters has been adopted and is currently being phased in.

3.4 Periodic Review and Evaluation of Effectiveness

Periodic review and evaluation of conservation measures is critical to ensuring that the most effective practices are being employed and that decision-making adapts with the availability of new information. Review of adopted measures can also be helpful in assessing potential changes to impacts on bycatch species as the characteristics and/or extent of a fishery changes, or as new fisheries develops. There are provisions within the seabird conservation measures adopted by all five tuna RFMOs for some form of review and evaluation of effectiveness and, in some cases, consideration of whether the measures should be amended based upon new information. Such an evaluation may be based upon a review of implementation from national reports, among other things. For example, ICCAT's conservation measure recognizes the need to consider new information as it becomes available and indicates that measures may require adjustment as a result. The WCPFC conservation measure, however, is the only one which specifically calls on its members to undertake research to further refine bycatch mitigation measures and to be considered in the revision of previously adopted measures and specifications. All reported information is to be annually reviewed by the WCPFC's technical bodies to determine whether any aspect of the conservation measure in place should be revised. It is hoped that this information will lead to a greater understanding of species-specific and fisheries-specific interactions and will subsequently assist in the identification of effective combinations of mitigation measures for reducing bycatch. There are no clear criteria, however, for determining what constitutes "effective" for any of the measures in force.

Conservation measures adopted by ICCAT, IOTC, and WCPFC for addressing seabird bycatch also require the usage of minimal technical specifications for application of mitigation measures. Providing minimum technical specifications can be helpful to fishers and fishery managers in providing detail on how mitigation measures are to be applied. In some cases, they can be used as benchmarks for monitoring compliance and for determining effectiveness of conservation measures overall. At this time, there has been no thorough consideration within the tuna RFMOs of how to determine fisher performance with the specifications and whether fishers should be held to performance standards as a way to gauge compliance or effectiveness, only that such specifications are minimum standards for usage.

3.5 Education and Training

Raising fishermen's awareness of the overall benefit to them and to bycatch species can help to facilitate increased compliance with any agreed-to conservation measures, can improve usage of measures, and can assist managers in identifying any difficulties with use by opening a constructive dialog with fishers. Educational materials can also improve fishers' and observers' ability to identify species with which longline vessels interact, as a way to improve the overall understanding of seabird-fishery interactions. The BPTG-Seabirds notes that expanding fishermen networks of contacts within the fishing communities can facilitate the exchange of information among them and can lead to innovations and overall better uptake of measures.

Educational and training materials have been developed by members of each of the five tuna RFMOs to assist in the domestic implementation of internationally agreed-to seabird bycatch mitigation measures. In some cases, these examples of materials have been used to initiate RFMO-funded projects to develop similar materials for use convention-wide. For example, ICCAT produced a poster to raise awareness among fishers of the need to reduce seabird bycatch. This poster has been translated into English, Spanish, French, Japanese, Chinese, Portuguese, and Turkish. The CCSBT also developed educational pamphlets on seabirds in four languages (English, Japanese, Korean, and Mandarin). They are currently available online and will be undergoing revisions in 2010, including the creation of one for Indonesian fishers.

Outside of the tuna RFMOs, CCAMLR developed a booklet entitled "Fish the Sea, Not the Sky" to be carried onboard fishing vessels as a way to educate fishers on the benefits to their operations of reducing interactions between seabirds and longline gear. This booklet has been produced in English, French, Russian, and Spanish and has been provided to the CCSBT for its consideration as it updates its own materials. BirdLife International and ACAP have also recently developed a series of best practice bycatch mitigation measures fact sheets to assist fishers in the uptake of bycatch mitigation measures.

3.6 Independent Performance Reviews

Three of the five tuna RFMOs, CCSBT, ICCAT, and IOTC have completed independent performance reviews, as called for by UN Fish Stocks Review Conference in 2006. In all three cases, the review panels noted the need for the RFMOs to make further progress toward the application of ecosystem-based considerations, such as the adoption of conservation and management measures for non-target species and species dependent on or associated with target stocks, including with respect to data collection requirements for the catch of non-target species.

For example, the CCSBT review indicated that, although CCSBT had adopted mandatory use of tori lines in 1997 and guidelines for design and deployment of tori lines in 1999, these measures no longer represented best practices for mitigating seabird bycatch. The IOTC review noted that, while the IOTC's scientific bodies have not undertaken separate assessments of certain ecologically related species, available information on seabirds, notably albatrosses and petrels indicate that these species' groups are of conservation concern and should be prioritized for action.

3.7 Coordination with Other Relevant RFMOs and IGOs

Given many seabird species' distribution across areas of multiple tuna RFMOs, working closely with one another and with other RFMOs and IGOs with expertise in reducing seabird bycatch is

essential for addressing seabird bycatch within tuna fisheries. By doing so, tuna RFMOs have access to sources of information and protocols that can be applied within their fisheries without having to duplicate the efforts of others. In some cases, tuna RFMOs have entered into MOUs with one another to share information and work collaboratively to address issues of shared concern. In particular, CCAMLR has expressed its interest in working with RFMOs with adjacent or overlapping fisheries (e.g., CCSBT, ICCAT, the IOTC, and the WCPFC) to reduce seabird bycatch and has adopted a resolution calling upon its members, acting through their participation in other RFMOs, to seek ways to share information and approaches for addressing seabird bycatch. To that effect, the WCPFC and CCAMLR have entered into an MOU and are actively using this arrangement to mutual benefit.

Due to declining populations and threats both on land and at sea, the CMS listed on its annexes all species of albatrosses and some petrels in the mid-1990s, noting the urgent need to establish a regional agreement for the conservation of these at-risk species. The resulting agreement, ACAP, has been an active contributor to the work of the tuna RFMOs through the provision of technical advice on seabird abundance and distribution and on the effectiveness of bycatch mitigation measures. The CMS itself has prioritized the issue of bycatch of marine species in recent years, appointing a Councillor to coordinate the work of the CMS Scientific Council on bycatch and strongly encouraging its members, through their participation at RFMOs, to raise the importance of bycatch, and to encourage RFMOs to share information regarding bycatch species of concern to the CMS, such as seabirds.

ACAP has also developed research and management tools to support the work of the tuna RFMOs, such as, maps displaying temporal and spatial overlap of seabirds and tuna fisheries. These products have contributed to the work of all five tuna RFMOs. ACAP is also working to improve risk assessment techniques, like those used within ICCAT and the WCPFC and, as previously mentioned, developed advice on research priorities on seabird bycatch mitigation measures for use in pelagic longline fisheries. ACAP's research priorities have been provided to the IATTC, IOTC, CCSBT, and the WCPFC.

4. Inventory of Existing Conservation Measures

At the 27th session of the FAO Committee on Fisheries, the RFMOs described their efforts to implement IPOA-Seabirds. It was noted that, although important initial steps to reduce seabird bycatch had been taken, more needed to be done. Key provisions of existing RFMO measures were identified and formed a basis for discussions in the development of the BPTG-Seabirds. As RFMOs had already begun adopting conservation measures to address seabird bycatch within their fisheries, their conservation measures do not necessarily contain each of these elements. Still, many of these key provisions can be found within the existing measures, as well as those currently being discussed for future adoption.

The table below provides an inventory of the conservation measures currently in place at each of the five tuna RFMOs, demonstrating where they contain similar provisions and how they are different from one another.

	CCSBT tori line decision (1997) and CCSBT Recommendation to Mitigate the Impact on Ecologically Related Species of Fishing for Southern Bluefin Tuna (2008)	IATTC Resolution C-05-01	ICCAT Recommendation 07/07	IOTC Resolution 08/03	WCPFC Conservation and Management Measure 2007-04
Key Provisions					
4.1 Binding	Yes and No	No	Yes	Yes	Yes
4.2 Stated Management Objective	Mitigate harm to ecologically related species	No	Seek to achieve reductions in all seabird bycatch	Seek to achieve reductions in all seabird bycatch	No
4.3 Implementation of IPOA	Yes	Yes	No	No	Yes
4.4 Prescribed Vessel Applicability and Area of Application	Yes, within IOTC and WCPFC areas	No	Yes, based on distribution of seabirds	Yes, based on distribution of seabirds	Yes, based on distribution of seabirds
4.5 Use of Multiple Mitigation Measures	Yes, IOTC and WCPFC measures when within IOTC and WCPFC areas	No	Required use of one or two measures	Required use of two measures and sinking of hooklines	Required use of two measures
4.6 Standards for Mitigation Measures	Yes, IOTC and WCPFC measures when within IOTC and WCPFC areas	No	Required use of specifications	Required use of minimum technical standards	Required use of minimum technical specifications
4.7 Reporting on Implementation and Information Sharing	Yes, collect and report	Yes, collect and provide	Required to develop mechanisms to record and required to report	Required annually	Required annually on which measures will be required, including technical specifications to be used and any changes in usage
4.8 Research and Review of Mitigation Measures	Encouraged	No	Yes	Not explicit	Encouraged for the purposes of developing and refining measures
4.9 Estimate Bycatch and/or Assess Impacts	Yes	Yes, when appropriate and feasible	Yes, required to collect and provide all available information	Yes, required for annual analysis	Yes, reporting of all information available to estimate bycatch
4.10 Review for Effectiveness and Revision	Yes	No	Yes, required with respect to area of application and other provisions in light of future information	Yes, review of impact of measures required by 2011, including based on international research	Yes, annual review of new information, including observer data, and revision of measures, including technical specifications
4.11 Safe Handling and Live Release	Yes, including with WCPFC and IOTC measures when fishing there	No	No	No	Encouraged
4.12 Collection and Use of Observer Data	Not explicit	No	Not explicit	Not explicit	Regional observer program will consider data needs for analyses of impacts and on effectiveness of measures
4.13 Phased-in Implementation	No	No	No	No	Yes, for different sized vessels fishing in different areas
4.14 Compliance Requirements	Yes, including with WCPFC and IOTC measures when fishing there	No	No	No	Yes, requirement specific to compliance
4.15 Consultation or Cooperation w/ other RFMOs and IGOs	Yes, in complying with WCPFC and IOTC measures when fishing there	No	No	No	No

5. Selected Bibliography

5.1 CCAMLR	Resolution 22/XXV. International Actions to Reduce the Incidental Mortality of Seabirds Arising from Fishing.
	Fish the Sea Not the Sky: How to Avoid By-catch of Seabirds When Fishing With Bottom Longlines.
5.2 CCSBT	Recommendation to Mitigate the Impact on Ecologically Related Species of Fishing for Southern Bluefin Tuna (adopted at the Fifteenth Annual Meeting – 14-17 October 2008).
5.3 CMS	UNEP/CMS/Resolution 9.18/Rev.2. Resolution on By-catch (adopted at the Ninth Meeting of the Conference of the Parties). 1-5 December 2008.
5.4 FAO	Best Practices to Reduce Incidental Catch of Seabirds in Capture Fisheries. FAO Technical Guidelines for Responsible Fisheries. No. 1, Suppl. 2
	Gilman, E.; Moth-Poulsen, T.; Bianchi, G. Review of measures taken by intergovernmental organizations to address sea turtle and seabird interactions in marine capture fisheries. FAO Fisheries Circular. No. 1025. Rome, FAO. 2007. 42p.
5.5 IATTC	Technical Meeting on Seabirds: Status and Distribution of Seabirds in the Eastern Pacific Ocean, and Interactions with Fisheries.
	SAR-9-11b. Albatross and Petrel Distribution Within the IATTC Area. Agreement for the Conservation of Albatrosses and Petrels.
	75-07c. Seabird Interactions with Longline Fisheries: Areas and Mitigation Tools.
	Resolution C-05-01. Resolution on Incidental Mortality of Seabirds (adopted at the 73rd Meeting of the IATTC). 20-24 June 2005.
	BWG-5-05a.i. Review of Seabird Status and Incidental Catch in Eastern Pacific Ocean Fisheries (5th Meeting of the Working Group on Bycatch). 24 June 2006.
5.6 ICCAT	Report of the 2009 Inter-sessional Meeting of the Sub-Committee on Ecosystems (8-12 June 2009).
	ICCAT Report of the Sub-Committee on Ecosystems (26 September 2008), Appendix 9.
	Report of the 2007 Inter-sessional Meeting of the Sub-Committee on Ecosystems (19-23 February 2007).
	07/07 Byc. Recommendation by ICCAT on Reducing Incidental By-catch of Seabirds on Longline Fisheries.
5.7 IOTC	Resolution 08/03. On Reducing the Incidental Bycatch of Seabirds in Longline Fisheries.
	The report of the 2009 WPEB includes discussion on seabirds
5.8 WCPFC	SC5-2009/EB-WP-09. Monitoring the Effectiveness of Conservation and Management Measures for Bycatch. David Sean Kirby, Oceanic Fisheries Programme, Secretariat for the Pacific Community.
	SC5-2009/EB-WP-06-Appendix. Appendix to EB-SWG-WP-6: Range distributions of seabirds at risk of interaction with longline fisheries in the western and central Pacific Ocean. Susan Waugh, Ben Lascelles, Phil Taylor, Ian May, Mark Balman, and Steve Cranwell.
	SC4-2008/EB-IP-1, CCAMLR Process of Risk Assessment to Minimise the Effects of Longline Fishing Mortality on Seabirds. S.M Waugh, New Zealand Ministry of Fisheries, G.B. Baker, Institute of Antarctic and Southern Ocean Studies, R. Gales, Tasmania Department of Primary Industries and Water, J.P. Croxall, BirdLife International.
	Conservation and Management Measure 2007-04. Conservation and Management Measure to Mitigate the Impact of Fishing for Highly Migratory Fish Stocks on Seabirds.
	SC3-EB SWG/WP-16. Recording Seabird Bycatch in Longline Observer Programs. Andy Black, Cleo Small, and Ben Sullivan. BirdLife International.
	SC3-EB SWG/WP-14. Seabird Bycatch Mitigation: Minimum Standards for Pelagic Longline Fishing and Priorities for Further Research. Agreement for the Conservation of Albatrosses and Petrels.
	SC2-2006/GN IP-3, Information on Seabird Mitigation Measures of Other RFMOs. WCPFC Secretariat.