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STAGES IN THE PROCESS OF MANAGING SEABIRD MORTALITY IN RFMO FISHERIES

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Abstract

Comparing the processes for managing seabird mortality in fishery management organisations has shown a set of similar structures and mechanisms across several of these fora. This paper outlines these structures and briefly reviews which mechanisms are in place in Regional Fisheries Management Organisations (RFMOs) in the Southern Hemisphere. The key stages in dealing with seabird mortality are to:

1. Recognise the problem of seabird incidental catch
2. Gather information specific to the fishery to characterise the nature and magnitude of the problem
3. Establish regulatory mechanisms that create incentives for improved performance and penalties, along with associated compliance monitoring
   a) Input controls
   b) Output controls
4. Develop effective mitigation strategies and assessment of ongoing performance via a technical review panel
   a) Assess risk and identify highest priority areas for management
   b) Review incidental levels across the fishery areas of concern
   c) Review effectiveness of measures and recommend modifications as necessary

BirdLife suggest steps that could be applied with the management framework of the WCPFC, identified by this review.

Introduction

Incidental capture of non target species is a problem across many fishery management contexts, and can affect the viability of particularly vulnerable bycatch species, and reduces the profitability of fishing operations in many instances. In the case of seabird incidental mortality, both outcomes are known to occur, with the added influence of consumer distaste for seafood products that are associated with damage to iconic seabird populations.

The motivations for reducing seabird mortality in fisheries are therefore multiple and apply across different sectors. No sector, whether it be the seafood industry, the resource managers, or the groups concerned with the conservation and wellbeing of protected species populations, can claim to derive benefit from ongoing mortality of seabirds species in fishing operations. In reviewing the mitigation options available for minimising seabird incidental catch in longline fisheries, Brothers et al 1999 concluded that "*with widespread use of …mitigation measures, a significant reduction in incidental catch of seabirds is achievable at a minimal cost and with much potential financial benefit to longline fisheries*."

It is therefore in the interests of multiple sectors to examine how to most effectively reduce to minimal levels, the mortality of seabirds, and especially the species of long lived petrels and albatrosses which are particularly vulnerable to population effects of additional mortality as occurs through their occasional capture in long-lining operations.

A review of the potential for seabird bycatch in tropical areas of the WCPFC Convention Area there was a lack of information available from which to conclude that seabird bycatch was not occurring (Watling 2002), while it is known to occur in higher latitude areas, and effects of even occasional captures of vulnerable species may have important population effects on tropical nesting species. When we examined the instruments and institutional structures being implemented or developed by several Regional Fishery Management Organisations (RFMOs), several identifiable stages in the development of seabird bycatch-reduction frameworks were evident. This paper sets out those stages, along with tables reviewing the progress in several RFMOs towards achieving effective seabird bycatch reduction.

This work builds on previous reviews of RFMOs and seabird bycatch (Small 2005, Gilman et al 2005, Waugh et al. 2008)

BirdLife recommends that the process outlined in this document to be considered for implementation in the developing WCPFC framework for minimising the adverse effects of fishing on seabird populations.

Stages in the development of effective seabird mitigation frameworks

Our review focussed on the measures and instruments in place in six RFMOs which manage long line fisheries in areas overlapping with albatross distribution, CCAMLR (trawl and pot fisheries are not discussed here), CCSBT, IATTC, ICCAT, IOTC, and WCPFC. Only the longline fisheries managed under these agreements were examined.

The following steps were identified as crucial to efficiently managing seabird bycatch in RFMOs, although we did not find all of these steps in place in all six RFMOs reviewed:

1. Recognition of the problem

There have been a number of in-depth reviews examining the issue of seabird-fishery interactions (Brothers et al 1999, Tuck et al 2003). In 2007, the FAO Committee on Fisheries (COFI) reiterated its recognition that seabird bycatch is a serious concern in many fisheries (FAO 2007). COFI recognised that long-line fishing, both at the surface, for example for tunas and billfish, or in demersal fisheries, as for toothfish *Dissostichus* spp., or Ling *Blacoides* spp. pose a high risk of seabird interactions that has a strong potential to affect seabird populations negatively through the mortality of individuals. Indeed, several analyses of seabird population dynamics have identified mortality in longline fisheries as a key driver for population decreases (Croxall et al. 1990, Weimerskirch et al, 1987, Brothers et al.1990).

The first stage in addressing the adverse effects of fisheries mortality on seabird populations for any regulatory authority is to recognise there is a problem in the fisheries that it manages. A range of fisheries commissions or Regional Fisheries Management Organisations (RFMOs) have recognised that seabird bycatch needs to addressed or reduced in the fisheries they manage, reflected often in the establishment of an initial management measure to encourage (or require) States to reduce, minimise, or fish in a manner mindful of the need to avoid, seabird mortality (Table 1).

Of the tuna RFMOs, IOTC has the clearest objective so far, with the aim of near zero seabird bycatch. This is followed by WCPFC, which has a duty to minimise bycatch in the convention text. For the others (CCSBT, ICCAT, IATTC), the objectives are as yet poorly defined.

This review shows that all of the six RFMOs reviewed had some form of statement or resolution in place acknowledging the problem of seabird incidental mortality.

2. Gather information specific to the fishery to characterise the nature and magnitude of the problem

Once the potential for fisheries to have interactions with seabirds is recognised, a common next step in reducing mortality is to gather data to characterise the problem. This recording of incidental catch occurs at three levels:

a) Opportunistic recording of seabird captures –for example through recording of location and timing and seabird captures along with catch-effort information about the fishery itself (e.g. target species, vessel category, fishing effort). Usually this is done by asking observers to supplement their routine stock-monitoring activities with sporadic observations of seabird take.

b) Recording of the nature and extent of seabird capture events – seabird injury types, seabird species identification and the manner in which birds are captured, systematic recording of seabird captures during defined parts of the fishing period including recording observer effort at observing seabird interactions.

c) Recording null events and detailed information about fishing practice in relation to seabird captures, including the fishing gear used, the characteristics of the vessel, fishing practices that appear to lead increase the likelihood of seabird captures such as discharge of offal and discards, mitigation measures in place, operational aspects of mitigation devices such as their wear-and-tear, ease of deployment.

The first kind of recording is typically the sort that is put in place in the first instance, across fishery management agencies. These data may be useful for analysing which sectors of a fishery (e.g. target fisheries) may present a risk of seabird mortality, in a qualitative sense. However, there are limitations to their use to finding solutions to the seabird mortality problem. Data in these instances may be limited to the recording of catch incidents and comments by observers about the likely causes for this. Often observer effort on seabird issues is sporadic, with low coverage rates and non-representative samples, in these first endeavours to assess the effects of fishing on seabirds, and quantitative assessments of the catch, and identification of the particular mechanisms of capture are not available.

The second category of information is collected to understand more about the species that are captured during fishing operations, and can lead to more effective quantification of seabird captures to species level in cases where observer effort is of a sufficiently high proportion of total fishing effort and representatively spread. It is particularly important that observer effort be recorded in order for quantitative assessment of capture rates to be made, and that observer coverage is representative across the fishery areas and seasons.

The third data type is necessary to examine how to ameliorate performance in fisheries in seabird bycatch statistics. Knowing which aspects of the operation affect seabird capture probability and information about the operational capability of any potential mitigation measures to ensure that these methods have least-possible impact on fishing operations economic viability. These kinds of analyses are most commonly used by vessel managers managing large fleets such as where vessel management companies decide to address environmental programmes ‘in house’, and the data detail is rarely available to national fishery management programmes.

Our review of the practices in place for the six RFMOs examined shows that no agreement other than CCAMLR currently has a centralised system which gathers data to examine the nature, magnitude and the causes of mortality of

seabirds. The CCAMLR data gathering is done at the highest level of detail identified here. In the other RFMOs, the data gathering and analysis is done by the members, and therefore is variable in completeness and quality. The overall picture of seabird bycatch across the fisheries is therefore absent with this second approach.

3. Establish regulatory mechanisms that create incentives for improved performance and penalties, along with associated compliance monitoring

Mandatory minimum requirements for seabird bycatch avoidance measures have been established across all RFMOs examined except IATTC. Some groups argue that the imposition of mandatory requirements stifles innovation and may lead to sub-optimal configurations being used to address problems when vessel-specific solutions would be better. This potential short-coming, not acknowledged by all analysts of in this area, may have been overcome by the adoption of a range of measures, such as in the WCPFC and IOTC seabird management measures, where fishing operators have a choice of two measures among a possible list of several.

Mandatory requirements may take the form of either a set of input controls, whereby the specifications of approved bycatch-reducing devices are required to be adhered to, or in the form of output controls, where the catch statistics measured at either vessel or fleet-level are the trigger from which restrictions on fishing operator's access to the fishery is set off.

In some cases, both types of controls apply, as in the CCAMLR longline fishery.

Input controls –

a) Bycatch reduction devices for longline fisheries - e.g. deployment of bird-scaring lines, line-weighting, attaining specified line sink rates, cryptic baits or stealth gear, devices to avoid seabird captures during hauling;
b) Modifying fishing practices – e.g. reduction or elimination in discharge of fisheries waste;
c) Fishery closures – night-setting restrictions, seasonal area closures, total fishery closures (e.g. through establishment of marine-protected areas).

Output controls –

d) Catch limits - A specified number of seabird mortalities that can be incurred before loss of fishing opportunities;
e) Area-leaving rules – a temporary loss of access to the fishery capture of a number of seabirds in an area over a specified limit;
f) Catch-rate monitoring – monitoring of captures against a rate of seabird catch relative to fishing effort.

The monitoring of compliance with these mechanisms by vessels or fleets is vital to their effective operation. This typically requires a high proportion of vessels to be monitored by independent observers, collecting detailed information about compliance with measures and performance against output controls. Regulations need

to be reinforced by legal mechanisms that provide the incentive for improvement in fishing practice.

Mandatory seabird bycatch mitigation requirements are in place for all six RFMOs except IATTC, which has no measures in place. A more comprehensive set of requirements exists for CCAMLR longline fisheries, while those for CCSBT and ICCAT are minimal compared with those for the remaining agreements.

4. Develop effective mitigation strategies and assessment of ongoing performance via a technical review panel

An effective mitigation strategy will require technical input from a range of affected groups. The establishment of technical review panels has been carried out by nearly all bodies that have recognised a seabird-mortality problem in their fisheries. The make-up of these groups can comprise technical experts with the following experience: seabird population and behavioural ecologists, mitigation specialists, fishery operators or their representatives, fishery management agency representatives, environmental scientists.

The principal activities identified in the review panels of fishery management organisations where greatest bycatch reduction has been achieved include:

i) **Risk assessment identifying highest priority areas for management** - Available data (either qualitative or quantitative) are used to examine which parts of a fishery is most likely to cause adverse effects to seabirds, and can incorporate information on seabird breeding distributions, at-sea distributions, quantitative fishery mortality data, fishing effort data, and severity of risk to a species (e.g. threat status).

ii) **Estimate incidental catch levels across the fishery areas of concern** – Catch statistics monitored by independent observers are examined to identify trends and mechanisms for improving performance. Assessment is needed of the sectors within fisheries where seabird mortality has been identified as a potential or actual problem. Review of these outcomes is often linked with the designing and implementation of observer data gathering programmes for best sampling of the incidental catch problem. Review of the implementation of the prescribed mitigation measures is required by the technical group, to ensure that robust measures are being used, and to what extent they have been taken up by fishing operators.

iii) **Review the effectiveness of measures and recommend modifications as necessary** – This review may require development or adaptation of mitigation measures to suit the particular fishery conditions. Ongoing improvements and advancement of new techniques in seabird mortality reduction need to be reviewed and incorporated as appropriate. Mitigation practices adopted in a fishery are researched thoroughly, and subject to rigorous scientific testing, and where necessary tested in the fishery to assess whether they are fit-for-purpose in the particular conditions of that fishery.

In order to achieve the goals and fulfil the aims of resolutions on minimising seabird mortality or the impact of occasional incidental mortality on seabird populations, continual improvement and feedback in the process of managing seabird mortality reduction is required. The process outlined here requires that all stages of the process are subject to periodic revision. We suggest that this be done annually for all elements of the technical review (stage 4), and as required depending on the outcome of technical review for stages 2 – 3.

The review of the achievement of these stages by the six RFMOs in this study shows that only CCAMLR fully implements all of these stages. Some other RFMOs (E.g. WCPFC, ICCAT) are currently undertaking one-off risk assessment processes, but it is currently unclear whether these will be repeated regularly to take account of improving risk assessment methodologies or data availability. Other RFMOs (IATTC) has undertaken a preliminary risk assessment, but without the structured methodology being used in WCPFC and ICCAT. While the establishment of mandatory measures to mitigate incidental seabird mortality (Stage 3 in this analysis) has been undertaken for the majority of agreements (the exception is IATTC), the regular review of mitigation research is not yet underway.

Discussion:

Recognition of the problem of seabird mortality in fisheries has been undertaken by the majority of RFMOs.

Clear definition of management objectives is necessary for the effective reduction of seabird mortalities in fisheries as with other natural-resource management issues. These remain poorly developed across the tuna RFMOs, and should be considered for introduction to establish imperatives for a) reduction of the catch of particularly vulnerable species b) desired outcomes against which achievement of bycatch levels and monitoring or implementation targets can be measured.

In the fisheries management systems examined in this review, data available to characterise seabird-fishery interactions for the combined fisheries managed under an RFMO was limited to that of the CCAMLR fishery. Most RFMOs gather data at only the first or second of these levels identified (qualitative or opportunistic, and basic quantitative statistics). In addition, the tuna RFMOs still rely on member states submitting summaries of data to the scientific meetings: the Secretariats don't yet have a centralised database of bycatch data. This may hinder the identification of an effective management strategy for seabird mortality, as the performance of the fisheries in reducing seabird incidental catch cannot be assessed without appropriate monitoring and analysis of catch statistics at an agreement-wide level.

Reduction in seabird mortality requires use of the full range of available information on risks to seabirds, mitigation practices, and data about fishery performance. Review of this information via a technical panel is the most common strategy for achieving this necessary stage in the RFMOs reviewed. However, the scope and depth of the material reviewed appeared to vary greatly between the groups, and was comprehensively treated only in the CCAMLR agreement.

Feedback between technical review panels and the ongoing implementation of earlier steps in a mitigation strategy are necessary for them to be effective. Review of management objectives and efficacy of measures is required.

Omission of one or more of the elements outlined in this document can lead to a misplacement of efforts to reduce seabird mortalities. This can be economically costly to the fishing industry involved, and result in poor uptake or compliance with measures.

Recommendations for WCPFC

For the WCPFC, the steps that our review has identified that could be added or enhanced to the existing process for managing seabird bycatch are:

1. Reinforce the existing seabird resolution so that it clearly states an objective of reducing seabird mortality to near zero levels
2. Continue implementation of the Regional Observer Programme with levels of coverage of greater than 20% in areas of risk of seabird bycatch, and centralise the database and analysis of data at a WCPFC level.
3. Annually review provisions for mitigation as input and output controls to ensure that the agreements mitigation provisions keep pace with international best practice in seabird mitigation
4. Establish a technical review panel comprising specialists in seabird mitigation, seabird biology and vessel and observer management, who are tasked with:
    a) Conducting an annual seabird risk assessment and identify highest priority areas for management
    b) Reviewing incidental levels across the fishery areas of concern
    c) Reviewing effectiveness of measures and recommend modifications as necessary

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Table 1: Structures and mechanisms recognized as contributing to the effective management of seabird mortality in fisheries, as employed by a range of Regional Fishery Management Organisations. Information was sourced from the web-sites of each agreement, and thus may contain some errors or inaccuracies.

Structure / mechanism in place in different RFMOs	CCAMLR (Bottom Longline fishery)	CCSBT	IATTC	ICCAT	IOTC	WCPFC
1. Seabird bycatch management measures –	CCAMLR R5/VII	Recommendations in 1997, Attachment E to CCSBT3, and Attachment U to CCSBT4	C-05-01	Resolution 02-14 Recommendation 07-07	Resolution 06/04 Resolution 08/?	WCPFC Convention Articles 5 and 6, Conservation and Management Measure 2007-04
2. Gather data on the nature and the magnitude of the bycatch problem at RFMO level a) Qualitative and opportunities assessment b) Quantitative basic statistics c) Quantitative with detailed fishery practice information	Gathered and reviewed at the level of quantitative data and detailed fishery practice information, reported at vessel by vessel level	None in place, although many papers have been presented through time to this RFMO on seabird bycatch to address discrete aspects of the seabird bycatch problem	None in place While recognising that the Secretariat has presented a preliminary assessment of seabird bycatch to Commission in 2007 and 2008	ICCAT currently undertaking an assessment of the impact of its fisheries on seabird populations, which will include an estimate of the number of seabirds caught per year (due March 2009)	None in place noting the IOTC Secretariat employed someone for 6 months with task of assembling available data on seabird bycatch in IOTC – a review which found there was a lack of suitable data from which to make an assessment of bycatch	Ecological Risk Assessment project underway. Paragraph 9 of CMM 2007-04 tasks the Scientific Committee with estimating seabird mortality. This will be limited by low levels of observer coverage. WCPFC Regional Observer Programme not yet in place.
3. Mandatory minimum mitigation requirements to be applied in areas of high to moderate risk of seabird interactions	Line weighting Streamer lines Limitation on offal discharge Night setting in high risk areas Technical specifications are agreed and reviewed annually where new information allows their improvement to be recommended	Streamer lines	None in place	Streamer lines for all longline vessels below 20 degrees South. Vessels targeting swordfish are exempted if they use night setting and line weighting	Longline vessels south of 30 degrees S must use a combination of two measures, from tori lines, line weights, night setting, blue-dyed squid and offal management, with at least one from the first three of these. Technical specifications have been agreed.	Choice of two of the following: Side setting; streamer lines; night-setting, weighted branch lines; offal management; blue-dyed bait; underwater setting chute, with at least one from the first four of these. Technical specification have been agreed.
4. Technical panel to develop effective mitigation strategies and assess performance a. Risk assessment b. Review incidental catch levels across the fishery areas c. Review effectiveness of measures and recommend modifications as necessary	Working Group on the Incidental Mortality Associated with Fishing a. Reviewed annually b. Mandatory reporting, Convention Area catch statistics reviewed annually c. Reviewed annually	Ecological Related Species Working Group a. No system in place b. No system in place c. No system in place	Bycatch Working Group a. To be developed when feasible and appropriate (C 05-01) b. No system in place, data collection is encouraged c. No system in place	Subcommittee on Ecosystems a. Being undertaken 2007-2009 (results ready March 2009) b. Being undertaken by the ICCAT seabird assessment (results ready March 2009). Reporting of available data required under Resolution 07-07 c. No system in place	Working Party on Ecosystems and Bycatch a. No system in place b. No system in place, mandatory requirement to collect and report available data. c. Seabird measure in 2008 schedules review by 2010 at the latest	Ecosystem and Bycatch Working Group a. ERA project 2006-2010 b. Paragraph 9 of CMM 2007-04 tasks the Scientific Committee with estimating seabird mortality. Collection and reporting of data is encouraged. c. CMM 2007-04 establishes process for scientific committee to regularly review and update.