FALKLAND ISLANDS NATIONAL PLAN OF ACTION FOR REDUCING INCIDENTAL CATCH OF SEABIRDS IN TRAWL FISHERIES

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Summary

The 2009 Falkland Island Plan of Action Seabirds-Trawling (FI NPOA-Trawling) outlines a four year strategy to ensure that incidental seabird mortality due to interactions with trawlers remains at a level that will have no deleterious impact on the long-term sustainability of the seabird populations.

Following FAO guidelines, a Seabird Interaction Management Strategy for each sector of the trawl fleet is described making recommendations based on five interconnected components; observer coverage, mitigation measures, bycatch objectives, research and development and education.

It is recommended the creation of the Seabird Bycatch Committee (SBC), constituted by representatives from the government, fishing industry and NGOs. The duty of the SBC will be to conduct yearly evaluations of the success of the plan and act as an advisory body for and report to the Fisheries Committee and the Environmental Committee.

In adopting the FI-NPOA-Trawling 2009 the Falkland Islands ensures compliance with domestic and international policies and conventions and adds to its international reputation for responsible and sustainable management of its Fishery.

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1. INTRODUCTION

This document forms the revised version of the first Falkland Islands National Plan of Action Seabirds-Trawlers, which was introduced in 2004 (Sullivan 2004). As with the previous version, it has been written as a document that can either be considered in context with the Falkland Islands National Plan of Action-Seabirds (FI NPOA-S) or as a stand-alone document.

The 2009 Falkland Island Plan of Action Seabirds-Trawling (FI NPOA-Trawling) is divided into two main sections. The first section provides a review of the scale and management of trawler related seabird bycatch worldwide (with an emphasis on the Southern Hemisphere) and summarizes the work conducted during the last four years in the Falkland Islands to reduce incidental seabird mortality. The second section forms the Falkland Islands Plan of Action Seabirds-Trawling (FI NPOA-Trawling), which details a comprehensive strategy to further reduce seabird bycatch associated with trawlers to levels that will have no deleterious impact on the long-term sustainability of seabird populations.

1.1. DEFINITIONS

For the purpose of this document the following definitions are applicable:

Bycatch and incidental mortality: refer to the unintentional mortality of non-target species (including fish, marine mammals and seabirds) within a specific fishery. If otherwise stated, bycatch in this document refers to seabird incidental mortality. Bycatch in relation to fish species is taken to mean the capture of non-commercial species, undersized fish or damaged fish that are not processed to a commercial product.

Discards and waste: includes all discarded bycatch fish species and offal resulting from the onboard processing of the catch.

Falkland Islands waters: refers to those parts of the southern Atlantic Ocean under governance of the Falkland Islands Government.

Seabirds: refers to bird species that habitually obtain their food from the sea beyond the low water mark.

Trawling: refers specifically to stern trawling and might be further sub-divided into demersal trawl fishing at the seabed and semi-pelagic/pelagic trawling, fishing in the water column.

Sustainable (seabird bycatch) target: Seabird bycatch level by a fishery which will have no deleterious impact on the long-term sustainability of seabird populations.

1.2. LIST OF ABBREVIATIONS

ACAP	Agreement on the Conservation of Albatrosses and Petrels
APP	Albatross and Petrel Programme
BSL	Bird Scaring Lines
CCAMLR	Convention on the Conservation of Antarctic Marine Living Resources

EEZ	Exclusive Economic Zones
FICZ	Falklands Interim Conservation and Management Zone
FOCZ	Falklands Outer Conservation Zone
ITQ	Individual Transferable Quota
FIFD	Falkland Islands Fisheries Department
FI NPOA-Trawling	Falkland Islands National Plan of Action for Reducing incidental Catch of Seabirds in Trawl Fisheries
FI NPOA-S	Falkland Islands National Plan of Action -Seabirds
GRT	Gross Registered Tonnage
IPOA-S	FAO International Plan of Action-Seabirds
LOA	Length Overall
SAST	Seabirds at-Sea Team
SBC	Seabird Bycatch Committee
TAC	Total Allowed Catch
TAE	Total Allowed Effort
VU	Vessel Units

2. BACKGROUND

The waters around the Falkland Islands form part of a productive ecosystem which is largely the result of upwelling brought about by the northerly flowing Falkland Current, carrying nutrient rich water from the Antarctic. The environment supports an important commercial fishery and an abundance of marine life, including significant populations of seabirds (Agnew 2002).

More than 63 species of seabirds have been recorded in the Falklands waters with 22 known to breed in the islands (White *et al* 2001, Woods & Woods 2006). For several species, including the black-browed albatross and southern giant petrel, the Falkland Island population represents significant proportions of the respective world populations.

The offshore harvesting of fish resources can threaten seabird populations, either by direct competition for the resource or by incidental mortality due to fishing activity (González-Zevallos & Yorio 2006, Sullivan *et al* 2006b, Abraham *et al* 2008, Croxall 2008, Moore & Žydelis 2008, Petersen *et al* 2008, Zador *et al* 2008, Soykan *et al* 2008, Watkins *et al* 2008).

To date, no negative impact on seabird populations resulting from direct competition for marine resources has been detected in the Falkland Islands (Pütz *et al.* 2001). However, because the fisheries are greater predators of fish stocks than seabirds, their long-term impact may well be detrimental to these birds (Thompson 1992, Thompson & Riddy 1995). On the other hand, discards might contribute significantly to seabird diet and variation of discards levels could alter their feeding habits and their population dynamics (Garthe *et al.* 2003, Votier *et al.* 2004).

Incidental seabird bycatch as a result of trawling fleets has been extensively documented throughout the Southern Hemisphere (Bartle 1991, Barton 2002, Sullivan & Reid 2002, González-Zevallos & Yorio 2006, Abraham *et al* 2008, Zador *et al* 2008, Watkins *et al* 2008), and to a lesser extent, in the Northern Hemisphere (Petersen *et al* 2008). The level of seabird bycatch is significant in several fishing sectors worldwide and its long-term impact is of serious global concern.

In response to the concern related to the incidental seabird mortality in fisheries, the United Nations Food and Agricultural Organization (FAO) Committee of Fisheries (COFI) developed an International Plan of Action-Seabirds (IPOA-S) (FAO 1999a). The IPOA-S focused initially on longline fisheries, and requires that countries with responsibility for managing longline fisheries in their own waters, or a fleet that fishes elsewhere, should carry out an assessment of these fisheries to determine if bycatch problem exists, and if so to ascertain the extent and nature of the problem, and adopt a National Plan of Action – Seabirds (NPOA-S). Recently, the best practice technical guidelines for IPOA/NPOA-S have extended the scope of these plans to include trawl fisheries (FAO 2008). The Agreement on the Conservation of Albatrosses and Petrels (ACAP) came into force in 2004, also as a result of international concern over the high level of incidental seabird mortality associated with fisheries.

The Falkland Islands National Plan of Action for Reducing incidental Catch of Seabirds in Trawl Fisheries (FI NPOA-Trawling) (Sullivan 2004), adopted by the Falkland Islands Fisheries Department in 2004, was among the firsts drafted NPOAs and one of the first to cover trawl fisheries. The NPOA-Trawling came about as a consequence of work conducted by the Seabird at Sea Team (SAST), which estimated mortality highlighted that trawl fisheries were causing significantly more seabird mortalities than longline fishing activities in Falkland Island waters(Sullivan & Reid 2003). The draft of the FI NPOA-Trawling was considered essential to meeting the overall conservation objectives of IPOA-S.

2.1. SEABIRD MORTALITY ASSOCIATED WITH TRAWL FISHING

Seabirds are attracted to trawlers primarily due to the release of discards, comprising the non retained catch or bycatch and offal resulting from the processing of the retained catch, and the catch in the net that provide, an otherwise, non-available source of food. This interaction can be beneficial and it is estimated that the trawl fishery in the Falkland waters provides around 5.4% of the energy requirements of the black-browed albatross breeding population (Thompson & Riddy 1995). However, this food source increases the risk to seabirds of potentially fatal interactions with fishing gear.

The incidental mortality of seabirds associated with trawl fishing can be classified into two broad categories: cable related and net related mortality.

2.1.1. Cable related mortality

Cable related mortalities occur due to collisions with cables running from the vessel to the net (warp cables) or net monitoring devices (netsonde and paravane).

Historically, significant levels of mortality resulted from seabirds colliding with netsonde cables (Batle 1991, Williams & Capdeville 1996, Weimerskirch *et al* 2000) and their use has since been prohibited in most trawl fisheries in the Southern Oceans including in the Falkland Islands.

Sullivan & Reid (2002) demonstrated that warp cables caused significant mortality of seabirds whilst feeding on discards at the stern of the vessel. The speed at which the warp cables cut through the water as the vessel pitches is sufficient to push a bird under the water, potentially resulting in drowning as the bird becomes entangled and snagged on the wires, or causing injuries, which may lead to a premature death. During 2002/2003 in Falkland Islands waters the seabird mortality due to cable interactions was estimated as a minimum of 1,529 birds, predominantly black-browed albatrosses (Sullivan *et al.* 2006b). More recently, studies elsewhere have demonstrated varying levels of mortality resulting from these interactions (González-Zeballos *et al.* 2007, Abraham *et al* 2008, Petersen *et al* 2008, Zador *et al* 2008). For example, within the South African deep-water hake fishery, it is estimated that approximately 18,000 birds per year are killed, comprising mainly of shy albatrosses, black-browed albatrosses, white-chinned petrels and Cape gannets (Watkins *et al* 2008).

Additionally, incidental mortality is caused by birds colliding with and being dragged down the paravane cable. This mortality has been recorded in trawlers with side-mounted paravanes deployed but is considered relatively rare in comparison with warp cable interactions (Sullivan & Reid 2003, Crofts 2006c).

2.1.2. Net related mortality

Net related mortality occurs when seabirds diving into the net or feeding on the enmeshed catch (stickers) become entangled, drown or suffer injuries, which may lead to fatalities. Higher levels of mortality have been recorded in pelagic and semi-pelagic nets (Hopper *et al.* 2003, Roe 2005, Baird 2008) than in demersal or bottom fishing nets (Sullivan *et al.* 2006a). Pelagic nets are typically larger with greater mesh sizes and sink less quickly than demersal nets, which increases the chances of seabirds becoming entangled (Sullivan & Reid 2003).

2.2. REDUCING MORTALITY (MITIGATION MEASURES)

While there is substantial evidence of seabird mortality associated with trawl fisheries around the world, there are also examples of effective management and implementation of mitigation measures that reduce mortality (Sullivan *et al.* 2004, Sullivan *et al*. 2006a). Several devices have been developed to minimise seabird mortalities in the trawl fisheries. Due to the varied nature of mortalities associated with trawl fisheries, a range of specific mitigation measures have been developed.

2.2.1. Cable Related Mortality Mitigation

Since the prohibition of netsonde cables in many trawl fisheries, incidental mortality due to warp cables and, to a lesser extent, paravane cables has been identified as the most significant cause of seabird mortality associated with trawl fishing (Sullivan and Reid 2003, González-Zevallos and Yorio 2006, Watkins *et al* 2008).

The principal cause of cable related mortality is the presence of discards at the stern of trawlers, attracting seabirds to the area where the cables enter the water, defined as the danger area (Munro 2005, Crofts 2006a, Abraham *et al*, 2008, Watkins *et al* 2008).). In the absence of discards, there is a marked reduction in bird numbers in this area and hence negligible mortality (Crofts 2006a, Watkins *et al* 2008).

Mitigation measures can be divided into two categories; (a) short-term solutions such as scaring devices which deter seabirds entering the danger areas and (b) long-term solutions that address discard and waste management to reduce the attractiveness of the trawler to seabirds.

2.2.1.1. Bird Scaring Devices

Bird scaring devices are designed to minimize the interactions of seabirds with warp cables and thus reduce mortality. There are a number of devices which have been trialled in comparative studies. Bird-scaring lines (BSL) are currently regarded as the most effective of the methods tested to date (Sullivan *et al* 2006a, Melvin *et al* 2004, Middleton & Abraham 2007). Comparative studies within various fleets concluded that there is no optimal universal design (Sullivan *et al*. 2006a, González-Zevallos & Yorio 2006, Middleton 2006) and that specific modifications tailored for different fleets or even vessels should be carried out to improve the performance of BSL (Bull 2007).

Since the introduction of the BSL (tori lines) in the Falkland Islands trawlers in 2004, refinements in the design, deployment, timing and mounting location have been made to improve their overall effectiveness. These changes resulted from inadequate performances identified in the original BSL design, such as safety on board, limited efficiency in cross winds and increasing concern about seabird interactions on the BSL itself (APP and FIFD *unpubl. data*, Abraham 2007).

The latest modification of the BSL, which sought to remedy these limitations, was tested in 2008. Trials at sea indicated that performance was enhanced particularly in cross winds and led to reduced seabird interactions in comparison with the original FIFD design (Snell 2008b). The new design has been incorporated into the 2009 Falkland Islands trawl fisheries licence conditions.

Since the reporting of paravane cable related mortality (Sullivan & Reid 2003) and the suggestions of potential solutions by Reid and Edwards (2005), no further work has been carried out to reduce this form of mortality. The attachment of flags or streamers to the paravane cable or placing short arms with streamers attached forward of the sluices and paravanes potentially

might reduce further incidental mortality. Trialling of such measures would need to be conducted.

2.2.1.2. Discard management

Possible discard management measures range from retaining discards on board, processing (minced, fishmeal) of the discards, strategic dumping of discards or a combination of these(Wienecke and Robertson 2000, Munro 2005, Abraham *et al* 2008).

A study on waste discard management options in the Falklands Islands concluded that due to the restrictions in the fleet the recommended options were the use of trawl-by-trawl interim storage tanks, maceration of discards and waste discharge astern of the trawl warps (Munro 2005). Additionally, for new vessels entering into the fishery the recommended measures were daily storage tanks or fishmeal plants, since it can be included in the original vessel design. This is supported by a recent study in New Zealand waters, where experimental test were conducted to compare the effectiveness of mincing and discards retention in mid-water trawling, concluding discards retention was a more effective strategy for reducing seabird mortality (Abraham *et al.* 2008).

Although the retention of discards on board will remove the attraction of trawlers to seabirds, practicalities such as the amount of discards to be stored and the actual configuration of the vessels constrain the options for immediate solutions. The combination of strategic dumping, by avoiding the discharge of discards during shooting and hauling operations, jointly with the use of tori lines during trawling has been suggested as a compromising option to further reduce seabird mortality (Sancho 2009). The ban of discharge of offal during the shooting and hauling of trawl gear is a measure already adopted by the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), through Conservation Measure 25-03 (SC-CCAMLR 2006) and more recently by the Minister of Fishery of New Zealand, through the Notice 2008 (No. F432) (MFish 2008).

The implementation of any discard management measure should be complemented with a set of general work practices to ensure best performance (Munro 2005). This might include the retention all fish landed on board and their processing through the system (i.e. not discarding bycatch directly from the deck), fitting of factory water discharge points with screens and meshes, cleaning of nets prior to shooting, and reducing the time the net is on the surface at shooting and hauling.

2.2.2. Net Related Mortality Mitigation

Efforts to reduce seabird mortality due to net entanglements have been developed in pelagic and semi-pelagic fisheries where these incidents have been documented at levels of concern (Hooper *et al.* 2003, Sullivan *et al.* 2004, Roe 2005, Crofts 2006b, Baylis 2008). The main factors affecting the number of seabirds killed are mesh size, time the net spends spread on the surface or at reachable diving depths, and the presence of stickers (enmeshed catch) in the net (Hooper *et al.* 2003).

To reduce net surface time it has been recognised that vessels should operate powerful and mechanically reliable winches (Sullivan *et al.* 2004) and maintain low vessel speed during setting and hauling. Additionally, good working practices such as thoroughly cleaning the net prior to shooting to ensure removal of stickers and reducing daylight fishing operations will further reduce seabird entanglements.

Further mitigation measures include the addition of weight to the nets to increase the sinking rate, the use of reduced mesh size and, most successfully, net binding (Roe 2005). Net binding with sisal string prevents the net from opening until it has sunk below the sea surface during

shooting, reducing the available time for seabirds to interact with the net (Sullivan *et al.* 2004). Trials conducted in CCAMLR waters (Subarea 48.3) by Roe (2005) and more recently on one of the Falkland Island pelagic trawlers found that the probability of seabirds becoming entangled when the net was bound was greatly reduced (Baylis 2008).

2.3. Trawler seabird mortality in the Falkland Islands

Records as from 1995 until 2008 indicate that at least 10 different seabird species have died as a result of encounters with trawl fishing gear in the waters of the Falkland Islands, with the black-browed albatross being the most affected (Table 1).

Given the relatively low mortalities of species such as penguins and shags, reported as incidental mortalities prior to 2000, it is unlikely that incidental mortality caused by trawling in the Falklands has a significant effect on those populations. On the other hand, mortalities of albatrosses and petrels have been significant; in particular black-browed albatross. The nature of the larger more aggressive species such as the black-browed albatross and giant petrels competing for discards causes their close proximity to the trawl gear, whereas other smaller and less aggressive species rarely approach or interact closely with the trawl gear.

Detailed species profiles of albatrosses and petrels reported killed are provided in Annex A.

Table 1. Incidental mortalities of seabirds reported by observers on trawlers, 1995-2008 (*taken from Table 5 in Barton 2002, ^SAST *unpubl.data*, ˜APP *unpubl.data*, "FIFD *unpubl.data*)

Common name	Scientific name	1995-2000*	2002-2003^	2004-2008˜	2006-2008"	Total
King penguin	*Aptenodytes patgonicus*	1				**1**
Gentoo penguins	*Pygoscelis papua*	4				**4**
Magellanic penguin	*Spheniscus magellanicus*	6				**6**
Albatross (unidentified)		1		1		**2**
Southern royal albatross	*Diomedea epomophora*		1			**1**
Black-browed albatross	*Thalassarche melanophris*	24	118	105	20	**267**
Giant petrel				1	2	**3**
Southern giant petrel	*Macronectes giganteus*		5	1		**6**
Northern giant petrel	*Macronecteds hali*			1		**1**
White-chinned petrel	*Procellaria aquinoctialis*		3			**3**
Cape petrel	*Daption Capensis*	2		1	1	**4**
Imperial shag	*Phalacrocorax atriceps*	2				**2**

2.3.1. Data collection and seabird mortality estimates

SAST (2001-2004) and APP (2004-2008) programmes have dedicated seabird observers on board of the trawling fleet operating in the Falklands waters. The data collection protocol is a

modified version of the protocol used by the Australian Fisheries Management Authority (AFMA) observers on Patagonian toothfish trawlers operating in Australian waters of the Southern Ocean (as outlined in Wienecke & Robertson 2000). A range of information was collected for each observed period including meteorological parameters, presence and level of discards, seabird abundance and number and severity of seabird interactions with fishing gear.

From June 2006, FIFD observer protocols require the observers to monitor hauling operations one every four days on board to record seabird mortalities due to interactions with trawling gear. During the year 2008, APP and FIFD observed 184 fishing days, corresponding to a 3% of the total fishing effort days.

Estimates of the number of seabirds killed and its variance were calculated following the methods previously described by Sullivan and Reid (2003), using observer-recorded mortality data and FIFD fishing effort data. The mortality estimates obtained using these methods should be regarded as minimum seabird mortalities since only certain fates, defined as seabird carcases witnessed by the observer, are taking into account in the statistical analysis.

The Falkland Island trawling fleet is constituted by a range of vessels using different fishing techniques and targeting varied species (*see Annex B for further details*). These variations within the fleet determine the level of seabird mortality observed and its source (net or cable related). Base on the observed records, the fleet was divided in three major categories: a) finfish, ray and skate fleet, b) *Loligo* squid fleet and c) pelagic fleet. Due to the varied nature of discard management in the pelagic fleet, vessels were divided into two subcategories: 1) vessels with discard management on board or 2) vessels from which discards are untreated. Available seabird mortality estimations for each of the fleet sectors are presented in Table 2.

Table 2. Minimum mortality estimates and coefficient of variance (CV) available for 2002-2008. M rate stands for mortality rate as estimated seabirds killed per fishing day.

		Year	Data origin	Estimated mortality	CV	Mitigation measures	Fishing effort (days)	M rate
Finfish/ Ray and Skate Fleet		2002-2003	SAST	1,529	0.15	No	3,257	0.45
		2004-2005	APP	169	0.53		2,527	0.06
		2007	APP/FIFD	510	0.51	Tori	3,735	0.14
		2008	APP/FIFD	590	0.45	Lines	3,940	0.15
***Loligo* Squid Fleet**		2005-2006	APP	358	0.98	No	1,824	0.19
		2007	APP/FIFD	0	-	Tori	1,750	0
		2008	APP/FIFD	35	3.05	Lines	1,969	0.02
Pelagic Fleet	**Discard management**	2008	FIFD	16	0.55	Tori	123	0.13
	Untreated discards	2008	APP/FIFD	9	2.04	Lines	35	0.26

2.3.1.1. Mortality in finfish and ray/skate trawl fleets

The first seabird bycatch estimates in the Falkland Islands were produced in 2002/03 for the finfish and ray and skate fleet. The minimum seabird mortality was estimated in 1529 seabirds, the majority black-browed albatrosses (Sullivan & Reid 2003). This level of seabird bycatch corresponded to a mortality rate of 0.45 seabirds per fishing day, which was considered unsustainable. In the first year after the introduction of BSL in these fleets, mortality rate dropped to 0.06 seabirds/fishing day and seabird bycatch estimate was 169 seabirds, showing a reduction of 90% (Reid & Edward 2005). More recent estimates showed a slight increase of

seabird mortality rate corresponding to 0.14 seabirds/fishing day in 2007 and 0.15 seabirds/day in 2008, equivalent to 510 and 590 seabird mortalities respectively (Sancho 2009).

2.3.1.2. Mortality in *Loligo* trawl fleet

The first mortality estimates for the *Loligo* squid fishery were obtained in 2005/06 at which point no mitigation measures were in place in this fleet. A total of 348 seabird mortalities (0.19 seabirds/fishing day) was estimated and BSL were consequently introduced in the licence conditions for this fleet. The post-BSL results showed a considerable decline in mortality estimates, with no mortality registered in the first year after the introduction (2007) and a minimum estimate of 35 mortalities during the second year (2008) (Sancho 2009). This translates to a mortality rate of 0.02 seabirds per fishing day.

2.3.1.3 Mortality in pelagic trawl fleets

Pelagic fleet mortality estimates were calculated for the first time in 2008. The combined mortality estimate for the pelagic fleet was 25 seabirds. The source and rate of mortality were unequal between both subcategories. All mortalities registered in the vessels with discard management were net related and the estimated mortality rate was 0.13 seabirds/fishing day. A mortality rate of 0.26 seabirds/fishing day was obtained for the vessel with no discard management, equally divided in between net and cable related mortality. The unequal mortality rate is explained by the presence of untreated discards, highlighting the relevance of discards as the main cause of seabird mortality due to cable interactions (Sancho 2009).

2.3.2. Seabird mortality underestimation

During 2008 all the trawling fleets had observer coverage and mortality estimations are available for each sector. The total mortality for the trawling fleet fishing in the Falkland waters was estimated as 650 seabirds. This figure might highly underestimate the actual mortality, since only observed carcases were included in the analysis. A recent study in South African waters shows that two out of 30 known mortalities from cable interaction were hauled on board (Watkins *et al.* 2008). No similar information is available for the Falkland Islands fleet, although an extensive record of seabird interactions with fishing gear has been collected by APP observers. Interactions were classified by intensity and outcome, including strongly suspected deaths. By including the suspected deaths in 2008 analysis, the total seabird mortality estimates rose to 2923 seabirds (Sancho 2009).

2.4. Legislative/Policy Framework

There are currently a range of policies and legislation related to seabird conservation matters in the Falkland Islands, which are linked to domestic, British and international policies, laws and conventions (*see Annex C for further details*). The most relevant are the Fisheries (Conservation and Management) Ordinance 2005 and the ACAP agreement. In response to the obligations related to these policies, laws and conventions, mitigation measures have been implemented on the licence conditions by the Director of FIFD (*see Annex D*).

3. FALKLAND ISLANDS PLAN OF ACTION FOR REDUCING INCIDENTAL CATCH OF SEABIRDS IN TRAWL FISHERIES

3.1. INTRODUCTION

The Falkland Islands have achieved significant success in the reduction of seabird mortality due to trawl fisheries. The co-operation between Government, Industry and NGOs has resulted in a reduction in seabird mortalities and has made the Falklands a country of reference for other countries working to address and mitigate seabirds bycatch by trawl fleets in their own and international waters.

Under the guidelines of the first FI NPOA-Trawling (2004), extensive work has been conducted to further understand the causes of seabird mortality due to interactions with trawl fishing gear across the Falkland Islands trawling fleet and develop the appropriate mitigation measures. The aim behind this is to ensure compliance with domestic policies and international agreements, one of the more relevant being ACAP.

During the last four years, seabird mortality has been identified in all trawling fleets in the Falkland Islands at levels which give rise to concern. Cable related mortality was evaluated as significant in demersal and pelagic trawlers in the presence of untreated discards. The use of mitigation measures, in the form of BSL, was progressively introduced in the license conditions and seabird mortality estimates showed a positive trend with a major reduction for the demersal fleet, although still at a significant level. Net related mortality in pelagic trawlers was recently identified as being significant and a set of new mitigation measures have been implemented in 2009.

While the crew of fishing vessels play a critical role in efforts to reduce incidental seabird mortality, the level of importance placed on the issue by government ordinances and policy and the management of fishing companies will largely determine the level of compliance and attitude towards the implementation of mitigation measures at sea. In relation to this principle, a background section is included with up to date available information related to seabird mortality and its mitigation strategies necessary to ensure trawler fishing impact is to a level that will have no deleterious impact on the long-term sustainability of seabird populations within the next four years. The full implementation of the FI NPOA-Trawling and its present and future reviews will enable the local fishing industry to demonstrate commitment to sustainable and environmentally appropriate management of Falkland Island fisheries.

It is intended that the plan be reassessed four years after implementation, at which time the bycatch objectives should be revised and the scope and contents of the plan re-evaluated. Additionally, it is recommended the creation of the Seabird Bycatch Committee (SBC), constituted by representatives from the government, fishing industry and NGOs. The SBC should conduct annual audits of the FI NPOA-Trawling to monitor the success of the actions and recommendations.

3.2. SCOPE

FI NPOA-Trawling applies to trawl fishing in Falkland Island waters and that conducted by Falkland Islands registered trawlers on the high seas.

3.3. OBJECTIVES

General objective

The primary objective of the FI NPOA-Trawling is to reduce incidental seabird mortality due to interaction with trawlers to a sustainable level, defined as a level that will have no deleterious impact on the long-term sustainability of seabird populations. This will be achieved by setting indicative bycatch objectives to reduce seabird mortality to a specific level and providing detailed Seabird Interaction Management Strategies to facilitate the process.

Specific objectives

The implementation of strategies and recommendations contained in the FI NPOA-Trawling should facilitate the achievement of the following objectives:

- Evaluate and maintain a suitable level of observer coverage to calculate a robust annual estimate of seabird mortality in all trawl fisheries enabling the setting of bycatch levels;
- Evaluate the use of robust mortality indices such as “heavy contacts” and their application in the estimation of seabird mortality and indicative bycatch targets.
- Evaluate the effectiveness of the mitigation measures in place and their possible improvement;
- Continue to investigate the development of alternative safe on board, cost-effective and practical mitigation measures to reduce trawler related incidental seabird mortality;
- Further investigation of discard management measures appropriate for the existing and future fleet;
- Evaluate and adopt a process whereby realistic annual indicative bycatch targets are set, based on robust mortality indices and thereafter achieve an annual reduction in trawler related mortalities to meet these targets;
- Recognizing the experience and knowledge of fishermen, encourage their involvement in the modification and development of mitigation measures;
- Continue international awareness of mitigation of trawling related mortality in the fishing industry and community at large;
- Ensure the dissemination of information and training opportunities for crew and other stakeholders to work towards practical implementation of the FI NPOA-Trawling and the further development of a seabird conservation culture in fishing companies operating in the Falkland Islands;
- Place high priority on establishing collaborative projects between the Falkland Islands and range of states where Falkland Island breeder and visitors seabirds migrate, and/or encourage them to investigate the scale of seabird mortality caused by their factory trawler fleets.

3.4. BYCATCH OBJECTIVES

The level of seabird mortality for the trawling fleet in 2008 has been estimated at 650 seabirds, most of them black-browed albatrosses. Seabird mortality were estimated for each sector separately, since they vary in the temporal and spatial distribution of fishing effort, discard

levels and type of fishing gear. Mortality estimates (seabirds per fishing day) are available for each fleet: 0.15 (CV=0.45) for demersal finfish, 0.02 (CV=3.05) for *Loligo* squid, 0.13 (CV=0.55) for pelagic vessels with waste management and 0.26 (CV=2.04) for pelagic fleet with untreated discards.

At present there are certain limitations of the current data which do not allow accurate and realistic assessments of bycatch and this subsequently limits setting indicative targets. The low level of observer coverage and the difficulties in ascertaining seabird mortality are the main factors affecting the robustness of the estimates. A precautionary approach should be taken, as mortality estimates are likely to be underestimations. The available information nonetheless still forms a valuable tool to monitor the performance of the trawling fleet, to be able to assess the further reduction of seabird mortality and any introduction of further mitigation measures.

Once the available data enables bycatch objectives to be set, they should apply to all seabird species, regardless of their conservation status. Due to the effort related management of all trawl fisheries and the format of data reported daily to FIFD, bycatch objectives should be expressed as a number of incidental seabird mortalities recorded per fishing day.

3.4.1. Stratification of Bycatch Data

Future bycatch estimation should be based on similar stratification principles to those detailed in FI NPOA-S and modified for each fishery (*sensu* Sullivan and Reid 2003, Crofts 2006a, Sancho 2009) (Table 3). The temporal and spatial components were defined to capture variations in both fishing effort and the various stages of the breeding cycle of black-browed albatross. The season and area of fishing have been identified as critical factors influencing seabird bycatch in many longline fisheries (e.g. Klaer and Polacheck 1998, Brothers *et al* 1999), including the Falkland Islands (Sullivan & Reid 2002) and the highly seasonal nature of existing bycatch data in the finfish fleet suggests that similar strata are appropriate for future estimations (Sullivan & Reid 2003).

Table 3. Stratification applied to every fleet for seabird mortality estimations

Fishing Fleet	**Spatial**	**Temporal**	
	Fishing Zones*	***BBA Breeding Cycle***	
Finfish/Ray and Skate demersal fleet	Central-east >48˚S, <51˚S, <60˚W South-east >51˚S, <54˚S, <60˚W South-west >51˚, <54˚S, >60˚W Central-west >48˚S, <51˚S, >60˚W	Young Chicks Old Chicks Winter Prospecting Laying Eggs	Jan-Feb Mar-Apr May-Aug 20 Aug 21-Sep Oct Nov-Dec
		Fishing Season (variable)	
***Loligo* squid fleet**	NA	Autumn Spring	Feb-Mar Jun-Sep
Pelagic fleet — **Discard management**	NA	NA	
Pelagic fleet — **Untreated discards**			

*The east/west edge of fishing zones is delimited by the outer edges of FICZ and FOZC

BBA stands for black-browed albatross

3.5. REPORTING

It is recommended that an annual review of FI NPOA-Trawling is undertaken and that this becomes the mandate of the Seabird Bycatch Committee (SBC), with consultation with relevant stakeholders. This will ensure that locally elected industry members and relevant government officials continue to have significant input into bycatch monitoring and mitigation efforts.

It is proposed that at this meeting a brief annual summary is also presented that contains, but is not limited to:

- an estimate of seabird mortality within the trawl fisheries
- an assessment of the level and utility of observer coverage
- an audit of performance against indicative bycatch objectives contained in Seabird Interaction Management Strategies
- a summary of the effectiveness of Seabird Interaction Management Strategies and any recommended changes to further reduce seabird bycatch
- recommendations for the development and/or changes to mitigation measures

3.6. EDUCATION, TRAINING AND PUBLICITY

As outlined in Section 3.1., the importance placed on reducing seabird mortality by crew-members will depend largely on the emphasis placed on the issue by government ordinances and regulation and subsequently by fishing company management. As such, the primary responsibility for the provision of education material and programmes to crew-members should be the responsibility of the management of fishing companies. In addition, information on bycatch levels and relevant management strategies (e.g. observer programmes, development and prescription of mitigation measures) should be disseminated, as appropriate, to local and international media.

In line with previous educational literature on reducing trawler related seabird mortality produced by SAST, FIFD and APP, further education material should be produced by FIFD summarizing the achieved goals from the previous FI NPOA-Trawling and future developments relating seabird mortality mitigation and goals to reach. These materials should be translated to the appropriate languages (i.e. Spanish and Korean) and distributed to all vessels as part of their licence. Fisheries officers and fishing companies should also be provided with this material.

3.7. DATA COLLECTION (AT-SEA OBSERVER PROGRAMMES)

From 2009, the collection of at-sea data is solely conducted by the FIFD observers. Modifications of the actual FIFD observer protocol will be introduce to strategically increase the allocated seabird bycatch monitoring accordingly to priorities based on the registered level of mortality in the different sectors of the trawling fleet.

3.8. SEABIRD INTERACTION MANAGEMENT STRATEGY

The five components of Seabird Interaction Management Strategy provide detailed recommendations to reduce the frequency of potentially fatal interactions between seabirds and fishing vessels, in this case specifically trawlers. Seabird Interaction Management Strategies also establish a cyclical framework of data collection and research to quantify and reduce seabird mortality to specified annual bycatch objectives (Figure 1).

The following section details the five elements of Seabird Interaction Management Strategy and outlines the common objectives of each element for each of the four trawl fishery.

3.8.1. Data collection (Observer Coverage)

Objective
At-sea observer programmes are regarded as the most effective means to gathering representative and independent data (FAO 1999b). As such, it is important that FI NPOA-Trawling facilitates the establishment, continuation or expansion of an appropriate observer programme(s) to investigate the nature of seabird interactions within the trawling fisheries. If incidental mortality is recorded, determine the spatial and temporal scale and cause(s) of the problem and develop a long-term monitoring programme.

3.8.2. Mitigation Measures

Objective
Recommend a suite of mitigation measures that should be implemented to reduce incidental mortality. These may include mandatory and voluntary measures and recommended actions to attain best practice management.

3.8.3. Bycatch Objectives

Objective
Based on stages 1 and 2 and a thorough knowledge of the operational constraints of the fishery develop annual indicative seabird bycatch objectives.

3.8.4. Research and Development

Objective
Mitigation measures – investigate the development of mitigation measures and evaluate the effectiveness of new mitigation measures under a range of environmental and operational conditions.

Other – identify and prioritize knowledge gaps in seabird ecology that are intrinsically linked with seabird bycatch and would enhance future efforts to quantify and manage impacts.

3.8.5. Education

Objective
Ensure appropriate educational material on managing incidental mortality is available to management, office staff and crew-members of fishing companies.

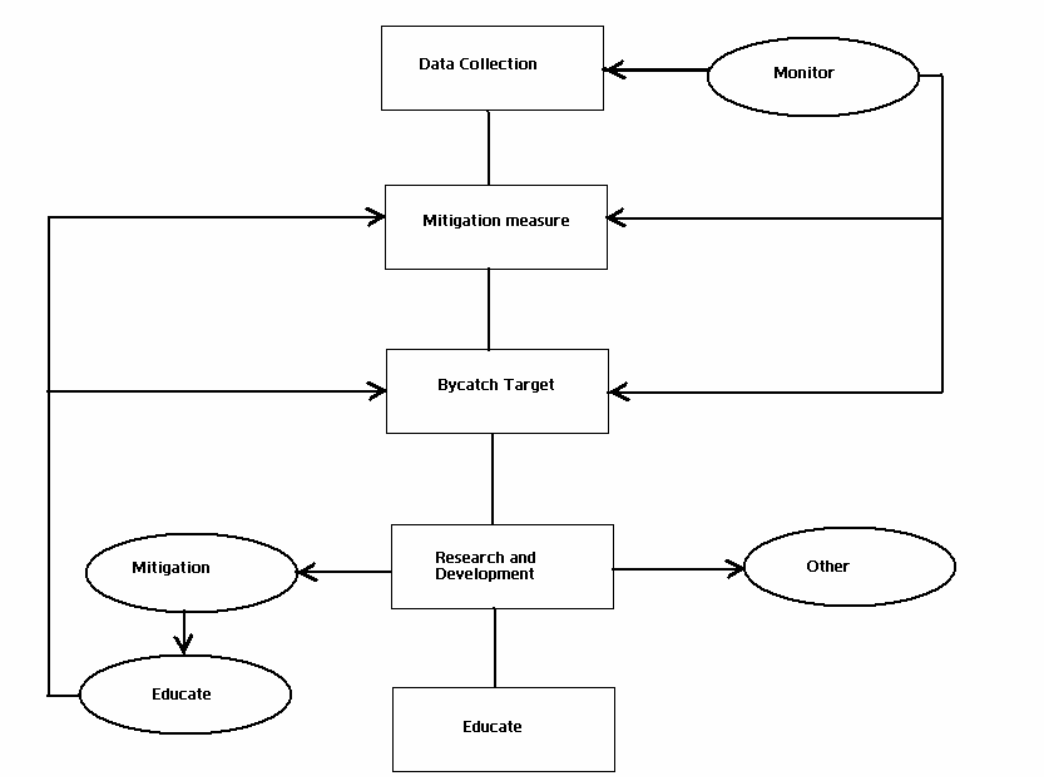

Figure 1. Seabird Interaction Management Strategy

3.9. FINFISH TRAWL FISHERY

3.9.1. Seabird Interaction Management Strategy

The intention of Seabird Interaction Management Strategy-Finfish is to concurrently quantify the current level of seabird bycatch associated with the fleet, and research and develop mitigation measures that will facilitate the future development of bycatch objectives that reduce mortality to a sustainable level.

Prior to the introduction of tori lines, the estimated bycatch of seabirds in demersal finfish, ray and skate trawl fisheries was 1529 for the 2002/03 year. In 2003/04 trials were conducted to test the efficacy of different bird scaring measures as mitigation measures in the trawl fisheries. These trials highlighted the effectiveness of BSL (tori-lines), and consequently these were required to be used by all finfish trawlers from 2004. The following year (2004/05), the estimated seabird bycatch in the finfish trawler fleet was reduced to 169 birds, a reduction of 90%. However, since 2004/05 the seabird bycatch level has increased to 510 in 2007 and 590 in 2008.

The increase in the mortality rate observed after 2004/05 highlights the need to ensure that the BSL are being properly deployed and that additional mitigation measures are considered. It is therefore recommended to study the introduction of complementary long-term mitigation measures, feasible and appropriate, to reduce the actual seabird mortality to a sustainable level.

3.9.2. Data Collection (Observer Coverage)

Strategy
The level of seabird observer coverage should be determined by statistical requirements to achieve a bycatch estimate within a prescribed level of precision.

2009/2010 FIFD fishery observer protocol will be adapted to include extended seabird interactions and mortality coverage, including the monitoring of the modified BSL enforced in June 2009. These protocol modifications should be adapted from the APP observer protocol to ensure consistency.

2010/2011 After assessing effectiveness of the previous year's observer coverage, the existing protocol should be evaluated. If considered satisfactory, observer coverage level should be maintained. Based on seabird mortality estimates, long-term mitigation measures should be evaluated and, if considered necessary, appropriate mitigation measures should be developed and trialed.

2011/2012 Observer coverage level should be maintained in pursuit of consistency to review the FI NPOA-Trawling. If further mitigation measures are implemented, FIFD fishery observer protocol should be adapted for the collection of relevant data for assessing effectiveness.

3.9.3. Mitigation Measures

Strategy
Under current fishing licences, the use of BSL is required by all trawlers in the Falklands waters. Whilst BSL have been shown to significantly reduce the level of seabird bycatch, this measure on its own is unlikely to reduce seabird mortality to a level that will have no deleterious impact on the long-term sustainability of seabird populations in the finfish trawl fishery.

Data collected by APP observers (2004-2008) suggest that discards are ultimately responsible for cable related interactions, which account for 95% of finfish trawler mortality. In the absence of discards, interaction with warp cables became rare and observed mortality non-existent. To reduce finfish trawler related bycatch in the long-term it is essential to lessen the attractiveness of vessels to the seabirds by managing the discharge of discards.

Although there are solutions which might involve vessels modification (Munro 2005), the reduction of discards during fishing operations, especially during periods when the warp cables are in motion (hauling, shooting and turning) and in some cases unprotected, would reduce mortality without any change to current vessel design. Alternatively, modifications to the vessels to ensure discards do not overlap with the danger area were the cables enter the water would also reduce seabird mortality.

3.9.4. Bycatch Objectives

Strategy
Given the actual bycatch estimates for the finfish fleet, it is a priority to be able to set an indicative bycatch target in this sector of the fleet.

By the end 2009/2010, a robust estimate of the seabird mortality should enable specific bycatch objectives to be incorporated into Seabird Interaction Management Strategy-Finfish for 2010-2011.

3.9.5. Research and development

Strategy
Mitigation Measures
To reduce contacts between seabirds and warp cables the following steps should be taken:

- A re-evaluation of the actual Waste Discard Management Discussion Document (Munro 2005) should be conducted by the end of 2010. On top of the feasibility (economic and operational) of necessary structural/technical alterations, the fact that several bycatch species (including invertebrates, rays, skates and some fish species) survive being caught and released should be considered.

- By mid 2010 an evaluation of the operational performance of the modified BSL enforced in June 2009 will be available. Based on the findings for the various demersal fleet components (finfish, *Loligo* squid and ray and skate fleet), introduction of complementary mitigation measures in the form of waste management should be evaluated.

3.9.6. Education

Strategy
- Convert the FI NPOA-Trawling Review into a practical set of procedures for use aboard trawlers.

- FIFD should produce an information sheet on reducing trawler seabird mortality, including the development of the actual mitigation measures in place and its development.

- If new mitigation measures are introduced, an information sheet should be produce by FIFD explaining the measure itself, the procedures involved and the intended goals.

- Continue to raise general awareness of mitigating trawler related seabird mortality in the fishing industry.

3.10. *LOLIGO* SQUID TRAWL FISHERY

3.10.1. Seabird Interaction Management Strategy

The intention of Seabird Interaction Management Strategy-*Loligo* squid is to continue monitoring the level of bycatch associated with this fleet, and if required, research and develop mitigation measures and set bycatch objectives that reduce mortality to a level that will have no deleterious impact on the long-term sustainability of seabird populations.

Significant seabird mortalities were estimated for the fleet during 2005/06 and mitigation measures in the form of BSL were subsequently introduced. Levels of seabird mortality dropped considerably since the introduction of mitigation measures with the latest estimate of mortality rate of 0.02 seabirds per day.

3.10.2. Data collection (Observer Coverage)

Strategy
The level of seabird observer coverage should be determined by statistical parameters to achieve a bycatch estimate within a prescribed level of precision.

2009/2010 FIFD fishery observer protocol will continue monitoring seabird mortality according to their actual protocol.

2010/2011 After assessing effectiveness of previous year observer coverage, the existing protocol should be evaluated. If seabird bycatch mortality rate exceed the actual value of 0.02 seabirds/fishing day, the seabird observer protocol used for finfish fleet should be adopted to assess the performance of the fleet and further mitigation measures in the form of waste management should be considered.

2011/2012 Observer coverage level should be maintained in pursuit of consistency to review the FI NPOA-Trawling. If further mitigation measures are implemented, FIFD fishery observer protocol should be adapted to the collection of relevant data in assessing effectiveness.

3.10.3. Mitigation Measures

Strategy
The introduction of mitigation measures, in the form of BSL, proved to be effective in this fleet with a drop of seabird mortality of 90%. Estimated mortality rate should be monitored yearly and, if it increases, long term mitigation measures such as those considered for the finfish fleet should be evaluated.

3.10.4. Bycatch objectives

Strategy
At present, this fleet shows the smallest seabird mortality rate of the trawling fleet with a value of 0.02 seabirds per fishing day. The evaluation of the performance of the modified tori line and the seabird mortality estimate for 2009/10 should provide the third mortality estimate for this fleet after the introduction of tori lines. A bycatch objective of 0.02 seabirds/fishing day can be set for this fishery from the year 2009/10, being evaluated after each season. If seabird mortality rate increases, further mitigation measures should be considered to ensure the bycatch objective is maintained.

3.10.5. Research and Development

Strategy

- A re-evaluation of the Waste Discard Management Discussion Document (Munro 2005) should be conducted by the end of 2010

- By mid 2010 an evaluation of the performance of the modified BSL enforced in June 2009 should be available. Base on the findings of the evaluation and the seabird mortality rate for this season, introduction of complementary long-term mitigation measures should be evaluated.

3.10.6. Education

Strategy

- Convert the FI NPOA-Trawling Review into a practical set of procedures for use aboard trawlers.

- FIFD should produce an information sheet on reducing trawler seabird mortality, including the development of the actual mitigation measures in place and its development.

- If new mitigation measures are introduced, an information sheet should be produce by FIFD explaining the measure itself, the procedures involved and the goals to achieve.

- Continue to raise general awareness of mitigating trawler related seabird bycatch in the fishing industry.

3.11. RAY AND SKATE TRAWL FISHERY

Available data from the Ray and Skate fleet have been combined with those of the finfish fleet. There is no evidence of differences in fishing procedures and discard of bycatch and offal are similar to those of the finfish vessels. In the last four years, fishing effort by the ray and skate trawl fleet has decreased and 25% of the vessels involved in this fishery hold fishing licences for finfish and at any stage they can alternate between the two. It is consequently thought that these two fisheries should be treated together (see Section 3.9.).

3.12. PELAGIC TRAWL FISHERY

Observations on board the pelagic trawling fleet have indicated significant seabird mortality and thus a section for this fleet has been added to the FI NPOA-Trawling.

In response to the increasing awareness related to the levels of observed mortality during 2008, mitigation measures have been implemented in 2009 licences to reduce seabird bycatch due to net interaction, which apply to pelagic vessels with the exception of surimi vessels. The new set of mitigation measures includes cleaning of the net prior shooting, the use of strops to bind the net for shooting, disruption of discards prior shooting and hauling and minimize the time the net is at the surface.

3.12.1. Seabird Interaction Management Strategy

The intention of Seabird Interaction Management Strategy-Pelagic is to concurrently quantify the current level of bycatch associated with the fleet and evaluate and develop of mitigation measures that will facilitate the future set of bycatch objectives that reduce mortality to a level that will have no deleterious impact on the long-term sustainability of seabird populations.

Significant seabird mortalities were estimated for the pelagic fleet during 2008, especially those related to pelagic vessel discharging untreated discards registering the highest seabird mortality rate (0.26 seabirds per fishing day). The mortality rate registered for those pelagic vessels with waste management on board was 0.13 seabirds per day, very similar to the 0.15 seabirds per fishing day obtained for the finfish fleet.

3.12.2. Data Collection (Observer Coverage)

The level of seabird observer coverage should be determined by statistical parameters to achieve a bycatch estimate within a prescribed level of precision.

2009/2010 FIFD fishery observer protocol will be adapted to include extended seabird interactions and mortality coverage, including the monitoring of the mitigation measures to reduce net related mortalities and the modified BSL design. The use of the mitigation measures to reduce net related mortality might be added as voluntary measures for surimi pelagic vessels.

2010/2011 After assessing effectiveness of previous year observer coverage, the existing protocol should be evaluated. If considered satisfactory, observer coverage level should be maintained. Based on extent of cable related seabird mortality estimates on pelagic vessels discharging untreated discards, the measures applied to the demersal fleet should extend to these vessels.

2011/2012 Observer coverage level should be maintained in pursuit of consistency to review the FI NPOA-Trawling. If further mitigation measures are implemented, FIFD fishery observer protocol should be adapted for the collection of data to assess effectiveness of the new measures.

3.12.3. Mitigation measures

Strategy
The introduction of mitigation measures in the form of BSL has not been effective in reducing net related seabird mortality, the main source of mortality in pelagic trawlers. Mitigation measures in the form of net binding have been trialed by FIFD and results have been positive. Implementation of this mitigation measure to avoid net entanglement of seabirds during shooting operations should therefore reduce seabird mortality.

For those pelagic trawlers discharging untreated discards, the same future mitigation measures applied to the finfish fleet should be taken into consideration, since APP data found that warp cable related mortality in the presence of untreated discards is significant for this fleet.

3.12.4. Bycatch Objectives

Strategy
Due to the implementation of the new set of mitigation measures to reduce seabird mortality in the pelagic fleet, there is no available data to determine a bycatch objective for this fleet.

The introduction of mitigation measures to reduce net related seabird mortality and the evaluation of the performance of the modified BSL during 2009/2010 should provide a robust mortality estimate, in which bycatch objectives could be base and incorporated into Seabird Interaction Management Strategy-Finfish for 2010/2011.

3.12.5. Research and Development

Strategy

- During 2009/2010 the performance of the new set of mitigation measures and their effectiveness in reducing seabird mortality should be evaluated. If it is considered satisfactory, bycatch objectives should be set for the fleet, otherwise further measures should be evaluated.

3.12.6. Education

Strategy

- Convert the FI NPOA-Trawling Review into a practical set of procedures for use aboard trawlers.

- FIFD should produce an information sheet on reducing trawler seabird mortality, including the development of the actual mitigation measures in place and its development.

- If new mitigation measures are introduced, an information sheet should be produce by FIFD explaining the measure itself, the procedures involved and the goals to achieve.

- Continue to raise general awareness of mitigating trawler related seabird bycatch in the fishing industry.

3.13. INTERNATIONAL FISHING

Fishing operations vary greatly depending on the nature of the target species and the vessel, thus the most appropriate and effective mitigation measures to reduce seabird mortality also vary. It is therefore not possible to recommend a uniform suite of mitigation measures for Falkland Islands registered trawlers operating outside of Falkland Islands.

3.13.1. Recommendations

Falkland Islands registered trawlers operating outside Falkland Islands waters where no management guidelines are in place to reduce seabird mortality, or where guidelines are less stringent than those utilized in Falkland Islands waters should utilize all technical mitigation measures and adopt fishery specific best practice methods as outlined in FI NPOA-Trawling.

3.14. REVIEW PROCESS

The Seabird Bycatch Committee (SBC) should monitor the progress of the FI NPOA-Trawling in regard to the implementation of recommendation and success in reducing seabird bycatch to meet the bycatch reduction goals (see timetable bellow). The SBC should act as an advisory committee of the Fisheries Committee and the Environmental Committee, reporting an annual review which details are contained in Section 3.5.

In addition, as required by IPOA-S, FI NPOA-Trawling should be reviewed at four-yearly intervals after its implementation. The SBC should commission an appropriate person(s) to conduct the four-yearly review, which should include, but not be limited to, a review of:

- The scope of the plan
- The purpose of the plan
- The legislative framework
- Status of ACAP and other international obligations and their relationship with FI NPOA-Trawling
- An audit of annual seabird bycatch objectives and assessment of appropriate new objectives
- A review of the conservation status of seabird species potentially impacted by the Falkland Islands trawling fleet

	FI POA-Trawling 2009	2009/2010				2010/2011				2011/2012				2012	
		Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Finfish, Ray and Skate Trawling Fleet	Data Collection	Extended FIFD observer data collection protocol				Assess effectiveness of obs. coverage				Assess effectiveness of obs. Coverage				**Review of FI POA-Trawling 2013**	
		Assess effectiveness of mitigation measures				Maintain or increase observer coverage				Maintain observer coverage					
						Assess effectiveness of mitigation measures				Assess effectiveness of mitigation measures					
				Development and trial of long term mitigation measures (waste management)											
	Mitigation measures						Assess further mitigation measures (Waste management)								
	Bycatch objectives					Incorporation of bycatch objectives			Assess bycatch objectives				Assess bycatch objectives		
	Research and development			Re-evaluation of Waste Management Discussion Document											
				Evaluation of operational performance of modified tori line											
	Education	Production of information sheets with results on reducing seabird mortality, introduction of new mitigation measures and raising general awareness of trawler related seabird mortality													
***Loligo* Fleet**	Data collection	FIFD observer data collection protocol				Assessing effectiveness of obs. coverage				Assessing effectiveness of obs. coverage					
						Adopt extended seabird protocol if mortality rate increase (0.02Sb/d)				Maintain or increase observer coverage					
						Assess effectiveness of mitigation measures				Assess effectiveness of mitigation measures					
	Bycatch objectives	Set bycatch objective of 0.02 seabird/day													
				Assess bycatch objectives					Assess bycatch objectives				Assess bycatch objectives		
	Research and development			Re-evaluation of Waste Management Discussion Document											
				Evaluation of operational performance of modified tori line											
	Education	Production of information sheets with results on reducing seabird mortality, introduction of new mitigation measures and raising general awareness of trawler related seabird mortality													
Pelagic Fleet	Data collection	Extended FIFD observer data collection protocol				Assess effectiveness of obs. coverage				Assess effectiveness of obs. coverage					
		Assessing effectiveness of mitigation measures				Maintain or increase observer coverage				Maintain obs. Coverage					
						Assess effectiveness of mitigation measures				Assess effectiveness of mitigation measures					
	Mitigation measures			Assess effectiveness of mitigation measures											
		Voluntary adoption of net binding and discard management in Surimi vessels													
	Bycatch objectives			Incorporation of bycatch objectives					Assess bycatch objectives				Assess bycatch objectives		
	Research and development	Evaluate performance of new set of mitigation measures for non-surimi vessels													
	Education	Production of information sheets with results on reducing seabird mortality, introduction of new mitigation measures and raising general awareness of trawler related seabird mortality													
Other	SBC			Annual review					Annual review				Annual review		

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Annex A. Species profiles of seabirds reported killed in Falkland Island Waters

A total of six species of albatross and petrels have been reported incidentally killed in trawl fisheries of the Falkland Islands since 2002. Three of these species breed within the Falkland Islands (black-browed albatross, southern giant petrel, white-chinned petrel); the other three are non-breeding visitors (southern royal albatross, northern giant petrel, cape petrel). Profiles that summarize the available knowledge for these species are provided below.

Falkland Island Breeding Birds

Black-browed albatross *Thalassarche melanophris*

IUCN Status:	Endangered
Falklands breeding population:	400,000 pairs
World breeding population:	530,000 pairs
Status:	Decreasing

The black-browed albatross is probably the most widespread species of albatross in the Southern Ocean. Besides the breeding population in the Falklands Islands, significant populations exist on South Georgia and islands off the southern coast of Chile with smaller populations found on Crozet, Kerguelen, Heard, McDonald, Macquarie, Antipodes, and several outer southern Islands of New Zealand. Although individuals from the Crozet Islands, Heard and Antipodes have yet to be sampled, the population in the Falkland Islands is genetically distinct from all other populations analyzed, (Alderman *et al.* 2005). Where sufficient data exists, black-browed albatross populations have been shown to be in decline worldwide.

The Falkland Islands support approximately 67% of the world population of black-browed albatross. There is some disagreement relating the trend of the Falkland Islands black-browed albatross populations with two different studies contradicting each other. According to Falklands Conservation, over the last five years the population has shown a continuous decrease just below 1% per annum (Huin & Reid 2006). A second study using different methods has concluded the population of the different colonies has increase at high rates (Strange 2007). Further work should be conducted to determine the actual status of the species in the Falkland Islands.

Breeding success is approximately 60% (Huin 2000). There are no major terrestrial threats affecting breeding in the Falkland Islands, thus the greatest risk to this species and the main cause of the population decline is thought to be fisheries-related mortality.

Densities of foraging black-browed albatross within Falkland Islands waters are highest over the Patagonian Shelf waters during the breeding season, September-April (White *et al.* 2002). During the austral winter, a large proportion of the population, including fledglings, migrate northwards (Huin 2002), where they interact with fleets fishing off the coasts of Brazil, Uruguay and Argentina.

Black-browed albatrosses are typically the dominant scavengers of longline baits, discards and offal associated with fishing vessels in the Falkland Islands waters. Prior to the introduction of mitigation measures in the Falkland Islands trawl fishery, the annual incidental mortality in the finfish and Loligo fleets was estimated to be 1500 and 350 individuals, respectively. In both cases, the introduction of tori lines resulted in a substantial (90%) reduction in seabird mortality, including black-browed albatrosses.

Southern giant petrel *Macronectes giganteus*

IUCN Status:	Near threatened
Falkland breeding population:	20,000 pairs
World breeding population:	36,000 pairs
Status:	Decreasing

Southern giant petrels are circumpolar in their distribution and typically breed on islands between 40°S-60°S (South Orkneys, South Shetlands, Antarctic Peninsula, South Georgia, Prince Edwards, Macquarie, Heard, islands to the south of Chile and Argentina). The Falkland Islands support more than half of the world population (Reid & Huin 2008).

Surveys of the at-sea distribution of this species in Falkland Islands waters have shown that the highest numbers occur over Patagonian Shelf waters, particularly in areas occupied by fishing vessels (White *et al.* 2002). In addition to those breeding within the Falklands, the numbers at-sea are likely to be bolstered by females from South Georgia, at least during the early stages of their breeding cycle (Croxall and Wood 2002). The seasonal presence of white-phase birds (White et al. 2002) indicates that birds that breed on the South Orkneys, South Shetlands and Antarctic Peninsula and South Georgia, where white-phased morphs are more common, are present within the Falklands Conservation Zones during winter.

Although frequently present in large numbers, giant petrels are less frequent victims of incidental mortality in the Falkland Islands trawl fishery with ten mortalities reported since 2004 (Table 2). However, they represent the second most common species caught since 2004.

White-chinned petrel *Procellaria aequinoctialis*

IUCN status:	Vulnerable
Falklands breeding population:	unknown 50 pairs+
World breeding population:	5,000,000 pairs
Status:	Decreasing

White-chinned petrels have a circumpolar distribution, breeding on South Georgia, Kerguelen, Crozets, Prince Edward, Antipodes, Auckland and Campbell islands. The Falkland Islands support a very small breeding population of this species. The number of birds recorded within the Falkland Islands waters during the breeding season (White *et al.* 2002), together with results from satellite tracking studies (Berrow *et al.* 2000) show that birds encountered at-sea are likely to include many form the large South Georgia population, which consists of approximately one million pairs (Matin *et al.* 2009).

The number of white-chinned petrels recorded in Falkland Islands waters is highly seasonal (White *et al.* 2002). Birds are widespread during the summer with highest densities encountered over Patagonian Shelf waters. During the winter, numbers present are far lower with sightings restricted to Patagonian Shelf waters to the west of the Falklands. White-chinned petrels are thought to migrate to more northerly latitudes during the winter where they are likely to face threats from other fishing fleets.

White-chinned petrels are seasonally frequent around trawlers in low abundance (less than 50 individuals). In the Falkland Islands trawl fishery no mortalities have been recorded since 2004.

Non-breeding birds

Southern royal albatross *Diomedea epomophora*

IUCN status:	Vulnerable
World breeding population:	7,870 pairs
Status:	Increasing

The southern royal albatross is endemic to New Zealand, breeding on Campbell, Enderby, Adams and Auckland Islands. The number of royal albatrosses recorded during at-sea surveys (White *et al.* 2002), together with results from satellite tracking studies (Nicholls *et al.* 2002), highlight the importance of the Patagonian Shelf as a feeding area for this species. Although southern royal albatross are present in considerable numbers year round in the Falkland Islands waters, the highest densities occur between March and June (White *et al.* 2002).

Like the wandering albatross and northern royal albatross, this species hardly approaches vessels and their interactions are usually limited to seabirds approaching the cod end during hauling operations when it comes afloat. Since 2004, no mortality of southern royal albatrosses has been recorded.

Northern giant petrel *Macronectes halli*

IUCN Status:	Near threatened
World breeding population:	7-12,000 pairs
Status:	Decreasing

Northern giant petrels breed at South Georgia, Prince Edward, Crozet, Kerguelen, Macquarie, Campbell and Antipodes Islands and are within Falkland waters year round with the highest densities recorded during the winter (White *et al.* 2002). Satellite tracking from South Georgia suggests that during the breeding season, at least, there could be a marked sex bias towards female birds in Falkland Islands waters (Croxall and Wood 2002).

Northern giant petrels behave around trawl vessel in the same way as southern giant petrels and are likely to be subject to the same risks of mortality.

Cape petrel *Daption capense*

IUCN Status:	Unclassified
World breeding population:	Several million pairs
Status:	Stable

Cape petrels have a circumpolar breeding distribution including Antarctica and adjacent Antarctic and sub-Antarctic islands. The nearest breeding population to the Falklands is located in South Georgia.

Cape petrels are only present within Falkland Islands waters in significant numbers in the non-breeding season, when there is a general northward migration of this species. Throughout the winter, Cape petrels are widely distributed within the Falkland Island waters and typically occur in their highest densities over the Patagonian Shelf (White *et al.* 2002). Large flocks of scavenging petrels are observed around trawlers during winter. In spite of their active feeding around the fishing gear, only two mortalities have been recorded since 2004.

Annex B. Overview of the Falkland Islands Trawl Fishery

The Falkland Islands EZZ extends out to the internationally recognized 200 nautical miles (nm) limit. This area is separated into the FICZ, a radius of 150nm from a central point and declared in 1986, and the FOCZ, which extends from coastal baselines and controlling points to 200nm to the north, south and east and was declared in 1990 (Figure 1).

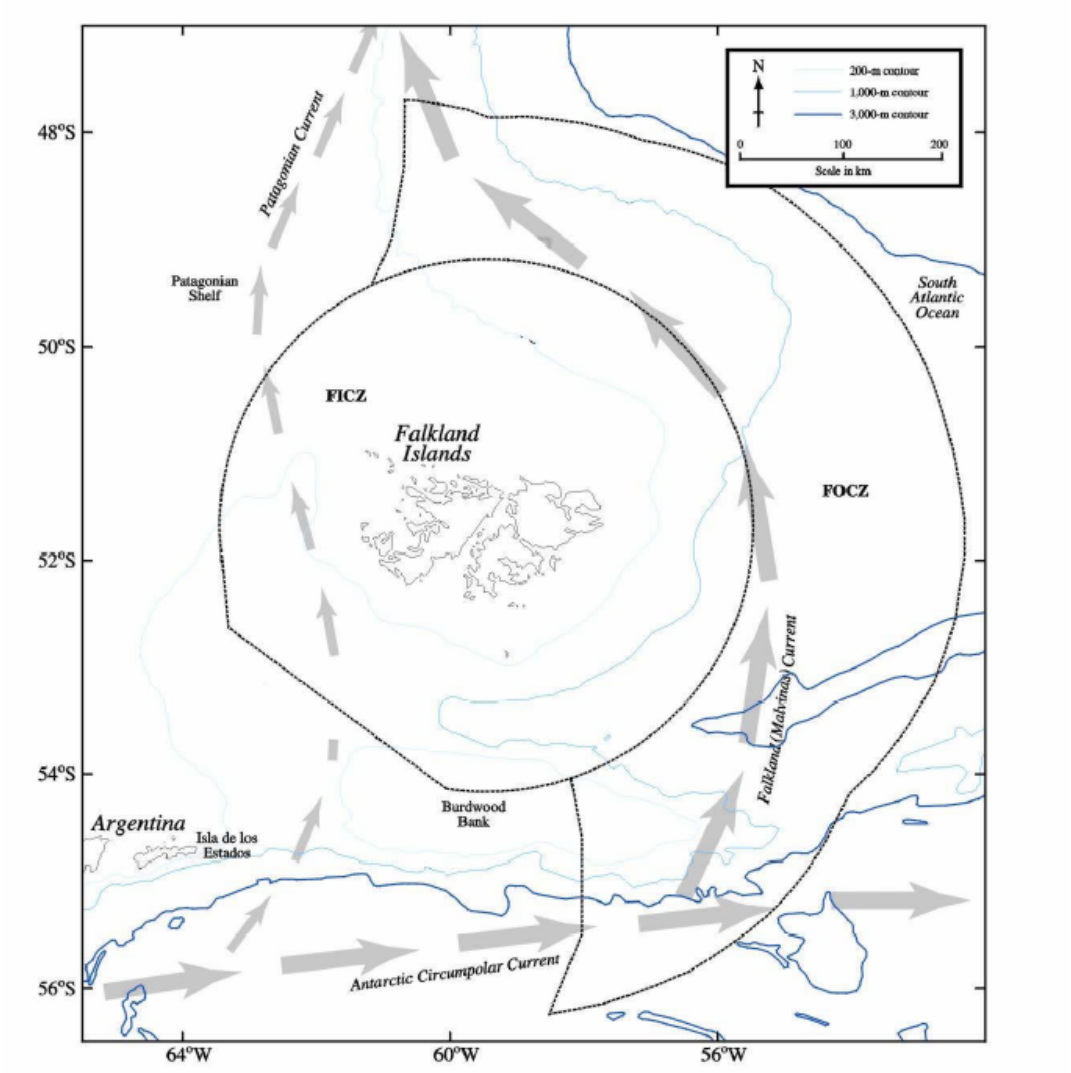

Figure 1. FICZ, FOCZ and Regional Currents.

Fisheries conducted in these waters are vital for the economics of the Falkland Islands, being the main income source for the Government. The revenue in 2007/2008 from fisheries raised the value of £15.2 million, making up 35% of income and around 60% of Gross Domestic Product (source: www.falklands.gov.fk).

Trawl fishing in the Falklands waters has been conducted since the 1970´s by multinational fleets. Fisheries Ordinances established a system of licenses to control access to the fisheries in 1986 and later in 1995 introduced an ITQ (Individual Transferable Quota) system. The 2005 Fisheries (Conservation and Management) Ordinance gave legislative effect to the introduction of property rights up to 25 years and extended the Conservation of Wildlife and Nature Ordinance 1990 beyond the territorial sea (12nm from the coast) to the FICZ & FOCZ.

Fishing area
The distribution of the fishing effort is related to the topography of the seabed, which presents a sharp increase of depth to the east and south of the Falkland Islands whereas to the west and north/northwest depths gently slope away across the Patagonian shelf. Typically trawling activities take place in depths of less than 300m, with the majority at depths of 200m or less. Thus fishing activities to the east and south predominantly takes place within 40 miles of the coast, whereas fisheries extend throughout the FICZ/FOCZ (150-200nm) to the west and north.

Fishing effort varies per area according to the licences conditions (Table 1). The *Loligo* Fishery is restricted to a specific area on the eastern and southern coast of East Falkland, the so-called *Loligo* box, whose boundaries might vary between seasons due to stock management objectives. Most Restricted and Unrestricted finfish Fisheries overlap, sharing the fishing grounds above 51º Latitude with the Skate and Ray Fishery, but all of them are prohibited inside the *Loligo* box. Restricted Finfish-Pelagic Fishery activity mostly concentrates in the *Loligo* box and is geographically restricted during the southern blue whiting spawning season.

Table 1. Typical breakdown of trawling licenses (Falkland Islands Fisheries Department). TAE stands for total allowable effort and TAC for total allowable catch.

Licence type	Period	Effort control	Area
Unrestricted Finfish	All year	TAE	Except *Loligo* box
Restricted Finfish	All year	TAE	Except *Loligo* box
Combined	March - May	TAE	Except *Loligo* box
Skates and Rays	All year	TAE	Except waters below 51° Latitude
Restricted finfish-Pelagic	All year	TAC	Except spawning area at spawning time
Loligo	Autumn season	TAE	*Loligo* box
	Spring season	TAE	*Loligo* box

Vessel Characteristics
All trawlers operating in the Falkland Islands waters are ocean-going factory vessels. They range in size from 50-110m LOA (Length Overall), with the larger vessels generally involved in the *Loligo* or Restricted Finfish-Pelagic Fishery. Vessels in the range of 50-75m LOA predominantly constitute the trawl fleet, with a typical crew of 25-40. Daily catches can vary greatly from several tonnes upwards to exceeding 30-40 tonnes.

Flag State
The flag of vessels fishing in the Falkland waters varies according to the licence type under which they operate. Unrestricted finfish, Restricted Finfish and Combined licensed vessels are either Falkland Islands or Spanish registered. *Loligo* vessels are mainly Falkland Island registered, with one British and one Spanish registered vessel. Skate and ray vessels have historically been predominantly Korean, but in recent years an increasing interest from Spanish owned vessels have emerged. Unrestricted Finfish-Pelagic licences are confined to Japanese or Chilean registered vessels, with the exception in 2008, when one Falkland Island registered vessel joined this fishery.

Licensing Conditions
The Ordinance and licensing provisions give the Director of Fisheries power to impose conditions on vessels fishing in Falkland Island waters and Falklands Island registered vessels operating on the high seas. This is achieved by means such as vessel reporting, carriage of observers, and conservation and mitigation measures to reduce the incidental mortality of seabirds. Current licensing conditions require that all trawlers deploy BSL during all fishing operations (Figure 2).

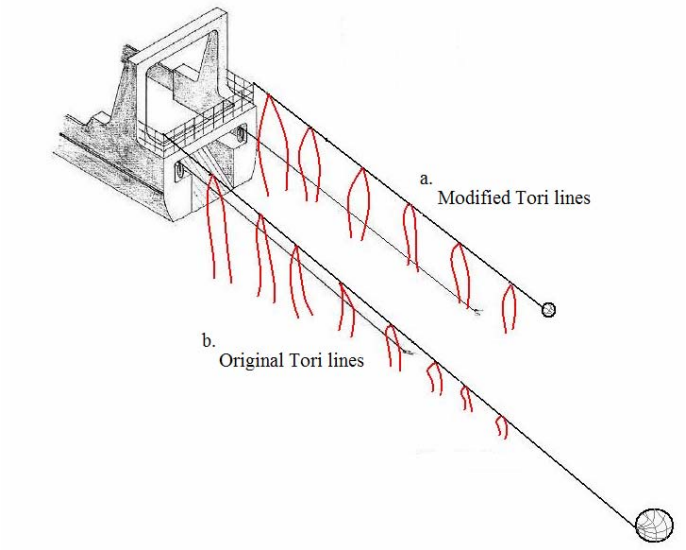

Figure 2. BSL (tori lines) designs under trawlers licence conditions in the Falkland Islands. a) Modified tori lines design implemented by FIFD 2009, b) Original tori lines design implemented by FIFD 2004-2008.

In 2009, further mitigation measures were implemented on pelagic vessels with the exception of those producing surimi. Pelagic vessels are now required to clean the net prior to shooting, use biodegradable strops to bind the net during shooting, discontinue discards 30 minutes prior to shooting and hauling and minimize the time the net is on the surface during all fishing operations.

Seabird observer coverage
The Albatross and Petrel Programme (APP) was established in 2004 to achieve compliance with the Agreement on the Conservation of Albatrosses and Petrels (ACAP) ratified by the UK. The programme replaced the Seabirds at Sea Team (SAST), where the primary aims between 2001-2004 were to investigate and quantify the incidence of seabird by-catch and interactions in the long-line and trawling fisheries in Falkland waters. Since 2004 to 2008 APP have employed dedicated seabird observers, who spend 100% of their duties assessing seabird interactions specifically in the trawler fleets. In addition observers monitored the performance of mitigation measures to assess and improve performance where possible.

Since 2006, the Falkland Islands Fisheries Department has incorporated seabird monitoring duties into the scientific observer protocol. In the past these protocols had only addressed collecting information for stock assessment purposes and biological studies of the exploited species. Currently FIFD fishery observers are required to observe hauling operations on every fourth day of fishing activity, to detect seabird mortality associated with fishing gear and to evaluate the performance of the tori lines. Subsequently, during 2008, a FIFD dedicated observer was tasked to investigate tori line performance and identify where improvements could be achieved.

Finfish, Ray and Skate Trawling Fleet

The finfish fleet embraces those trawlers fishing under the unrestricted finfish, restricted finfish and combined licences. The finfish fleet in the Falklands operates throughout the year targeting predominantly southern blue whiting (*Micromesistius australis*), hoki (*Macruronus magellanicus*), hake (*Merluccius hubbsi* and *M. australis*), kingclip (*Genypterus blacodes*), red cod (*Salilota australis*) and more recently rock cod (*Patagonotothen ramsayi*). The majority of

the finfish effort is concentrated in the west of FICZ at water depths up to 400m, but typically between 100-200m.

There is a small ray and skate trawling fleet of Korean and more recently Spanish trawlers targeting the family Rajidae, the most commonly caught skate and ray species being *Bathyraja griseocauda*, *B. albomaculata*, *B. brachyurops* and *Dipturus chilensis.* For the purpose of this document the ray and skate fleet will be included under finfish fleet.

During the last four years, the fishing effort in terms of fishing units has been constant, although due to variations in the GRT of the vessels forming the fleet, fishing effort days have varied (J. Barton *per comms*). The ray and skate fleet effort has been reduced by half since 2005, whereas finfish trawling effort days has increased by 25 percent for the same period. As a combined fishing effort of these fleets, the overall effort in fishing days has been a slight increase over the last 4 years (Figure 3).

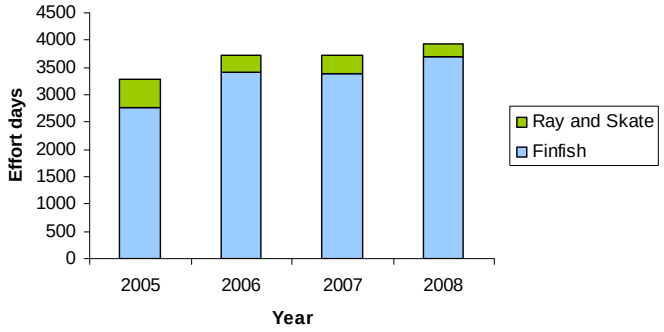

Figure 3. Finfish and ray and skate trawler fleet effort (2005-2008) defined as number of fishing days

Loligo Squid Trawling Fleet

The *Loligo gahi* trawler fleet is the second most important commercial fishery in the Falkland Islands, after the *Illex argentinus* jigging fleet. *Loligo* vessels target two cohorts in their feeding grounds on the east coast of the islands at depths of 120 to 250m. The *Loligo* fishery is restricted to a specific area (*Loligo* box) from which all other trawling effort is prohibited, with the exception of pelagic vessels fishing for southern blue whiting. Typically, 16 vessels are licensed to fish over two *Loligo* seasons. The fishing effort remains stable with small variations in the 2nd season (spring) due to early closures for stock conservation reasons (Figure 4).

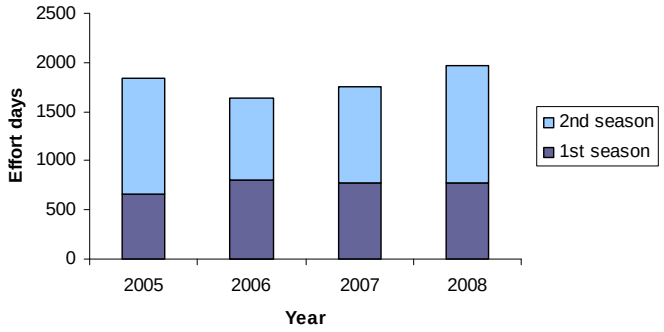

Figure 4. *Loligo* trawler fleet effort (2005-2008) defined as number of fishing days

Restricted Finfish-Pelagic fishery

The restricted finfish-pelagic fleet is the smallest fleet operating in the Falkland waters with 1 to 3 vessels targeting hoki and blue whiting. The fishing activity takes place mostly in the east and

south of FICZ from October through December at depths of 200 to 400m. From the 1st of July until 15th of October, the blue whiting spawning grounds south and south-east off the islands are closed to this fishery. The actual TAC for this fishery is 18,000 tonnes of blue whiting. Fishing effort defined as number of fishing days has increased during the last 4 years and in 2008 included a surimi pelagic vessel discarding sump water, a pelagic trawler with a fish meal plant and a pelagic trawler discarding untreated waste and bycatch (Figure 5).

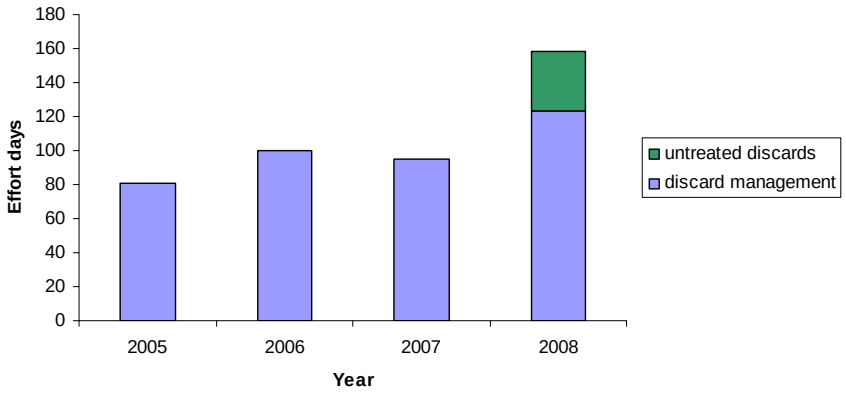

Figure 5. Pelagic trawler fleet effort (2005-2008) defined as number of fishing days

Annex C. Policy/legislative Framework

Falkland Island Law

Conservation of Wildlife and Nature Ordinance 1999

All seabird species are protected in the Falkland Islands under this Ordinance, adopted? in 1999 to replace the previous Wild Animals and Birds Protection Ordinance. The ordinance contains provisions for the protection of wild birds, wild animals and wild plants, introductions of new species and for the designation of National Nature Reserves.

The Fisheries (Conservation and Management) Ordinance 2005

This ordinance was introduced in September 2005 and gives legislative effect to a review and modernisation of fisheries policy including the introduction of property rights in the Falkland Islands fishery.

Under the Fisheries (Conservation and Management) Ordinance 2005, sustainability means maintaining the potential of fisheries resources to meet the reasonable foreseeable needs of future generations; avoiding, remedying, or mitigating adverse effects of fishing on the marine environment so far as it is reasonably practicable to do so.

The waters covered by the ordinance include the internal waters territorial seas, and the FICZ and FOCZ. This ordinance also extends the Conservation of Wildlife and Nature Ordinance 1999 to the fishing waters beyond the territorial sea.

International Associations, Conventions and Law

International Union for the Conservation of Nature

The International Union for the Conservation of Nature (IUCN) through the Species Survival Commission (SSC) has for more than 30 years been assessing the conservation status of species on a global scale in order to highlight taxa threatened with extinction, and therefore to promote their conservation.

Assessments are conducted according to strict scientific criteria and assessed by a committee at the IUCN congress. Assessment criteria include the population size, the geographical range and the reduction in population size in relation to the generation length of the assessed species. For those species where adequate data exist, seven levels of threat are identified; Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW) and Extinct (EX).

Approximately 36 species that are found in the Falkland Islands are red listed, including within the seabirds species the black-browed albatross (vulnerable), southern giant petrel (endangered) and white-chinned petrel (endangered).

Convention of the Conservation of Migratory Species of Wild Animals

This convention came into force in 1983 under the United Nations Environmental Program (UNEP). The fundamental objective of CMS is to protect and conserve terrestrial, marine and avian migratory species throughout their range. Migratory species are defined by the convention as those that regularly cross international boundaries, including international waters.

Six albatross and petrels that breed on the islands or are common visitors are listed under Appendix II of the convention, including black-browed albatross, southern giant petrel and white-chinned petrel. This appendix covers those species that have an unfavourable conservation status and require concerted and collaborative international efforts to achieve and maintain a favourable conservation status.

Agreement on the Conservation of Albatross & Petrels

The Agreement on the Conservation of Albatross & Petrels (ACAP) is a daughter agreement of CMS. At the sixth meeting of the Conference of Parties to the CMS, the threat posed by fisheries bycatch to a wide range of species in general, but particularly albatrosses and petrels, was noted, and it was requested that relevant parties develop an agreement under the convention for the conservation of Southern Hemisphere albatrosses and petrels. ACAP came into force in February 2004 with the ratification by the required five states. The agreement was ratified by the UK in April 2004 and extended to the UK Overseas Territories in the South Atlantic Ocean. A total of 13 countries have joined the ACAP agreement, including Chile (2005), Argentina (2006), Brazil (2008) and Uruguay (2009). This expansion on the Parties of the ACAP constitutes a great development since jurisdictional waters of these countries are extensively used by Falkland Island breeding and migratory seabirds.

ACAP is a binding agreement that requires signatory countries to commit to a range of actions that address all threats relevant to albatrosses and petrels, not just the threat posed by fisheries. One of ACAP´s general conservation measures that relates directly to fisheries is to 'develop and implement measures to prevent, remove, minimize or mitigate the adverse effects of activities that may influence the conservation status of albatrosses and petrels' (Article III 1c).

The agreement currently includes 26 species, 19 albatrosses and 7 petrels. Three of these species, the white-chinned petrel, southern giant petrel and black-browed albatross breed in the Falkland Islands. An additional four ACAP listed species, the wandering albatross, southern royal albatross, grey-headed albatross and northern giant petrel, regularly forage within Falkland Island waters.

A workshop was held in the Falkland Islands in March 2006 to identify conservation priorities to achieve the ACAP objectives in the UK Overseas Territories of the Falkland Islands, South Georgia, British Antarctic Territory and Tristan da Cunha. The meetings proceedings (Falklands Conservation 2006) effectively form a Falklands Species Action Plan for black-browed albatross, southern giant petrels and white-chinned petrels. This document was later converted into a Falklands plan, being review and revised in 2007. The next version is currently under review.

United Nations Convention on Law of the Sea

The United Nations Convention on Law of the Sea (UNCLOS) 1982 entered into force in the Falkland Islands in 1994. UNCLOS provides a framework for the better management of marine resources and a new legal regime that affords ocean and coastal states rights and responsibilities for the management and use of fishery resources within their EEZs, which embrace 90% of the world's marine fisheries.

Article 61 of the agreement is related to the impact of the incidental mortality of seabirds and other non-target species and requires coastal states and states fishing on the high seas to consider the effects on species associated with or dependent upon harvested species, with a view to maintaining or restoring populations of such associated or dependent species above levels at which reproduction may become seriously threatened. The convention also introduces the concept of precautionary management.

For the Falkland Islands flagged vessels to fish on the high seas, a licence must be issued by FIFD and vessels must be equipped with a vessel monitoring system.

Convention on the Conservation of Antarctic Marine Living Resources

Although the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) is strictly aimed at protecting the marine ecosystem in the convention area (http://www.ccamlr.org/pu/E/conv/maplge.htm), it is also relevant to conservation measures and resource management in Falkland Islands waters.

Food and Agriculture Organisation- Code of Conduct for Responsible Fisheries

These guidelines were born of the need to address continuing concern regarding unregulated fishing on the high seas, particularly of migratory fish species of stocks of fish that straddle the waters of various nations. In 1991, the Food and Agriculture Organisation Committee of Fisheries (FAO-COFI) called for the development of new concepts, which would lead to responsible, sustained fisheries. Subsequently, the International Conference on Responsible Fishing, held in 1992, further requested FAO to prepare an international Code of Conduct to address these concerns. In November 1993, the 'Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas' was adopted at the 27th Session of the FAO Conference.

In response to these developments, the FAO Governing Bodies recommended the formulation of a global 'Code of Conduct for Responsible Fisheries' to be consistent with these instruments and, in a non-mandatory manner, establish principles and standards applicable to the conservation, management and development of all fisheries. The Code, which was unanimously adopted in October 1995 by the FAO Conference, provides a necessary framework for national and international efforts to ensure sustainable exploitation of aquatic living resources in harmony with the environment (FAO 1995).

Within the framework of the 'Code of Conduct for Responsible Fisheries', the 'International Plan of Action-Seabirds (IPOA-S)' was developed. The issue of the incidental mortality of seabirds in longline fisheries first received official international recognition with the passing of a resolution at the IUCN World Conservation Congress in 1996 that called for concerted action to reduce seabird mortality.

This was followed in 1997 by the FAO-COFI establishing a Seabird Technical Working Group to draft guidelines on reducing incidental mortality and prepare a draft Plan of Action to implement the mitigation guidelines, which resulted in the production of the IPOA-S (FAO 1999a).

The Falkland Islands Government and Fisheries industry adopted in 2004 a National Plan of Action (NPOA)-Seabirds (Trawling) for the period 2004-2008 and a National Plan of Action-Seabirds (Longlining) for the same period - 2004-2008. The process of plan preparation and adoption was led by Falklands Conservation and the RSPB. The plans set out the adoption of fishing licence conditions, which include aspects to protect seabirds, and for the NPOA-Trawling to adopt and monitor new seabird bycatch mitigation measures. Targets for bycatch rates were set for the NPOA-Longlining, but not for the NPOA-Trawling.

Annex D. Implemented mitigation measures in the Falkland Islands Trawl fishery.

In 2009 new set of mitigations has been introduced in the demersal and pelagic trawl fishery by the FIFD to further reduce seabird mortality. Modifications in the design of the BSL (1) were introduced to improve their performance as deterrent of cable related mortality. To reduce seabird mortality due to net related interactions, a set of measures (2) were implemented in the pelagic trawlers, excluding surimi vessels.

1. Trawler: Bird scaring line – 2009

Note: THE DESIGN OF BIRD SCARING LINE SET OUT HERE IS TO BE IMPLEMENTED BY 01 JULY 2009.

THIS DESIGN CAN BE IMPLEMENTED EARLIER THAN THE 01 JULY 2009, OR THE CURRENT VERSION MAY BE USED TO THE 01 JULY 2009.

FISHING LICENCE : SUPPLEMENTARY CONDITION

Demersal Trawler Licences

Mitigation of Seabird Mortalities

1) In order to reduce incidental seabird mortalities through warp strikes, all finfish and Loligo trawlers must deploy two Bird Scaring Lines (BSL).

2) BSL must be deployed immediately after the trawl doors are submerged, throughout the trawl until once hauling operations commence.

3) BSL must be deployed from the stern of the vessel from attachment points higher than and no more than 2 m horizontally from the trawl warp (where it passes over the block at the stern of the vessel). Extension pieces may need to be fabricated to allow correct positioning of the streamers.

4) A third spare streamer line must be available for immediate deployment in the event of a mishap with either of the two streamer lines in use.

Design

Figures 1 & 2 detail the design of BSL that have been tested and shown to significantly reduce the number of seabirds hitting the trawl warps whilst foraging astern of fishing vessels, reduce bird entanglements and improve durability.

The lines must be made from 8-10 mm floating line, either laid or pleated. The total length of the line astern the vessel is 30 m.

Six double streamers are to be attached at intervals indicated in Fig 1. Attachment may be by swivels with stoppers or directly into the lay of the rope (Fig 2). Streamer lengths range from 2 × 8 m streamers closest to the stern to 2 × 3 m streamers nearest the buoy.

It is essential that the streamers be made from semi-flexible tubing of high visibility (red, orange or yellow). The recommended tubing is Red Mazzerpur 10 mm polyurethane tubing. Polythene and materials such as fire hose; old waterproofs and dark coloured tubing are not acceptable.

The drag buoy must be a net covered 300mm diameter HDP moulded fishing float attached by a swivel.

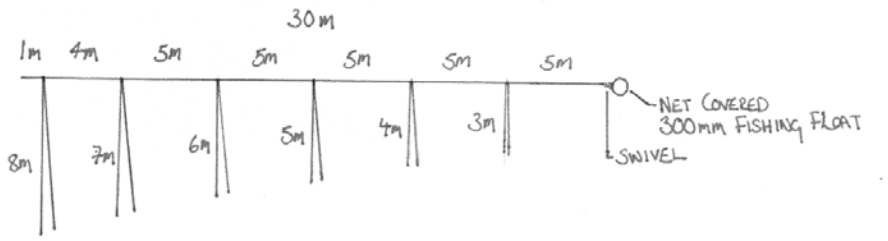

Fig 1. Design of Approved BSL

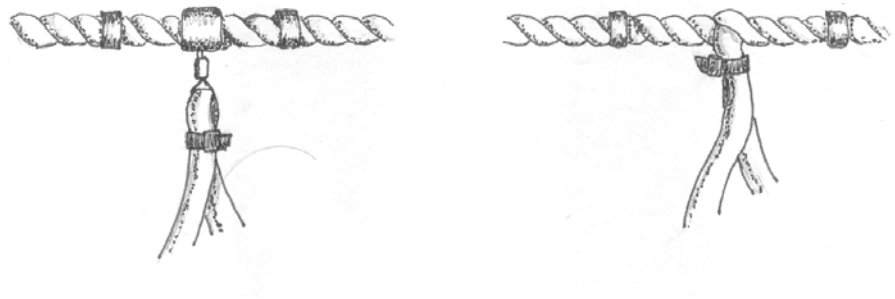

Fig 2. Attachment of Approved BSL

2. Implementation of mitigation measures to reduce seabird mortalities associated with pelagic trawling within the Falkland Island Conservation Zone

Background

In response to seabird mortalities associated with pelagic fishing operations, the Falkland Island Fisheries Department has implemented mitigation measures based on CCAMLR conservation measures (25-03) for reducing the incidental mortality of seabirds and marine mammals.

Mitigation measures for vessels operating within the Falkland Islands Interim Conservation and management Zone (FICZ) and the Falkland Islands Outer Conservation Zone (FOCZ) include:

- Use of strops during shooting (biodegradable material such as sisal string)
- No discards from the factory during shooting and hauling
- Minimise the time that the net is stationary on the surface of the water during shooting and hauling
- Cleaning of the net prior to shooting

Strops reduce bird mortalities by (1) minimising the spreading of the net on the surface, which reduces the likelihood of birds getting entangled and subsequently drowning while trying to scavenge from the net and (2) increase the rate at which the net sinks during shooting. The remaining mitigation measures minimise the interaction between seabirds and commercial fishing operations by reducing discards that attracts seabirds to vessels.

The most suitable string for use as strops is 3 ply sisal string with a breaking strain of 110kg, to ensure the net has sunk below the surface before the bindings break.

Implementation of mitigation measures

- Strops should be attached at approx. 3 m intervals with the string passing between 2 meshes to avoid the binds slipping down the net.
- The binding should also be tied to the net so they are not lost at sea once they have broken
- Strops should be attached along sections of the net where the mesh size is sufficiently large for seabirds to become entangled

- No discards from the factory 30 minutes prior to shooting and hauling
- Prior to shooting, by-catch (such as squid) and fish should be removed from the sections of the net were mesh size is sufficiently large for seabirds to become entangled
- Hauling and shooting procedures that minimise the time the net is stationary on the surface should be adopted