LONGLINE FISHING AT TRISTAN DA CUNHA: IMPACTS ON SEABIRDS

LIJNVISSERIJ BIJ TRISTAN DA CUNHA EN DE GEVOLGEN VOOR ZEEVOGELS

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Tristan da Cunha and Gough Islands in the central South Atlantic Ocean support globally important seabird populations. Two longline fisheries occur within Tristan's Exclusive Economic Zone: a pelagic fishery for tunas and a demersal fishery for bluefish and alfoncino. Fishery observers have accompanied all three licensed demersal cruises. Despite attracting considerable numbers of birds and setting lines during the day, only one bird (a Great Sheawater Puffinus gravis*) was killed (mortality rate 0.001 birds per 1000 hooks). By comparison, the pelagic fishery for tuna, which exceeds demersal fishing effort, probably has a much greater impact. Observations aboard one vessel in mid-winter suggest a bycatch rate of >1 bird killed per 1000 hooks; this could be even higher in summer when more birds are breeding at the islands. Stricter regulations are required for pelagic vessels, including routine placing of observers on board. The gravest threat posed by longline fishing to Tristan's seabirds comes from vessels fishing illegally in Tristan waters, as well as vessels in international waters that do not use basic mitigation measures. There is a pressing need for better policing of Tristan's waters.*

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INTRODUCTION

Longline fishing has been identified as the major cause behind long-term population decreases in several seabird species (e.g. Weimerskirch & Jouventin 1987, Croxall *et al.* 1990, Brothers 1991, Brothers et al. 1999). As a result, the Food and Agriculture Organization (FAO) of the United Nations has requested member nations to produce International Plans of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (IPOA-SEABIRDS, FAO 1999). In the first instance this requires that member states assess whether a problem exists with seabird bycatch in their longline fisheries.

Tristan da Cunha (37°S, 12°W) is a United Kingdom Overseas Territory located in the central South Atlantic Ocean, roughly midway between

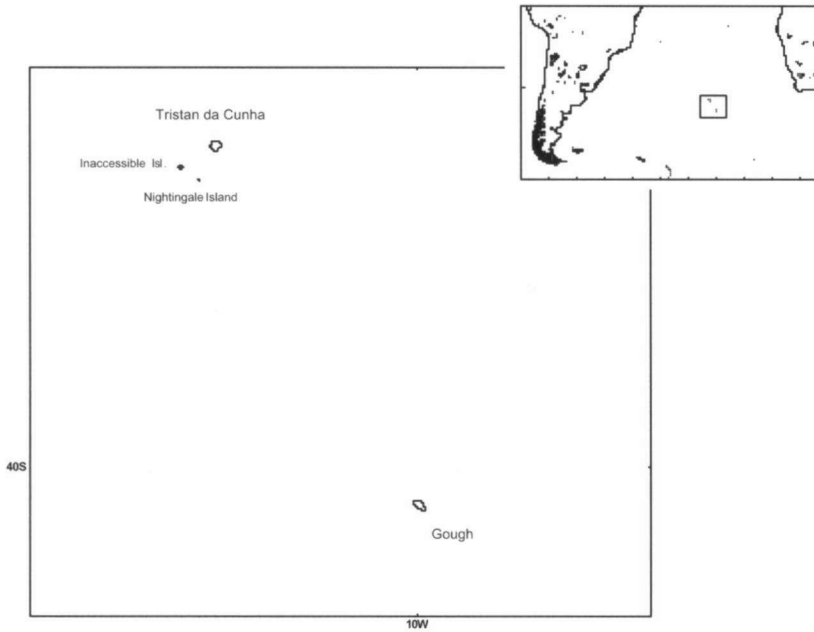

Fig. 1. Tristan da Cunha and Cough Island in the South Atlantic Ocean.
Fig. 1. Tristan da Cunha en Cough Island in de Zuid-Atlantische Oceaan.

South Africa and South America (Fig. 1). The three islands in the Tristan group and Gough Island (40°S, 10°W) all support globally important seabird populations (Richardson 1984). They are the sole breeding locations for Tristan Albatross *Diomedea [exulans] dabbenena*, Atlantic Yellow-nosed Albatross [Mollymawk] *Thalassarche [c.] chlororhynchos*, Spectacled Petrel *Procellaria conspicillata* and Atlantic Petrel *Pterodroma incerta*, and support the majority of the world populations of Northern Rockhopper Penguins *Eudyptes [chrysocome] moseleyi*, Sooty Albatross *Phoebetria fusca* and Great Shearwaters *Puffinus gravis*. The main island of Tristan has a small community of some 300 people who derive most of their income from fishing. The primary fishery is for Tristan Rock Lobster *Jasus tristani* which takes place in the narrow shelf waters surrounding the islands in the Tristan group and at Gough Island (Ryan 1991). This fishery is operated by a single concession holder that has exclusive commercial fishing rights within 50 nautical miles of the islands (Tristan da Cunha Fishery Limits Ordinance 1983, as amended 1991, 1992 & 1997). This fishery has limited impacts on seabird populations, primarily causing some mortality from night-strikes when birds become disoriented by the ships' lights (Ryan 1991).

Prior to 1995, the lobster fishery was the only sanctioned commercial fishery, although unlicensed fishing was known to occur at least occasionally, including the use of drift-nets with adverse effects on seabirds (Ryan & Cooper 1991). Permits to fish in waters 50-200 nautical miles (the outer limit of the Exclusive Economic Zone, EEZ) from the Tristan islands and Gough have been sold annually since 1995. To date, all licensed fishing in these waters has been with longlines, although an application to trawl for demersal and midwater fish on seamounts has been approved. Nothing is known about the interactions of these fisheries with the seabirds that breed on the Tristan islands. This paper summarises the information currently available on longline fishery-seabird interactions at Tristan da Cunha.

METHODS

Tristan's Natural Resources Department administers the sale of permits to fish with longlines in Tristan waters. Most vessels applying for permits in Tristan waters target pelagic fish such as tunas while en route between fishing grounds in the south-west and south-east Atlantic Ocean. Consequently it is difficult to require permit holders to report to Tristan to take aboard fishery observers before commencing fishing. Only one observer from Tristan's Natural Resources Department (NG) has been on a pelagic longliner, and he was returned to Tristan after only two sets, ostensibly because the vessel experienced technical problems. Other than this, there is no record of pelagic fishing effort other than the numbers of permits sold each year.

By comparison, longline vessels targeting demersal and midwater fish visit Tristan's waters specifically to fish on various seamounts within Tristan's 200 nm EEZ. The permit conditions for these vessels require that they call at Tristan and take aboard fishery observers before any fishing can take place. Once the observers are dropped back on Tristan the vessels can no longer fish, and must immediately leave Tristan waters. Observers have inspected fishing operations on all three demersal longline fishing cruises to Tristan waters since 1995. They observed all hauls and recorded the numbers of seabirds killed. On the most recent cruise in November 1999, NG and IL also estimated the numbers of seabirds attending the vessel during shooting and hauling operations. Because hauling and shooting often took place in quick succession it was not feasible to separate the birds attending the different fishing activities.

RESULTS

Longline fisheries in Tristan waters target both pelagic (e.g. tunas *Thunnus* spp.) and demersal or midwater fish species (e.g. alfoncino *Beryx splendens* and Antarctic bluefish *Hyperoglyphe antarctica*). In the five years 1995-99, 21

Table 1. Numbers of longline permits sold for Tristan waters, the nationality of the operating company, and the type of fishing activity.
Tabel 1. Aantal uitgegeven vergunningen voor lijnvisserij bij Tristan da Cunha naar nationaliteit en type visvangst (pelagisch of demersaal).

Year	Pelagic (tuna)		Demersal/midwater	Total
	Japan	Portugal	South Africa	
1995	6			6
1996	4		1*	5
1997	3	1		4
1998	1	1	1*	3
1999	2		1	3
Total	16	2	3	21

* ship registered in Argentina, but operated by a South African company

longline permits have been issued (Table 1). All but three (86%) have been for pelagic longlining, with most being to Japanese tuna vessels. The numbers of permits sold each year has halved since the system was initiated in 1995, with the number of pelagic permits sold falling to one third the number originally sold (Table 1).

Pelagic fishery The only observer data for the pelagic fishery are for a Japanese vessel in mid-winter (29 July to 1 August 2000). Only two sets were observed. Each involved some 3000 hooks and setting took almost 6 hours to complete. The first set took place during the day (07:20-12:55h) and attracted 10-12 Black-browed Albatrosses [Mollymawks] *Thalassarche melanophris* and 15-25 Great Shearwaters *Puffinus gravis*. The second commenced in the early morning (02:45h) and was completed approximately 1.5 hours after dawn (08:05h), by which time 2-5 Black-browed Albatrosses and 6-8 Great Shearwaters were in attendance. No bird scaring line was used for either set. The observer was able to watch only *c.* 60% of each haul, and crew members rapidly discarded birds caught. However, at least 4 Black-browed Albatrosses were caught on the first set; none was seen on the second set. All four birds were sodden, and thus apparently were caught during setting. This represents a mortality rate of 1.5 birds per 1000 hooks set (based on the numbers of hooks actually observed during the haul).

Demersal fishery The three demersal longline cruises set 693 700 hooks (Table 2). Due to the exploratory nature of the cruises, hook loss was relatively high (13.5% overall), but decreased with each cruise. Although not a permit requirement, bird scaring lines were deployed during all sets. Daylight setting was permitted on the understanding that it would be prohibited should bird

Table 2. Details of all three demersal longline fishing cruises in Tristan waters with fishery observers on board.
Tabel 2. Waarnemingen aan boord van lijnvissers bij Tristan da Cunha: aantal uitgezette en verspeelde haken en de waarnemers aan boord.

Fishing dates	Hooks set	Hooks lost	Observers
24 Dec. 1997 to 1 Feb. 1998	323 400	50 000	J. Glass
20 Feb. to 19 Mar. 1998	220 300	30 900	I. Lavarello
5 to 23 Nov. 1999	150 000	12 750	N. Glass & I. Lavarello
Total	693 700	93 650	

Table 3. Numbers of hooks set during November 1999 in relation to the time of day when setting took place.
Tabel 3. Aantal uitgezette haken in november 1999 en de tijd van de dag.

Time of day	Number of hooks	%
Dawn *zonsopkomst*	6 000	4.0
Day *overdag*	87 000	58.0
Dusk *zonsondergang*	10 000	6.7
Night *'s nachts*	47 000	31.3
Total	150 000	

bycatch become significant. During the November 1999 cruise, more than two thirds of the 150 000 hooks were set during daylight, or at dawn and dusk (Table 3). An average of 273 seabirds from six species attended the vessel during fishing operations (Table 4). The most abundant species was the Great Shearwater, but there were substantial numbers of both Tristan Albatross and Atlantic Yellow-nosed Albatross (Table 4). Despite the reasonably large numbers of birds attending fishing operations, only one bird was reported killed: a single Great Shearwater. This gives a bycatch rate of only 0.007 birds per 1000 hooks. No birds were reported killed on the other two cruises, giving a combined bycatch rate for the demersal fishery of only 0.001 birds/1000 hooks.

Cetaceans often also are attracted to longline vessels, and can cause significant losses by eating fish as the line is hauled. This can lead to friction between fishers and cetaceans. Long-finned Pilot Whales *Globicephala melas* and Dusky Dolphins *Lagenorhynchus obscurus* were observed during the November 1999 demersal cruise, but the only cetacean that appeared to be attracted by the fishery was a single beaked whale (possibly Shepherd's Beaked Whale *Tasmacetus shepherdi*). This individual stayed with the vessel for approximately two hours on 8 November 1999 while the line was being hauled. It was not possible to tell whether it removed fish from the line.

Table 4. Numbers of seabirds attending demersal longline sets and hauls during November 1999 in Tristan waters (n = 8 counts).
Tabel 4. Aantallen zeevogels aangetrokken door lijnvissers in november 1999 in de omgeving van Tristan da Cunha (n= 8 tellingen).

Species	Mean	SD	range
Great Shearwater	202.5	207.0	30-600
Tristan Albatross	22.6	18.5	3-50
Yellow-nosed Albatross	22.6	13.5	5-45
Giant petrels *Macronectes* spp.	10.9	10.4	0-30
Sooty Albatross	8.3	12.9	0-40
Subantarctic Skua *Catharacta antartica*	6.6	4.9	0-15
All species	273.4	267.2	38-780

DISCUSSION

The seabird bycatch rate in the small demersal longline fishery off Tristan is exceptionally low, and suggests little cause for concern. The fact that licensed longline fishing is only permitted at least 50 nautical miles from the breeding island probably contributes to the small numbers of birds killed, because seabird bycatch in the Patagonian Toothfish *Dissostichus eleginoides* fishery around the sub-Antarctic Prince Edward Islands decreases markedly with increasing distance from the islands (Ryan & Purves 1998; Ryan & Watkins 1999).

By comparison, the limited bycatch data for the more extensive pelagic longline fishery suggests that this fishery poses a significant threat to seabirds in Tristan waters. Other pelagic fisheries in the Southern Hemisphere have high bycatch rates (>1 bird per 1000 hooks set), and albatrosses in particular are more prone to being killed (e.g. Brothers 1991; Ryan & Boix-Hinzen 1998; Brothers *et al.* 1999; Neves *et al.* 2000; Olmos *et al.* 2000). Seabird bycatch rates by pelagic longline vessels operating in Tristan waters are likely to even higher in summer, when more seabirds are present around the islands. We recommend that permit holders should be encouraged wherever possible to apply mitigation measures to reduce seabird bycatch. Such measures include:

- Setting lines only at night (defined as nautical dusk-dawn).
- Using an effective bird-scaring line during all sets.
- Ensuring that the line sinks quickly through sufficient weighting and slow setting speed (demersal fisheries) and through using thawed bait with punctured swim bladders (pelagic fisheries).
- Limiting the amount of offal discarded, and only dumping offal on the side away from the hauling station (to avoid birds scavenging at the offal chute being entangled).

Making these measures mandatory may be counter-productive, however, because vessels without observers might be tempted to modify their logbooks to show that lines were set only during the night, and thus affect fishery statistics (e.g. altered soak times would bias estimates of catch per unit effort).

The dilemma facing Tristan's Natural Resources Department is to promote seabird-friendly fishing without encouraging licensed fishers to join the ranks of unlicensed fishers. 'Pirate' fishing vessels are sighted regularly, but the island's fishery patrol vessel lacks the ability to force vessels to stop for inspection. The decrease in the numbers of pelagic longline permits sold since 1995 (Table 1) probably reflects the low chance of being caught fishing without a permit rather than a decrease in the desire to fish in Tristan waters. More effective policing of Tristan's waters by UK naval vessels is essential to limit the numbers of unlicensed vessels fishing. This will not only increase revenues to the island from permit fees, but also allow better management of the fish and seabird resources. A recent observation from Gough Island gives an indication of the possible impact of unlicensed longline vessels on seabirds. Nick du Plessis, Captain of the *Kelso*, one of the ships used in the lobster fishery, reported ten Tristan Albatrosses floating dead off Gough in February 2000. At the time, Spanish conversations were heard on short-range (VHF) radio channels, suggesting that longline vessels were fishing illegally inside the island's EEZ. The Tristan Albatross only breeds at Gough and Inaccessible Island, and is considered Endangered (Croxall & Gales 1998).

The importance of Tristan's seabird colonies emphasises the need to incorporate Tristan da Cunha in the United Kingdom's National Plan of Action for reducing incidental catch of seabirds in longline fisheries. Many of the seabirds breeding at Tristan and Gough forage well outside the 200 nautical mile EEZ, however, and we know that large numbers of birds are killed by longlining throughout the South Atlantic (Cooper 1994; Ryan & Boix-Hinzen 1998; Neves *et al.* 2000; Olmos *et al.* 2000). Effective long term conservation of Tristan's seabirds requires that these fisheries also significantly reduce their seabird bycatch.

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SAMENVATTING

Tot de grootste bedreigingen voor zeevogels behoort de bijvangst in de lijnenvisserij ('long-line fishery'). De duizenden met aas haken aan elk van de uitgezette lijnen oefenen een onweerstaanbare aantrekkingskracht op albatrossen en stormvogels uit. Per ongeluk aangehaakte vogels sterven de verdrinkingsdood. Rond Tristan da Cunha en Cough Eiland, zeer geïsoleerde eilandjes met interna-

tionaal belangrijke populaties broedvogels vind, zowel een gereguleerde visserij (met vergunning) als piratenvisserij plaats. Hier worden de bevindingen van waarnemers aan boord van toegestane vissersvaartuigen beschreven. Twee soorten visserij werden onderzocht: een meer op de bodemfauna gerichte demersale visserij en de tonijnenvangst (pelagische visserij). De eerste bevindingen wijzen uit dat de demersale visserij bij de huidige praktijk weinig bijvangstrisico's met zich meebrengt, maar in de tonijnenvisserij zou aanzienlijk zorgvuldiger gewerkt kunnen worden. Tevens wordt gerapporteerd over wat de waarschijnlijke gevolgen van een illegaal vissende Spaanse visser moeten zijn geweest: tenminste 10 kadavers van zojuist verdronken. endemische Tristan (Reuzen-) Albatrossen Diomedea [exulans] dabbenena.

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