

# FISHING GEAR, OIL AND MARINE DEBRIS ASSOCIATED WITH SEABIRDS AT BIRD ISLAND, SOUTH GEORGIA, DURING 1993/1994

NICOLAS HUIN & JOHN P. CROXALL

*British Antarctic Survey, Natural Environment Research Council, High Cross, Madingley Road, Cambridge CB3 0ET, U.K.*

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## SUMMARY

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We record the first observations of oiled albatrosses at South Georgia, provide data on ingestion of plastics by albatrosses and giant petrels and report a six-fold increase over the previous year in the incidence of fishing line and hooks associated with, regurgitated by and impaled in seabirds. Although the presence of oil and the ingestion of plastics are probably causing only minor problems for South Georgia seabirds at present, the increase in number and variety of environmental threats is a cause for concern.

## INTRODUCTION

Seabirds face an increasing variety of threats from human fishing practice and from anthropogenic debris in the Southern Ocean (Ryan 1987, Bartle 1991, Brothers 1991, Murray *et al.* 1993, Croxall & Wace 1995). For many albatross species, recent population declines have been ascribed mainly to interactions with longline fisheries (review in Gales 1993); this applies particularly to Black-browed, Grey-headed and Wandering Albatrosses, *Diomedea melanophris*, *D. chrysostoma* and *D. exulans* at South Georgia (Croxall *et al.* 1990, Prince *et al.* 1994).

Understanding the potential magnitude and significance of the effects of human activities and debris on albatross populations requires systematic recording and reporting of relevant data, in order to establish baselines and to follow trends. Whereas studies of populations in breeding colonies and of interactions with fishing vessels at sea are becoming more widespread and systematic, other potential impacts may be less well documented.

Recent observations at Bird Island, South Georgia of oiled penguins (Reid 1995) and of fishing hooks and other gear attached to, regurgitated by, or associated with albatrosses (Cooper 1995) caused us to start recording such events in a more standardized fashion, in order to be able to evaluate whether such impacts would increase in future. This paper reports oiled seabirds, marine debris ingested by seabirds and fishing gear associated with them at breeding sites on Bird Island between April 1993 and March 1994.

## METHODS

The data reported are from a combination of systematic regular visits to selected seabird colonies and incidental observations during general field work.

The entire breeding population of Wandering Albatrosses and

selected colonies of other species (Gentoo Penguins *Pygoscelis papua*, Macaroni Penguins *Eudyptes chrysolophus*, Black-browed and Grey-headed Albatrosses) are visited regularly each year in order to perform standardized census and capture-mark-recapture studies, chiefly of breeding birds. On all such visits the number of birds or nests checked and any evidence of oil on plumage, marine debris and fishing gear regurgitated by or associated with birds is recorded. Similar records of other species (e.g. Northern and Southern Giant Petrels *Macronectes halli* and *M. giganteus*) or of the above species elsewhere on the island, are not based on regular visits and therefore cannot be quantified in the same way.

As part of routine work on Wandering Albatrosses, one area, comprising about 150 breeding pairs and producing 90–100 fledged chicks, is checked annually between October and December in order to collect 25–30 ‘pellets’. These pellets comprise the annual regurgitation, by chicks prior to fledging, of accumulated squid beaks; this provides another potential source of information on ingestion of marine debris.

## RESULTS

### Oil

Two breeding Wandering Albatrosses (0.08% of the total breeding population of 2658 birds in 1993/94) were seen with small amounts of blackish oil on their breast plumage. One bird, observed on 22 December 1993, had just returned from a foraging trip lasting one day, and had thus been contaminated relatively close to South Georgia. The oil, of unknown nature and origin, formed a roundish patch 15 cm in diameter. For the other bird, observed on 11 March 1994, with several small (1-cm diameter) spots of oil, no data are available on the duration of the previous foraging trip. With both birds, all signs of oil had disappeared a few days later and they continued breeding, successfully hatching eggs, without any observable ill effects.



**Fig. 1.** Wandering Albatross *Diomedea exulans* with longline fishing hook impaled in its throat, Bird Island, South Georgia, 1993/94.

### Plastic debris

Material regurgitated by three species of seabird is summarized in Table 1. In future items of plastic debris will be more precisely identified. Of the material from Wandering Albatrosses, six items (54%) were found loose on the ground, the other five being part of the pellets containing squid beaks.

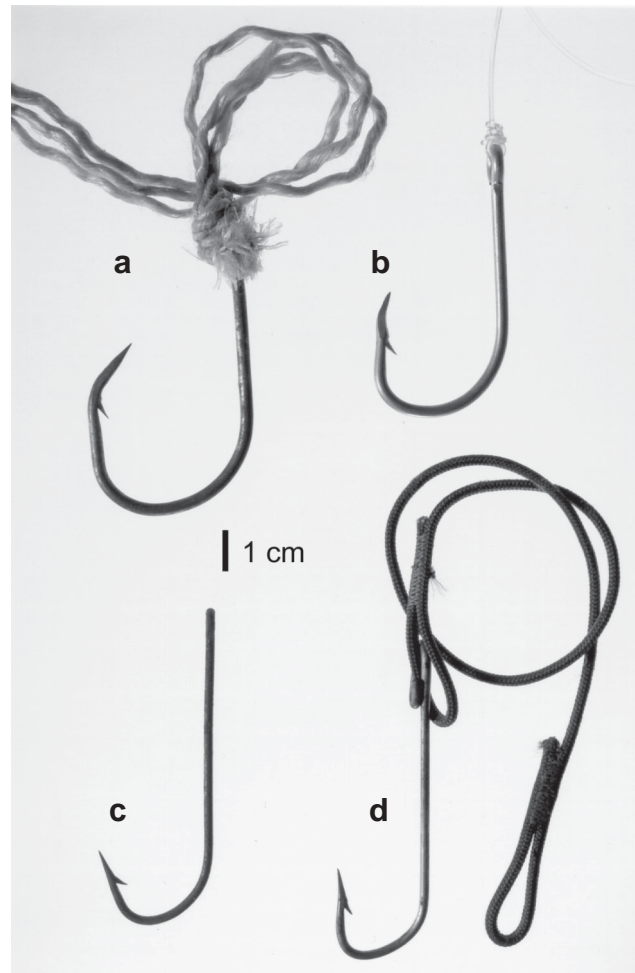
### Fishing Gear

#### *Wandering Albatross*

Material found in association with Wandering Albatrosses is summarized in Table 2. Of the 37 items reported, 95% came from fin-fisheries. The other two, being the decoys from squid jigs, were found in October–December, but were not associated with pellets of squid beaks. Most material (55%) came from the collection of 25 squid pellets; most of the rest (40%) was found beside nests. Only two birds had impaled hooks (see Fig. 1); these were successfully removed from both birds.

Excluding pellets collected between October and December, least material was found in April–June (two items) and July–December (one item) and most in October–December (seven items) and January–March (eight items). However, the dates of regurgitation will not necessarily reflect when the birds actually obtained the material, because they may retain it in the stomach for considerable periods.

The nine items of fishing gear (one line, four hooks, four lines and hooks) retained for further identification cover the full range of material encountered (Fig. 2). Fishing line was of four types: triple filament (4-mm diameter) nylon rope (e.g. Fig. 2a), monofilament nylon line (e.g. Fig. 2b) of 1-mm diameter, 2-mm diameter cord (e.g. Fig. 2d) and nylon twine (2.5-mm diameter).



**Fig. 2.** Fishing hooks collected in association with albatrosses at Bird Island, South Georgia 1993/94. See text for further details.

Hooks were of two main types, each with two minor variants. The hooks illustrated in Figs 2a (one example) and 2b (three examples) are both used widely in Korean and Chilean longline fisheries for Patagonian Toothfish *Dissostichus eleginoides*. All our examples of hooks known to be from Korean vessels have multifilament nylon lines (like Fig. 2a), whereas those from Chilean vessels have monofilament lines like that attached in Fig. 2b. Hooks as illustrated in Fig. 2c (three examples) and with a cord line (Fig. 2d) are identical to those used by Russian longline vessels fishing for *Dissostichus*. The provenance of hooks with circular (rather than oval) attachment loops (e.g. Fig. 2b; one example) and with different types of line is uncertain.

For all lines still attached to hooks, the line appeared to have been severed by a sharp instrument. As Cooper (1995) suggests, birds are believed to be caught on hooks during the hauling operation and then cut free when brought on board ship.

#### *Mollymawks*

Four decoys from squid jigs were found in Grey-headed Albatross colonies between October 1993 and March 1994. On 5 January 1994 a breeding adult Black-browed Albatross in a study colony had a hook (that illustrated in Fig. 2b) embedded in its throat. The hook was removed successfully. The bird

TABLE 1  
NATURE OF PLASTIC DEBRIS REGURGITATED BY SEABIRDS AT BIRD ISLAND,  
SOUTH GEORGIA, 1993/1994

Species	Debris					Number of nests checked
	Cigarette lighter	Glove	Bottle/tube cap	Misc./unknown	Total	
Wandering Albatross	2	1	2	6	11	1329
Grey-headed Albatross				6	6	3397
Southern Giant Petrel		1		1	2	

had just returned from a two-day foraging trip, suggesting that the hook had been ingested relatively close to South Georgia. Another similar fishing line and hook was regurgitated by a Black-browed Albatross on 19 February 1994.

#### *Giant petrels*

On 14 September 1993, an adult Northern Giant Petrel with a line and hook (of the type illustrated in Fig. 2b) attached to its wing had these removed by cutting through the barb.

## DISCUSSION

### Oil

The observations of oiled albatrosses are the first such records at South Georgia since the start of the research programme in 1971/72. Taken together with the previous year's report of oiled penguins (Reid 1995), they are a continuing cause for concern that oil is being discharged near South Georgia.

### Plastic debris

Ingestion of plastics by albatrosses at Bird Island was first recorded by Prince (1980) in 1975/76. Similar observations have been made in most subsequent years but no previous quantitative data are available to compare with the present records. None of the plastics ingested originated from the local research station and all probably derived from material jettisoned by vessels at sea.

### Fishing gear

In 1992/93 six instances of fishing gear associated with albatrosses were reported from Bird Island (Cooper 1995). Five of these instances involved Wandering Albatrosses, comprising one line (in pellet), two loose hooks (one in pellet), one hook and line and one hook impaled in the foot of a breeding bird. The other instance involved a Black-browed Albatross with a hook and line lodged internally. The six-fold increase this year may partly represent more intensive observations, especially in examination of squid pellets. However, the main studies of albatrosses are conducted in an identical fashion each year (see Croxall *et al.* 1990, Prince *et al.* 1994), so it is equally possible that the considerable increase in reports of fishing gear and especially of hooks does represent a real change in the number of birds encountering such material. The fishing effort (in terms of thousand of hooks deployed) for *Dissostichus* around South Georgia in the 1993/1994 season was twice that of the previous year (4433 thousand hooks deployed from July 1993 to June 1994 compared with 2289 thousand in 1992/1993), although it was lower than in the four previous years (range from 4764 thousand in 1990/1991 to 10 068 thousand in 1989/1990) (data from CCAMLR-SB/95/7 Statistical Bulletin, Volume 7).

Hooks attached to, or regurgitated by, albatrosses may come from two different sources associated with fishing operations. The first concerns those (usually few) birds caught alive when lines are being hauled in (e. g. Brothers 1991, Murray *et al.* 1993, N.P. Brothers *in litt.*). The second source is the discarding of unwanted bycatch and fish offal (heads), which still

TABLE 2  
FISHING GEAR ASSOCIATED WITH WANDERING ALBATROSSES *DIOMEDEA EXULANS* AT  
BIRD ISLAND, SOUTH GEORGIA, 1993/1994

Source	Fishing line	Fishing hook	Fishing line & hook	Total hooks	Squid jigs	Total	No. nests checked
Found by nest	5	4	5	9	2	16	1329
In chick squid beak pellet	3	14	2	16	0	19	92
In bird: adult	0	1	0	1	0	1	
chick	0	0	1	1	1	1	
Total	8	19	8	27	27	37	—

contain hooks which are then scavenged by birds around the fishing vessels (N.P. Brothers *in litt.*). Birds caught during line setting (the commonest source of entanglement in longline fisheries) cannot sever the line and either pull free or are drowned. Birds caught during hauling are cut, or pulled, free when brought on board and then released (J.A. Bartle *in litt.*). We have no data on the number of birds released alive around South Georgia and the number which survive. Birds feeding on discards can readily swallow hooks that have not been removed; Wandering Albatrosses may be at a higher risk than other birds, being able to swallow larger items. The level of mortality from this source is also unknown. Although it is likely that the main origin of hooks associated with albatrosses is from discards rather than from birds being caught during hauling, we cannot estimate at present their relative proportions.

A rough overall indication of the number of Wandering Albatrosses involved can be derived from the number of pellets regurgitated by chicks in which hooks are found. Thus pellets provided over half (59%) of hooks reported in 1993/94. Of the 25 full pellets collected, five (20%) contained hooks. If this is representative of the whole chick population, then at least 250 adult Wandering Albatrosses (from a total breeding population of 1329 pairs fledging around 1000 chicks) would have ingested hooks and regurgitated these to their offspring. This is a minimum estimate, because an unknown number of adults may not regurgitate to chicks the hooks on which they were caught or may regurgitate them at sea prior to return.

The implication that even 10% of the Bird Island population of breeding Wandering Albatrosses was swallowing hooks via discards and/or was caught and freed on longlines in 1993/94 is of serious concern. It is of direct concern in itself through the potential for internal injury to the birds and of indirect concern through its testimony to the presumably much larger number of birds caught and killed as a consequence of the setting of longlines in the South Atlantic.

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