

Seabird and turtle bycatch in the South African pelagic longline fishery

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Introduction

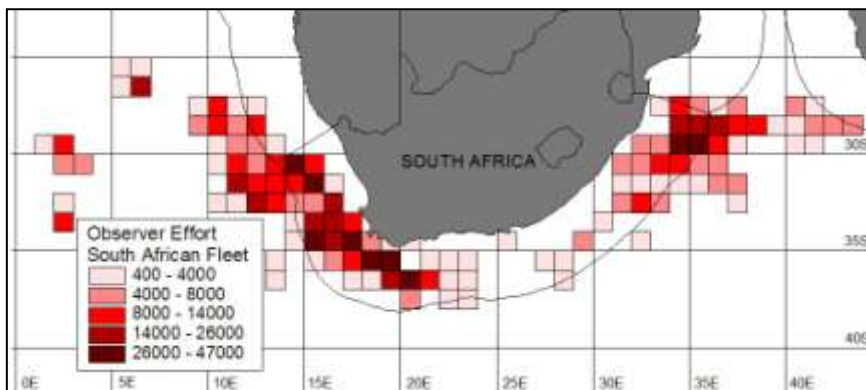
This paper provides an update of seabird bycatch in the South African Swordfish *Xiphias gladius* longline fishery.

Methods

Data were collected by sea-fisheries observers on board pelagic longline vessels operating in the South African fishery since 1998. This information included seabird bycatch information (species, number and status), as well as gear (e.g. number of hooks, length of mainline etc.) and operational (time of set and position etc) information. These vessels carried rights to fish within South Africa's EEZ as well as on the high seas. The data used in this report were made available by Marine and Coastal Management, Department of Environmental Affairs and Tourism, South Africa.

Results

South African vessels targeting Swordfish use the American Longline system. These vessels set a total of 10.6 million hooks from 1998 to 2005, at an average of 1.3 million hooks per year. Fishing effort differed between years ($\chi^2=1534980$, $df=5$, $p<0.001$) and peaked in 2002 at 2.6 million hooks and decreased till 2005 when 0.8 million hooks were set. There was also a significant difference between seasons ($\chi^2=309948$, $df=3$, $p<0.001$). Approximately 3 million hooks were set during spring and winter compared to an average of 2.1 million hooks during summer and autumn. Observer data was collected from 827 sets or 1 million hooks (10% of the total) from 1998 to 2005. Although these vessels target swordfish, they catch a combination of swordfish (22%), tunas (40%), blue sharks (24%) and Mako sharks (3%).



Seabird bycatch

Swordfish directed vessels caught seabirds at a rate of 0.22 birds/1000 hooks in the winter and 0.24 birds/1000 hooks in the summer (Table1). White-capped albatrosses were the most commonly caught at a rate of 0.08 birds per 1000 hooks. Black-browed albatrosses and white-chinned petrels were caught at an average catch rate of 0.35 and Yellow-nosed Albatrosses at an average rate of 0.003 birds/1000 hooks. Although catch rates for albatrosses were the highest on the west coast, a significant number of petrels were caught on the east coast i.e. in the Indian Ocean (Fig 1).

Generalized linear modeling revealed light to be a significant factor both in terms of daylight (accounted for 0.3% of the variance, $p < 0.001$) and moonlight (accounted for 7.7% of the variance, $p < 0.001$). Catch rates were highest when sets occurred during the day and over full moon periods when they were set at night (Fig 2). The average catch rate was 0.2 birds per 1000 hooks during full moon compared with an average of 0.05 outside of full moon periods.

Table 1: Summary of catch rates and extrapolations stratified by 5 degree grid square, season and flag

Species	Black-browed Albatross	White-capped Albatross	Yellow-nosed Albatross	White-chinned Petrel	Total Birds
SA swordfish winter	0.05	0.07	0.03	0.05	0.22
SA swordfish summer	0.02	0.09	0.01	0.02	0.24

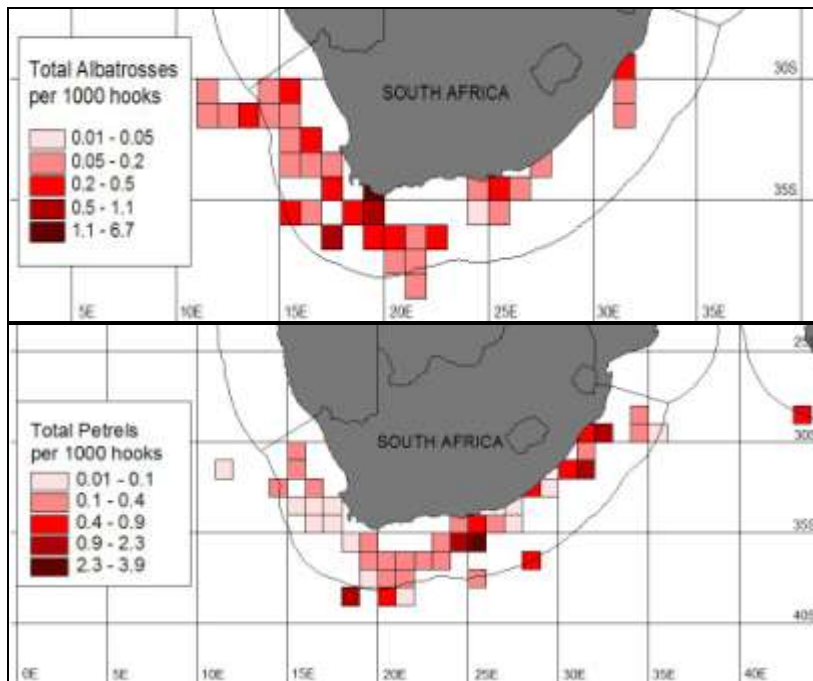


Figure 1: Catch rates of albatrosses and petrels by one degree grid square

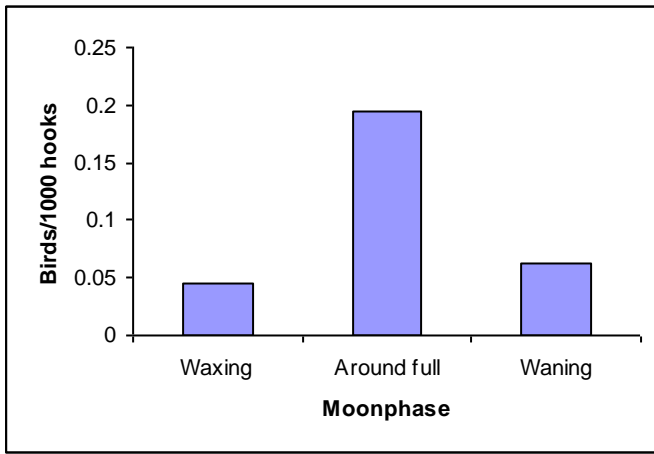


Figure 2: Effect of moon phase on seabird mortality