CHAPTER EIGHTEEN

The conservation of albatrosses in Uruguayan waters

A. STAGI,[1] R. VAZ-FERREIRA,[1] Y. MARÍN[2] and L. JOSEPH[3]

At least five species of albatrosses visit Uruguayan waters from breeding sites in the Southern Ocean. The threats to albatrosses in Uruguayan waters include intentional killing by fishermen, oil spills and mid-water (tuna) and demersal longline fishing activities. Of these longline fishing poses by far the most serious threat to albatross survival. On 14 tuna fishing trips between 1993 and 1994 catch rates of 4.7 albatrosses/1 000 hook deployed were recorded. The Black-browed Albatross was the main species caught. Catch rates by demersal vessels were lower but there is potential for the absolute number of albatrosses caught by demersal vessels to be higher, due to the greater number of hooks deployed in each set. An educational programme for fishermen and the implementation of seabird bycatch mitigation measures on fishing vessels are urgently required.

Key words: Albatrosses, Uruguayan Waters, Longline Fishing, Seabird Bycatch.

INTRODUCTION

THE Uruguayan coast runs along the south-western Atlantic Ocean and includes one of the world's largest estuaries. The Río de la Plata, which is an estuary formed by the Río Paraná and the Río Uruguay, has a surface area of 30 212 km^2 and a coast that extends for some 280 km between the mouth of the Río Uruguay and Punta del Este. The southwestern Atlantic Ocean extends for approximately 200 km between Punta del Este and Chuy between 34°S and 38°S. Between the coast and the continental shelf is an ocean surface of about 133 000 km.^{2} In this area the water masses are highly dynamic owing to their diverse origins either from the Malvinas current, the Brazil current, coastal waters, or the Río de la Plata. In summer tropical waters from the Brazil current predominate and during winter cold water from the Malvinas current advances over the continental shelf. The two currents meet and form the Sub-tropical Convergence, which is a zone of upwelling and high productivity. This upwelling area is favoured by a rich variety of marine life including sea mammals and seabirds; it is also favoured by commercial fisheries.

In this chapter we provide an overview of the occurrence of albatrosses in Uruguayan waters and discuss the conservation-related problems affecting them. We also describe the impacts of fishing activities on albatrosses and our attempts to minimize fisheries-induced mortality of albatrosses in Uruguayan waters. The information presented complements the unpublished report by Vaz-Ferreira *et al.* (1994).

ALBATROSSES IN URUGUAYAN WATERS

Although no albatross species breed near Uruguay five species have been recorded in Uruguayan waters. The most common of these are the Wandering *Diomedea exulans*, Black-browed *D. (Thalassarche) melanophrys* and Yellow-nosed *D. (Thalassarche) chlororhynchos* Albatrosses. Royal Albatrosses *D. epomophora* are an occasional visitor and there is one record of a Grey-headed Albatross *D. (Thalassarche) chrysostoma* visiting Uruguayan waters.

Wandering Albatrosses

This species is most abundant in winter but there are some summer records (Escalante 1970; Gore and Gepp 1978; A. Stagi and R. Vaz-Ferreira, pers. obs.). Wandering Albatrosses are usually seen as single birds or as pairs; only rarely are groups of several birds observed. Data from banding recoveries (Croxall and Prince 1990) and from satellite-tracked birds (Prince *et al.* 1992; Prince *et al.* 1997) have shown that Wandering Albatrosses in Uruguayan waters originate from South Georgia and are most

[1]Sección de Vertebrados, Facultad de Ciencias, Universidad de la República, Tristan Narvaja 1674, Montevideo 11200 Uruguay.
[2]Instituto Nacional de Pesca (INAPE), Constituyente 1497, Montevideo 11200 Uruguay.
[3]Laboratorio de Evolución, Facultad de Ciencias, Universidad de la República, Tristan Narvaja 1674, Montevideo, 11200 Uruguay.

Pages 220–24 in THE ALBATROSS BIOLOGY AND CONSERVATION, ed by G. Robertson and R. Gales. Surrey Beatty & Sons, Chipping Norton, 1997.

probably females, the males foraging further south. A Wandering Albatross caught off Uruguay had been banded twice, once off eastern Australia and once at South Georgia; this albatross holds the record for the longest time (32 years) between banding and recovery in Uruguayan waters. Five band recoveries have been of birds banded as nestlings at South Georgia.

Black-browed Albatrosses

This species is most abundant in Uruguayan waters during the winter and only occasionally are birds seen in summer (Escalante 1970; Gore and Gepp 1978; A. Stagi and R. Vaz-Ferreira, pers. obs.). Black-browed Albatrosses follow fishing boats and commonly form groups of 20–90 birds and occasionally more than 500. Tickell (1967) showed that 88% of recoveries of Black-browed Albatrosses banded at the Islas Malvinas (Falkland Islands) came from the Atlantic coast of South America, including Uruguayan waters, whereas about 95% of recoveries of South Georgia birds came from South Africa. Only 1.6% of the latter had been recorded off the South American coast.

Yellow-nosed Albatrosses

This species accompanies fishing boats during the day and occasionally is found dead on beaches of the Uruguayan coast; in August 1967 10 individuals were found dead on beaches near Punta del Este (35°S; 55°W, F. Achaval, pers. comm.). Although at-sea observations have revealed groups of up to 250 Yellow-nosed Albatrosses in the first half of April, most frequently seen have been small groups of albatrosses or single, immature birds.

ALBATROSS MORTALITY IN URUGUAYAN WATERS

The factors that affect the survival of albatrosses in Uruguayan waters include deliberate capture and killing by fishermen, shooting by fishermen (up until about 1990), oil spills and commercial fisheries.

Oil spills

The potential for mortality through oiling is of special concern in Uruguay and occasionally oiled Black-browed and Yellow-nosed Albatrosses are washed up on beaches, suggesting mortality through the direct and indirect consequences of oil spills. The Uruguayan oil refining company ANCAP has an oil processing plant on the Atlantic coast and oil tankers regularly anchor a few kilometres offshore while oil is pumped to a nearby plant. Oil spills are not uncommon and there is concern from the general public about the effect of oil spills on the sea, marine life, the coastal environment and the tourism industry.

Intentional killing by fishermen

From interviews with fishermen and casual observations on fishing boats it seems that an unknown number of albatrosses has died through wanton destruction by members of boat crews (the reaction of fishermen to hooked and drowned birds is generally one of antipathy). For example, up until about 1990 members of some crews used to entertain themselves by shooting albatrosses that flew near fishing boats. Albatrosses that did not die outright may have been killed with blows, or by being hooked. In one instance an albatross had its wings tied together before being thrown into the water simply so the crew could see what would happen. In another instance two baited hooks on a line were cast into the water so that the crew could watch two albatrosses fighting for the bait; the birds became hooked and died trying to free themselves. Other cases involve painting captured albatrosses, placing bow ties around their necks and removing the feathers from their heads. In all cases the observers were unable to prevent these actions from taking place.

Fisheries-induced mortality

Several fishing methods are practised in Uruguayan waters (Fig. 1). These include traditional net and hook fishing and coastal trawling, neither of which leads to significant mortality of albatrosses. Deep-sea trawling attracts many birds but is also a minor cause of mortality. The greatest cause of albatross mortality in Uruguayan waters is from longline fishing for Tuna *Thunnus* spp., Merluza (Hake) *Merluccia hubbsi* and rays (Vaske 1991). The most important of these for the conservation of seabirds is longline fishing for tuna. Tuna (mid-water) fishing began in 1959 and in 1995 five tuna vessels were fishing in Uruguayan waters (owing to the depletion of tuna stocks Swordfish *Xiphias gladius* is the main target species of these vessels). The number of hooks in each set varies from 300–1 000 and the hooks are baited with whole squid. The lines usually are set at night in an operation lasting between three and six hours. The fishing seasons are March–May, July–August and September–October. We have observed the deployment of 61 545 baited hooks during 139 sets and hauls in 14 tuna fishing trips. The demersal (bottom-set) long lines have involved 723 950 baited hooks set in two trips and 46 nets set on one trip fishing for Merluza. Collectively, we have spent a total of 324 days at sea comprised of 247 days on tuna vessels, 65 on deep sea longline boats and 12 days on Merluza fishing vessels.

We have most detailed data from a total of nine trips on tuna vessels between 1993 and 1994 in which 26 364 hooks were set. A total of

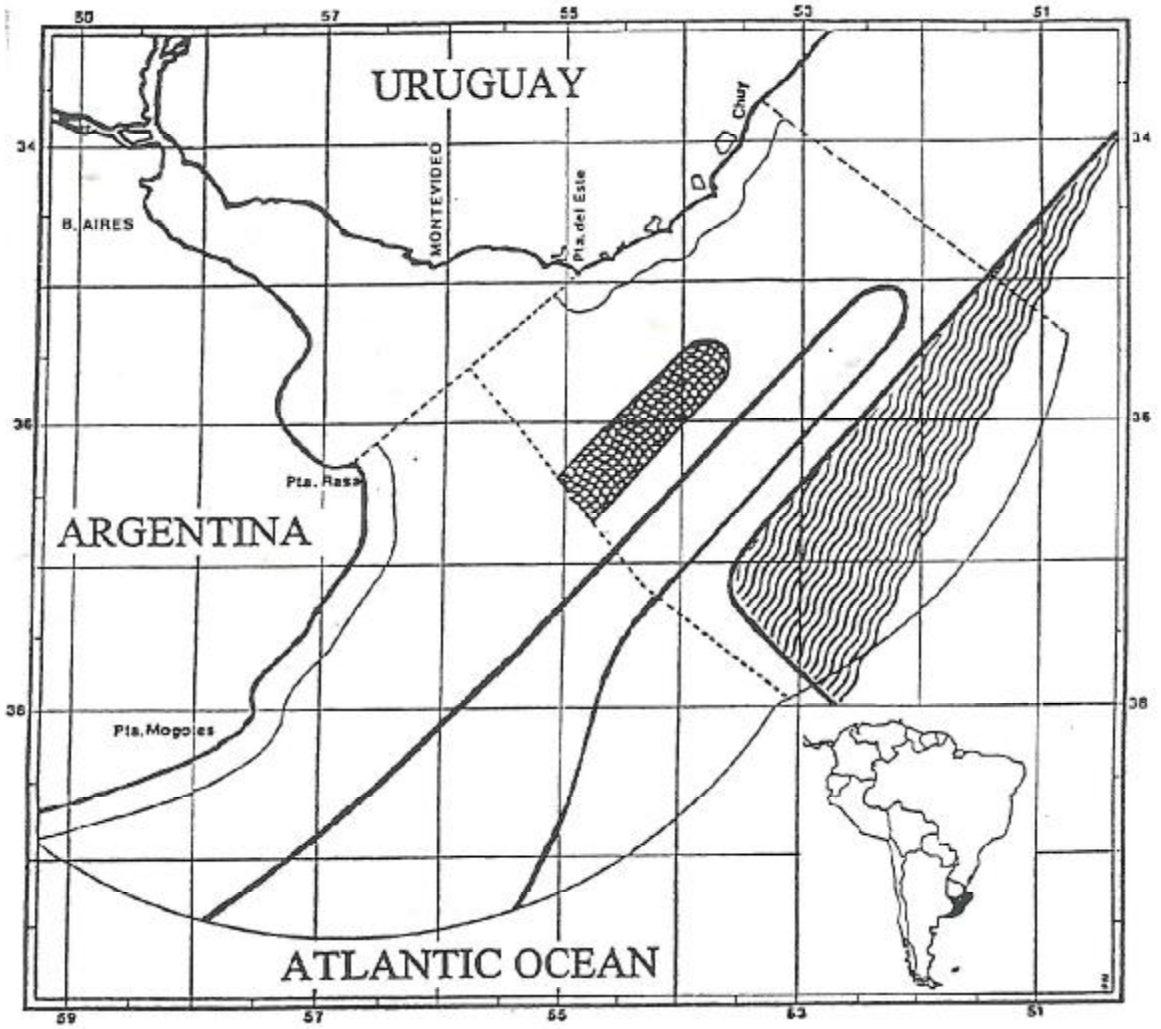

Fig. 1. Map of Uruguayan territorial waters showing the locations of longline fishing for tuna (wavy shading), demersal (bottom-set) longline fishing for rays (checkered shading) and trawl fishing for Merluza (Hake) (open area delineated by emboldened line).

277 seabirds were hooked and drowned and of these 265 were albatrosses, mostly Black-browed Albatrosses. This represents 10.5 birds/1 000 hooks deployed, though the numbers are driven upwards by the absence of weighted swivels on the first trip. On this first trip 154 albatrosses were killed, so it was decided to place an 80 gm swivel 3.6 m from the hook to accelerate the sink rate of baits. Omission of the catch rates for the first trip gives a mean of 4.7 albatrosses/1 000 hooks deployed (Table 1). As well as using weighted lines crews have been advised to set lines after sunset to minimize attracting the birds. When birds are seen at night, viscera and remains of fish are occasionally thrown overboard to distract their attention away from where the lines are being set. Nonetheless, lines are sometimes set by day to guarantee that lines are set before those of a competing vessel. We believe that fishermen do not wish to hook

Table 1. Numbers of albatrosses hooked on longline tuna fishing trips in Uruguayan waters in 1994. The 123 albatrosses caught comprised 120 Black-browed Albatrosses and three Wandering Albatrosses. The first trip used lines with unweighted swivels (see text for explanation). Totals in parentheses exclude estimates for the first trip.

Trip number	Number of hook set	Number of albatrosses caught	Number of albatrosses caught/ 1 000 hooks
1	820	154	481.3
2	1 740	70	40.2
3	1 624	5	3.1
4	4 068	3	0.7
5	3 008	6	2.0
6	3 112	9	3.0
7	1 584	3	1.5
8	5 278	22	6.7
9	7 230	14	1.9
Totals	26 864	277	10.5
	(26 044)	(123)	(4.7)

albatrosses on purpose because of the potential loss of a hook and a fish (a 60 kg Swordfish can bring up to US $360).

The catch rate of albatrosses caught by tuna vessels in Uruguayan waters varies for males and females. For example, in 1994 a sample of 37 albatrosses (all species combined) killed by longline fishing activities included 35 females, one male and one bird of unknown sex. We are aware that more female than male Wandering Albatrosses frequent Uruguayan waters (Prince *et al.* 1997) and that most Yellow-nosed Albatrosses caught by longline vessels in Brazilian waters are female (Neves and Olmos 1997) but are not aware of such a female-biased mortality in Black-browed Albatrosses. A biased sex ratio of albatrosses killed has implications for pair formation, and if consistent in time can be expected to have more serious consequences for albatross conservation than if mortality was spread more evenly between the sexes. In 1995 a single demersal longline fishing trip resulted in 83 dead Black-browed Albatrosses, but for logistical reasons we were unable to determine the sex of these birds.

The demersal longline fishery for rays and other deep sea species commenced in Uruguayan waters in 1994 with one Uruguayan boat, and in 1995 a Korean boat was involved. This fishing practice potentially poses the most serious threat to albatrosses. Although the hooking rate of albatrosses in this fishery is lower than in the tuna longline fishery many more hooks are used and a great number of birds can be killed (Table 2). For example, in two trips in 1995 78 Black-browed Albatrosses were killed on the first trip and five on the second trip; these numbers are known to be underestimates of the actual numbers of birds killed because not all captured birds were landed on deck and our observations did not include the entire duration of the fishing trips.

Table 2. Numbers of Black-browed Albatrosses killed in two demersal (bottom-set) longline fishing trips for rays in Uruguayan waters in 1995.

Trip	Number of times line set	Number of hooks set	Number of hooks sampled	Number of birds killed
1	64	423 700	135 550	78
2	12	300 250	67 100	5
Total	106	723 950	202 650	83

FUTURE PROSPECTS

Regulations currently in force in Uruguay prohibit driftnet fishing and allow observers on foreign tuna fishing boats controlled by the National Institute of Fisheries (INAPE). Foreign tuna boats normally fish freely outside Uruguayan waters even if they use Uruguay as a base. Uruguayan boats, of which there are presently four, are free to fish within or outside territorial waters and are not required to have observers on board. Clearly there are aspects of these regulations that we would like to change, and it is pleasing that biologists from both INAPE and the Universidad de la Republica, Montevideo, are working together in an attempt to improve regulations and their enforcement.

Uruguay is a small country of some three million people. While there is much concern for environmental issues outside the University and government departments, relatively few people are equipped to provide environmental education, particularly away from the capital, Montevideo. Uruguayans are aware that much of their countries national resources lie in the sea and we hope that the coming years will see an increase in Uruguayan's concern for ensuring the future of these resources and for birds such as albatrosses. If Uruguay is to contribute substantially to the conservation of albatrosses an improvement in the efforts to work with and educate those involved in fisheries and help them appreciate the international concern about these birds is needed. Though more resources are badly required, both from within and outside Uruguay to accomplish these tasks, it is pleasing to note some progress has been made.

We would like to initiate a campaign to inform crews of tuna and demersal fishing boats about the conservation of albatrosses. Informative posters and leaflets could be produced that educate fishermen about the biology of albatrosses, the economic costs of losing baits to albatrosses and albatross-friendly fishing methods. Other measures such as using weighted swivels, using fewer and less intense lights on the boats and only setting lines at night will also reduce the bycatch of albatrosses. In Uruguay we have limited resources, but a joint effort between INAPE and our University could produce such a campaign. Visits to Uruguay by international ornithologists will also help in raising the awareness of the public and fishing crews to the problem of albatross mortality in longline fisheries.

ACKNOWLEDGEMENTS

Our presence on fishing boats in Uruguayan waters was possible through the kind co-operation and interest shown by C. Rios and the authorities of INAPE, Montevideo. We thank P. A. Prince for assistance with the literature and for sharing unpublished satellite tracking data of Wandering Albatrosses. A.S. and R.V.F especially thank Graham Robertson of the Australian Antarctic Division, and the Australian Antarctic Foundation, for making it possible for us to attend the First International Conference on the Biology and Conservation of Albatrosses.

REFERENCES

Croxall, J. P. and Prince, P. A., 1990. Recoveries of wandering albatrosses *Diomedea exulans* ringed at South Georgia 1958–1986. *Ringing and Migration* **11**: 43–51.

Escalante, R., 1970. Aves Marinas del Rio de la Plata y Aguas Vecinas del Oceano Atlantico. Barreiro y Ramos, Montevideo.

Gore, M. E. and Gepp, A. R. M., 1978. Las Aves del Uruguay. Mosca Hermanos, Montevideo.

Neves, T. and Olmos, F., 1997. Albatross mortality in fisheries off the coast of Brazil. Pp. 214–19 *in* The Albatross Biology and Conservation ed by G. Robertson and R. Gales. Surrey Beatty & Sons, Chipping Norton.

Prince, P. A., Wood, A. G., Barton, T. and Croxall, J. P., 1992. Satellite tracking of wandering albatrosses *Diomedea exulans* in the South Atlantic. *Antarct. Sci.* **4**: 31–36.

Prince, P. A., Croxall, J. P., Trathan, P. N. and Wood, A. G., 1997. The pelagic distribution of South Georgia albatrosses and their relationships with fisheries. Pp. 137–67 *in* The Albatross Biology and Conservation ed by G. Robertson and R. Gales. Surrey Beatty & Sons, Chipping Norton.

Tickell, W. L. N., 1967. Movements of black-browed and grey-headed albatrosses in the South Atlantic. *Emu* **66**: 357.

Vaske, T., 1991. Seabirds mortality on longline fishing for tuna in southern Brazil. *Ciencia e Cultura* **43**: 388–90.

Vaz-Ferreira, R., (co-ordinating author). 1994. Mortality of albatrosses and other seabirds produced by tuna longline fisheries in Uruguay. United Nations Environment Programme Report CMS5oC 5.6.