Ser. Cient. INACH 49:23-28, 1999

Seabird observations during fishing longline operations in the Antarctic region (Statistical Subareas 48.1, 48.2 and 88.3)[1]

A. GONZALO BENAVIDES[2] and PATRICIO M. ARANA[3]

ABSTRACT

A 43-day cruise on FV *Tierra del Fuego* took place in February and March 1998, as part of the New Fisheries Project developed by Chile in the Antarctic (Statistical Subareas 88.3, 48.1 and 48.2). During this research study every measure currently in force was used to prevent incidental seabird mortality, carrying out bird observations in each one of the 52 settings with Spanish-designed longlines as well. Neither bird capture nor mortality was reported during the fishing activities. During the entire cruise a total of 436 birds were observed. The most abundant was *Thalassarche melanophrys,* with 204 sightings, followed by *Oceanities oceanicus,* with 77; *Catharacta lonnbergi*, with 40; and *Thalassarche chrysostoma,* with 37. The highest relative abundance was found in Subarea 48.1 with 11.1 birds/haul, followed by Subareas 48.2 and 88.3 with 7.6 and 5.0 birds/haul, respectively. The highest number of species was found in Subarea 48.1 with 19 species observed and the least in Subarea 48.2 with the presence of only 4 species.

Key words: Seabirds, relative abundance, observations, incidental mortality, Antarctic, CCAMLR.

Observación de Aves Marinas durante operaciones de pesca con espineles de profundidad en la Región Antártica (Subáreas Estadísticas 48.1, 48.2 y 88.3)[1]

A. GONZALO BENAVIDES[2] y PATRICIO M. ARANA[3]

RESUMEN

En febrero y marzo de 1998 se efectuó un crucero de 43 días de duración con el buque espinelero factoría *Tierra del Fuego*, como parte de los Proyectos de Nuevas Pesquerías desarrollado por Chile en la Antártica (Subáreas estadísticas 88.3, 48.1 y 48.2). Durante dicha investigación se adoptaron todas las medidas vigentes para impedir la mortalidad incidental de aves, realizándose además observaciones de aves marinas en cada uno de los 52 lances realizados con espineles de diseño español. No se registró captura y mortalidad incidental de aves durante las faenas de pesca realizadas. En todo el crucero se observó un total de 436 aves, siendo la más abundante *Thalassarche melanophrys* con 204 avistamientos, seguida de *Oceanities oceanicus* con 77, *Catharacta lonnbergi* con 40 y *Thalassarche chrysostoma* con 37. La Subárea que presentó una mayor abundancia relativa en avistamientos fue la 48.1 con 11.1 aves/lance, seguida por la 48.2 y la 88.3 con 7.6 y 5.0 aves/lance. La distribución de especies fue diferente en cada Subárea, siendo la más abundante la Subárea 48.1 con un total de 10 especies observadas y la menos abundante la 48.2, con sólo 4 especies presentes.

Palabras clave: Aves marinas, abundancia relativa, observaciones, mortalidad incidental, Antártica, CCRVMA.

---

[1] This document was presented to CCAMLR Meeting, in October 1998, as WG-FSA-98/19: 11 pp.

[2] Laboratorio de Ecofisiología, Facultad de Ciencias, Universidad de Chile, Casilla 114-D, Santiago, Chile, gbenavid@mop.cl

[3] Escuela de Ciencias del Mar, Universidad Católica de Valparaíso, Casilla 1020, Valparaíso, Chile, parana@ucv.cl

INTRODUCTION

The Conservation Measures 134/XVI, 135/XVI and 140/XVI, adopted during the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) held in November, 1997, allowed Chile to carry out New Fisheries Projects during the 1997/1998 season in the statistical Subareas 88.3, 48.1 and 48.2 (Arana and Vega, 1998). During the project's study and approval process, special attention was given to aspects dealing with the mortality associated with longline fishing operations of *Dissostichus* spp. Thus, incidental mortality of seabirds has been of special concern from the very beginning of this fishery (Dalziel and De Poorter, 1993; Ashford *et al.*, 1994), given its possible relationship with the depletion of several seabirds populations, such as the Wandering Albatross (*Diomedea exulans*) (Brothers, 1991; Croxal *et al.*, 1990; Weimerskirkch and Jouventin, 1994; de la Mare and Kerry, 1994; Croxal *et al.*, 1996; Moreno *et al.*, 1996).

Therefore, the exploratory fishery finally authorised took into account all the measures now in force in order to minimise the effects of this situation, amongst which the following are worth pointing out: use of streamer lines, set and hauling during evening hours, and use of thawed bait. This paper reports the zero incidental mortality rates observed during the New Fisheries Projects performed by Chile in Subareas 88.3, 48.1 and 48.2. At the same time, seabirds observed during the aforementioned research are provided.

METHODS

Between February 14th and March 18th 1998, 52 hauls were made in the Antarctic region, with the 54-m Chilean-flagged fishing vessel *Tierra del Fuego,* owned by Pesca Chile S.A. The Spanish-designed longline was used. Out of these hauls, 21 were done in Subarea 88.3 (Bellingshausen Sea), 24 in Subarea 48.1 (South Shetland Islands and Antarctic Peninsula) and 7 in Subarea 48.2 (South Orkney Islands) (Figure 1). In compliance with the CCAMLR Conservation Measure 29/XVI, the ship used streamer lines during all the hauls (CCAMLR, 1997).

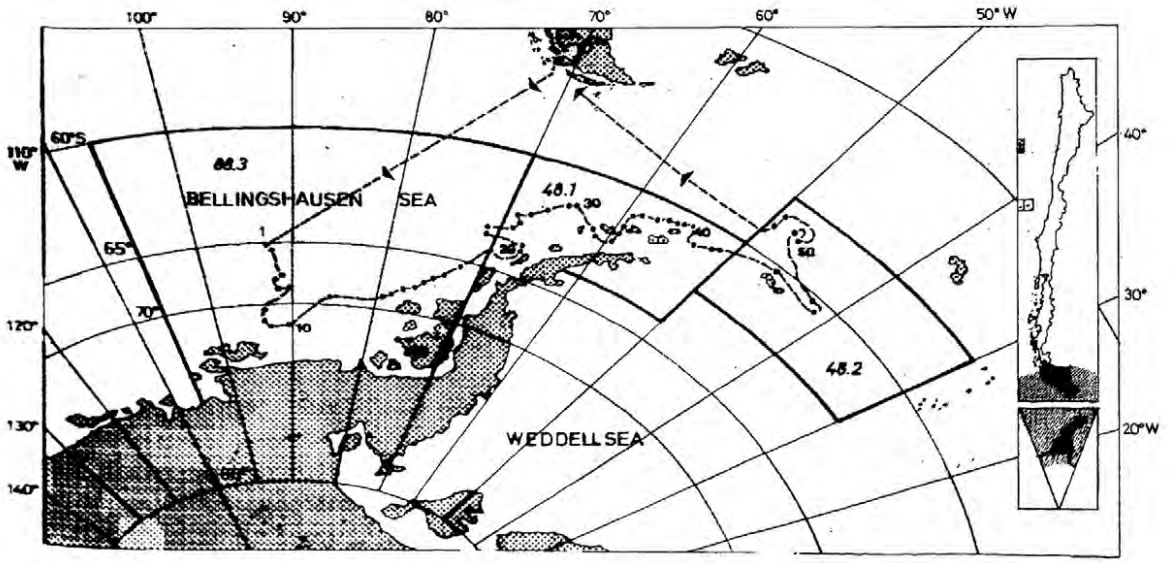

Figure 1. Exploratory fishing track (——>) and haul locations (•).

On each occasion, one scientist from the Universidad Católica de Valparaíso and the International Scientific Observer, simultaneously registered by simple observation (without a pair of binoculars) the presence of all seabirds around the ship during the setting of the longlines. This task was done over a period of 10 minutes, which approximately corresponds to 50% of the actual time it takes to set the fishing gear (±20 min). The birds observed were identified by using as a reference "Fish the Sea not the Sky" (CCALMR, 1996) and the "Guía de campo de las aves de Chile" (Field Guide on Chilean Birds) (Araya and Millie, 1986). During the hauling the observers also registered possible killed seabirds.

Due to the fact that the number of hauls was different in each Subarea, the sightings had to be standardised in order to compare them among areas visited. This was done by dividing the number of birds observed by the total number of hauls done (52). This process was preferred, since the time assigned for bird observation while casting the longlines was the same during each haul, regardless the time these operations took.

RESULTS AND DISCUSSION

No seabirds were killed during all the longline hauling. While the longlines were being set, a total amount of 436 seabirds belonging to 13 species of 4 families were observed, throughout the entire campaign (Table 1). The most abundant species turned out to be *Thalassarche melanophrys,* with 204 individual sightings, which corresponds to 46.8% of all the birds reported, followed by *Oceanities oceanicus,* with 77 sightings (17.7%); then, *Catharacta lonnbergi,* with 40 (9.2%) and *Thalassarche chrysostoma,* with 37 (8.5%). In terms of absolute abundance, Subarea 48.1 reported to have the greatest amount of birds observed, with a total of 267 sightings.

Table 1. Total number of observed seabirds by species and CCAMLR Statistical Subarea.

Species	Seabirds observed (n)			
	Subarea			Total
	88.3	48.1	48.2	
DIOMEDEIDAE				
Thalassarche chrysostoma	24	13	0	37
Thalassarche melanophrys	30	174	0	204
Diomedea epomophora	0	0	2	2
Macronectes giganteus	5	2	0	7
Macronectes halli	0	1	0	1
PROCELLARIIDAE				
Unidentified petrels and shearwarers	0	10	11	21
Daption capense	11	9	0	20
Thalassoica antarctica	2	1	0	3
Procellaria aequinoctialis	0	16	0	16
OCEANITIDAE				
Oceanities oceanicus	36	31	10	77
STERCORARIIDAE				
Sterna vittata	2	0	0	2
Catharacta maccormicki	6	0	0	6
Catharacta lonnbergi	0	10	30	40
TOTAL NUMBER OBSERVED	116	267	53	436

The Subarea that showed a greater relative abundance was 48.1, with 11.1±4.5 birds/haul, followed by 48.2 and 88.3, with 7.6±6.0 and 5.5±3.9 birds/haul (Figure 2). The greatest abundance of seabirds was registered in Subarea 48.1 (*T. melanophrys, O. oceanicus* and *Procellaria aequinoctialis*). The latter may be dùe to the fact that it is the northest of the research Subareas, and closest to the South Shetlands and others islands, which are thougtht to be nesting or feeding areas for the species present (Araya and Millie, 1986).

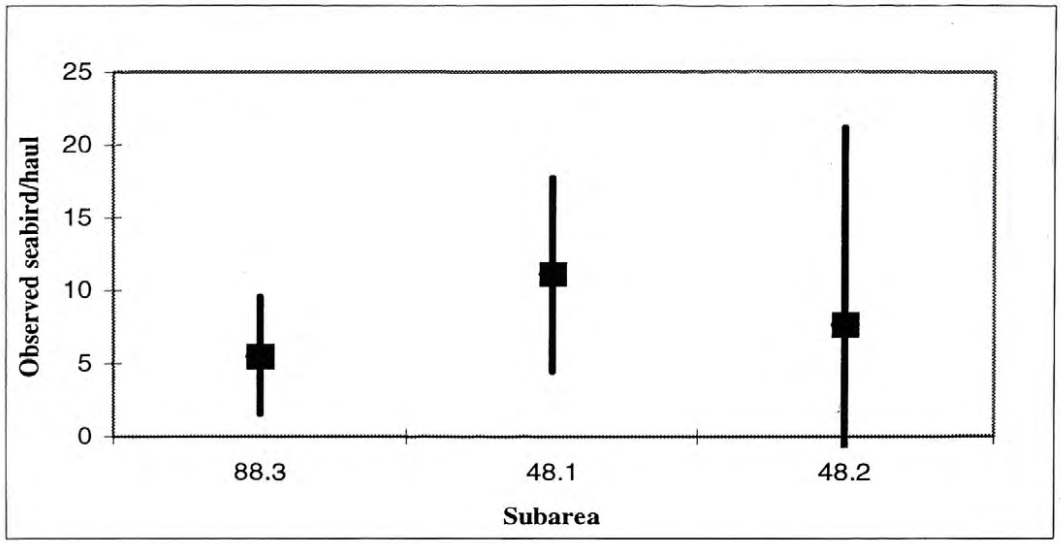

Figure 2. Relative abundance of observed seabirds relative to the total number of hauls (mean and standard error).

Species distribution was different in each Subarea. In Subarea 48.1 a greater diversity of species was observed, from a total of 9 species, *T. melanophrys* being the most abundant. In Subarea 88.3 *O. oceanicus* and *T. melanophrys,* with a total of 9 species, were found to be the most abundant. In Subarea 48.2 only 4 species were observed, *C. lonnbergi* being the most abundant.

On the other hand, it is also important to point out that the birds did not approach close to the stern during the longline setting, even when this was done during daylight hours. The seabirds in these Subareas were not interested in the bait used. This was verified by throwing sardines (*Sardinops sagax*) and squids (*Illex argentinus*) to the seabirds, while they were resting near the ship during hauling. It was evidenced that they left the bait untouched. This situation was specially evident in Subarea 88.3. Though this is still only informal data, it indicates that bird behaviour can vary according to the geographic area they inhabit and the frequency and characteristics of fishing operations. This introduces an interesting research topic for a better understanding of bird's behaviour, that could be used to prevent their incidental mortality during longline fishing activities, by improving the fishing technique.

This evidence shows that certain conservation measures, considered to be effective, when globally applied may prove unnecessary in some geographic areas. Therefore, the conservation measures, applied as a whole, should take into account the uniqueness of each Subarea or Division.

Otherwise, they may result inappropriate in some cases, such as the use of streamer lines and the setting of longlines only during darkness hours.

These results show that despite the mobility that has always been assigned to seabirds, their geographic distribution in adjacent areas may give totally different results. Therefore, in order to establish adequate Conservation measures, it is necessary to increase the knowledge on distribution, abundance and behaviour of seabirds within the CCALMR administrative area. In the same way, in those areas in which a low incidental mortality rate has been determined, prohibitions such as setting longlines only during hours of darkness should be more flexible in order to facilitate fishing operations. At the same time, it is necessary to establish more effective methods and the use of better elements to prevent incidental mortality of seabirds.

ACKNOWLEDGEMENTS

The authors would like to thank the Subsecretaria de Pesca (Chile) for its support and for facilitating the authorisation necessary to carry out this research study to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), for its authorisation. We would also like to thank the fishing company Pesca Chile S.A. for their logistic and financial support. Also, the work performed by Mr. Julio Sinconegui, Argentinean Scientific Observer, on the observation of birds during the cruise is hereby acknowledged. Also, the authors would like to thank the crew of the *FV Tierra del Fuego* for their continuous collaboration throughout the cruise and who significantly contributed to the successful outcome of this Antarctic expedition. Finally, our thanks to two anonymous referees for their useful comments.

REFERENCES

ASHFORD, J.R., J.P. CROXALL, P.S. RUBILAR and C.A. MORENO, 1994. Seabird interaction with longline operations for *Dissostichus eleginoides* at South Sandwich Islands and South Georgia. CCAMLR Science, 1: 143-153.

ARANA, P. and R. VEGA, 1999. Exploratory fishing for *Dissostichus* spp. in the Antarctic region (Subareas 48.1, 48.2 and 88.3). CCAMLR Science 6: 1-17.

ARAYA, B. y G. MILLIE, 1986. Guía de campo de las aves de Chile. Editorial Universitaria, Santiago, 406 pp.

BROTHERS, N., 1996. Longline fishing, dollars and sense: Catching fish not bird using bottom set or mid water set longlines. Parks and Wildlife Service Tasmania, Australia, 80 pp.

CHEREL, Y. and N. KLAGES, 1997. A review of the food of albatrosses. *In*: G. Robertson an G. Gales, Albatross biology and conservation, Surrey Beatty and Sons, Chipping Norton, NSW Australia, 113-136.

COMMISSION FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES (CCAMLR), 1996. Fish the Sea not the Sky, Hobart, Australia, 46 pp.

COMMISSION FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES (CCAMLR), 1997. Report of the Sixteenth Meeting of the Commission, Hobart, Australia 27 October – 7 November, 1997. CCAMLR-XVI, 152 pp.

CROXALL, J.P., P. ROTHERY, S.P.C. PICKERING AND P.A. PRINCE, 1990. Reproductive performance, recruitment and survival of Wandering albatrosses *Diomedea exulans* at Bird Island, South Georgia. Journal of Animal Ecology, 59: 775-796.

CROXALL, J.P. AND P.A. PRINCE, 1996. Potential interactions between wandering albatrosses and longline fisheries for Patagonian toothfish at South Georgia. CCAMLR Science, 3: 101-1110.

DANZIEL, J. AND M. DE PORTER, 1993. Seabird mortality in longline fisheries around South Georgia. Polar Record, 29(169): 143-165.

DE LA MARE, W.K. AND K.R. KERRY, 1994. Populations dynamics of the wandering albatross (*Diomedea exulans*) on Macquarie Island and the effects of mortality from longline fishing. Polar Biology, 14: 231-241.

MORENO, C.A., P.S. RUBILAR, E. MARSCHOFF and L. BENZAQUEN, 1996. Factors affecting the incidental mortality of seabirds in the *Dissostichus eleginoides* fishery in the Southwest Atlantic (Subarea 48.3, 1995 season). CCAMLR Science, 3: 79-91.

WEIMERSKIRCH, H. AND P. JOUVENTIN, 1994. Changes in population size of large Procellariiformes breeding in the French sub-Antarctic Islands: Potential influence of southern fisheries and particularly long-lining. Document WG-IMALF-94/11. CCAMLR, Hobart, Australia.