

**REPORT OF THE *AD HOC* WORKING GROUP ON INCIDENTAL
MORTALITY ARISING FROM LONGLINE FISHING**

(Hobart, Australia, 21 and 22 October 1994)

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(Hobart, Australia, 21 and 22 October 1994)

INTRODUCTION

1.1 The meeting of the *Ad Hoc* Working Group on Incidental Mortality Arising from Longline Fishing (WG-IMALF) was held in Hobart, Australia, on 21 and 22 October 1994. The Convener, Dr C. Moreno (Chile), chaired the meeting.

ORGANISATION OF THE MEETING AND ADOPTION OF THE AGENDA

2.1 The Convener welcomed participants to the meeting and introduced the Provisional Agenda which had been circulated prior to the meeting. The Provisional Agenda was adopted.

2.2 The Agenda is included in this report as Appendix A, the List of Participants as Appendix B and the List of Documents presented to the meeting as Appendix C.

2.3 The report was prepared by Mr N. Brothers (Australia), Dr J. Croxall (UK), Ms J. Dalziell (Australia), Drs M. Imber (New Zealand), W. de la Mare (Australia), T. Polacheck (Australia), Lic. E. Marschoff (Argentina), Mr D. Miller (South Africa) and Dr E. Sabourenkov (Secretariat).

LEVEL OF INCIDENTAL MORTALITY ARISING FROM LONGLINE FISHING AND ITS SIGNIFICANCE TO MARINE ANIMALS FOUND WITHIN THE CONVENTION AREA

Incidental Mortality Associated with Longline Fishing in the Convention Area

3.1 Longline fishing for Patagonian toothfish (*Dissostichus eleginoides*) was started in the South Georgia area (Subarea 48.3) by the Soviet Union in 1988/89 and around Kerguelen (Division 58.5.1) by Ukraine in 1990/91.

Subarea 48.3 (South Georgia)

3.2 In the South Georgia area no reports of incidental mortality were received from 1986/87 to 1989/90. In 1990/91 Dalziell and De Poorter (WG-IMALF-94/5) observed the hauling of three lines (set at night) and recorded six dead birds (four white-chinned petrels, two albatrosses - one a black-browed albatross), a rate of 0.66 birds/1 000 hooks. Extrapolating to the whole longline fishery at South Georgia in this year (581 vessel-days) gave a total estimated mortality of 2 300 white-chinned petrels and 1 150 albatrosses. Although the sample size is small, the estimate is possibly conservative because bird catch rates for daytime sets would probably be higher (especially of albatrosses) than night time ones. WG-IMALF-94/5 also contains a report of observations by a Soviet fisheries inspector that catches of four to eight seabirds per line were typical in the 1989/90 season.

3.3 The only data on levels of incidental mortality received by CCAMLR for 1991/92 and 1992/93 concerned five cases of incidental mortality of seabirds reported by commercial fishing vessels operating in Subarea 48.3 in 1991/92; data were on form C2. However, reports on measures taken to avoid incidental mortality were made by Russia for 1991/92 (CCAMLR-XI/BG/17). According to these reports mortality of birds normally occurred during daylight and deterrents, including use of streamer lines, were being investigated. A similar report for 1992/93 (SC-CAMLR-XII/BG/18) indicated that setting lines before dawn and stopping offal discard 30 minutes before setting were 5 to 10% effective at reducing seabird mortality. The use of a towed streamer line (as illustrated in SC-CAMLR-XII/BG/18, Figure 1), however, was 60 to 80% effective. In addition, Ashford *et al.* (1994)¹ reported that up to six seabirds (principally black-browed albatrosses) were caught per set during Chilean fishing operations in 1992/93 in Subarea 48.3 (see also SC-CAMLR-XII, paragraph 10.2).

3.4 From the fishery in 1993/94, when scientific observers were present (under the provisions of Conservation Measure 69/XII) on all four of the vessels authorised to fish in the area, detailed reports on incidental mortality were available to the meeting from the vessels *Friosur V* (WG-IMALF-94/15 and 16), *Ihn Sung 66* (WG-IMALF-94/14) and *Makshevo* (SC-CAMLR-XIII/BG/9 Rev. 1).

3.5 On the *Friosur V*, using the 'traditional' method², observations of 20 of the 27 lines set recorded 98 seabird mortalities (all during setting, none during hauling) at an average rate of 0.47 birds/1 000 hooks (WG-IMALF-94/15). However, the four daylight sets resulted in 85% of the total mortality (mainly giant petrels, grey-headed and black-browed albatrosses), whereas the 16 night

¹ Ashford, J.R., J.P. Croxall, P.S. Rubilar and C.A. Moreno. 1994. Seabird interactions with longlining operations for *Dissostichus eleginoides* at the South Sandwich Islands and South Georgia. *CCAMLR Science*, Vol. 1: 143-153.

² In the 'traditional' method of rigging the longline, a single line is laid from which branchlines containing hooks are strung (see Ashford *et al.*, 1994).

time sets only contributed 15% of the mortality (exclusively of white-chinned petrels). There were some technical difficulties with rigging a streamer line³ to CCAMLR specifications, but when used it reduced seabird mortality under most conditions, being least effective in calm weather and when birds were feeding intensively. Avoidance of potential interactions during hauling would be improved by discarding offal over the side of the ship opposite to the side where hauling takes place. There was some evidence that smaller fishing hooks were more readily ingested by petrels than larger ones.

3.6 For the first time in longline fisheries in the Convention Area, significant interactions involving cetaceans (sperm and killer whales) were reported (WG-IMALF-94/16). These occurred in respect of 25 of the 27 lines observed and were restricted to the hauling operation (whether at day or at night). No mortality was observed although sperm whales were twice entangled, before breaking free. There was considerable circumstantial evidence that the whales removed fish from the lines, often in substantial numbers. The losses in terms of fish and fishing time (delaying sets and/or changing sites to avoid killer whales) are costly to the fishery and the report suggests it would be prudent to investigate developing measures to reduce interactions in order to assist the fishery and to minimise the likelihood of future action potentially harmful to cetaceans.

3.7 On the *Ihn Sung 66*, using the ‘Spanish’ method⁴, 30 sets, deploying 250 400 hooks, were made (WG-IMALF-94/14). A total of 21 seabirds were reported killed (15 black-browed albatrosses, 1 light-mantled sooty albatross, 5 giant petrels), giving a rate of 0.08 birds/1 000 hooks. However, for the 25 860 hooks monitored by the scientific observer, five black-browed albatrosses were caught, a rate of 0.19 birds/1 000 hooks. This represents a total mortality of 55 albatrosses over the fishing period. Eight birds (3 black-browed albatrosses, 5 giant petrels) were observed to be snagged during hauling (they eventually freed themselves, although hooks were still embedded in them), giving an estimated total of 29 black-browed albatrosses and 48 giant petrels over the fishing period. From the evidence available, setting lines only at night would have prevented all the observed seabird mortality on this vessel. No streamer line was in use for 16 of the sets. Once a line was rigged, seabird mortality was reduced by some 79%. Suggestions for a streamer line design, suitable for longliners using the ‘Spanish’ method, are provided in WG-IMALF-94/14, Figures 2 and 3. The paper notes that offal was being discarded continuously during hauling operations. This clearly increased the potential for seabird mortalities; discharging the offal only on the side of the ship opposite to the side where hauling operations took place would have improved the situation considerably.

³ A streamer line is defined in Conservation Measure 29/XII. The term is also used to include such bird deterring devices as ‘tori’ pole and bird line and pole.

⁴ In the ‘Spanish’ method of rigging, two lines are laid, one the fishing line holding the branchlines and hooks, and the other joined to the fishing line which is used for hauling.

3.8 From the same fishing operation, SC-CAMLR-XIII/BG/14 reports interactions with killer whales similar to those discussed in paragraph 3.6 above. An adult female elephant seal was killed after becoming entangled in the hauling and fishing lines.

3.9 On the *Makshevo* 82 longlines, deploying 239 200 hooks, were set using a Mustad autoliner (SC-CAMLR-XIII/BG/9 Rev. 1). Seventy-five seabirds were caught, comprising 41 sooty shearwaters (probably white-chinned petrels), 27 giant petrels, 6 black-browed and 1 wandering albatross, at an overall rate of 0.31 birds/1 000 hooks. A streamer line of the 'Russian' design (see paragraph 3.3 above and SC-CAMLR-XII-BG/18) was in regular use. On the one day when this line broke, 21 birds (17 giant petrels, 4 black-browed albatrosses), comprising 28% of the overall mortality, were entangled during the set.

3.10 Interactions with sperm and killer whales were also frequent and several observations were made of them feeding on *D. eleginoides* from the longline; the presence of whales usually forced the vessel to search for a new fishing area. One sperm whale became entangled in the longline which it broke on diving.

3.11 In discussing these reports of the longline fishery in Subarea 48.3, the following points were made:

- (i) the use of scientific observers had provided CCAMLR with the first adequate sets of quantitative data on incidental mortality of seabirds in the Convention Area and the first evidence of any kind of interactions involving cetaceans;
- (ii) the observers had produced excellent results, often under very difficult conditions, and had also managed to achieve and maintain good relations with the fishing masters and crew without which such useful data could not have been collected;
- (iii) catch rates of seabirds were broadly similar to those reported for longline fisheries elsewhere (see Table 2 and paragraph 3.41). Current annual mortality of seabirds from longline fishing in Subarea 48.3 is likely to be in the order of a few hundred birds (over half of of these would be albatrosses). The levels of mortality, at least in some previous years with greater fishing effort and little or no use of mitigating measures, could easily have been five or more times higher. Even current levels of mortality are likely to be having detrimental effects on some local albatross populations;
- (iv) setting lines only at night would reduce very significantly the catch of albatrosses. It would probably, however, result in larger numbers of white-chinned petrels being

killed; further work on measures to prevent incidental mortality of petrels will be required;

- (v) streamer lines were shown to be highly effective in reducing seabird mortality. Some modification of the existing CCAMLR specification, to cater for the different types of longline fishing in the Convention Area, would be appropriate;
- (vi) discharge of offal during setting should continue to be prohibited; discharge during line hauling should be conducted on the opposite side of the vessel to hauling operations; and
- (vii) attention should be given to the problem of cetacean interactions.

3.12 The meeting noted that a report from the Russian scientific observer on the Bulgarian longliner *RK-1* should be available for the meeting of the Scientific Committee and the relevant data it contains will need evaluating at that time.

Subarea 48.4 (South Sandwich Islands)

3.13 Detailed observations of seven sets were made by a scientific observer during an exploratory fishing cruise during 1992/93 (SC-CAMLR-XII/BG/8 Rev. 1) and reported to CCAMLR last year (SC-CAMLR-XII, paragraphs 10.1 and 10.2). No incidental mortality was seen and only one bird was hooked during hauling. However, aggregations of potentially vulnerable seabirds (especially black-browed albatrosses and white-chinned petrels) were observed close to the fishing vessel.

Division 58.5.1 (Kerguelen)

3.14 In longline fishing around Kerguelen in 1990/91, seabird mortality rates averaged 0.5 birds per set (over 163 sets), approximately 0.2 birds/1 000 hooks. These birds were principally black-browed albatrosses, giant petrels and white-chinned petrels (SC-CAMLR-X/BG/14). However, this rate was observed largely in the absence of mitigating measures.

3.15 A detailed 13-day study of seabird/longline interactions was undertaken at Kerguelen in February 1994 (WG-IMALF-94/12). The current longline fishery takes *D. eleginoides* at relatively shallow depths (450 to 590 m), compared to the fishery around South Georgia (800 to 1 600 m), and uses Mustad autoliners. Seabirds attempting to take bait from hooks were principally white-

chinned petrels, giant petrels and albatrosses; white-chinned petrels comprised 87% of the birds following ships. From 72 sets, 38 birds (36 white-chinned petrels, 2 grey-headed albatrosses) were recorded killed, giving a rate of 0.22 birds/1 000 hooks. However, rates were significantly higher for daytime sets (1.00) than night-time ones (0.38) and, at night, higher when deck lights were on (0.59) than when off (0.15). Most important, however, the discharge of offal at the start of setting, on the opposite side of the vessel to that used for setting, reduced seabird mortality to very low levels (five white-chinned petrels in 44 sets and only one in the 41 sets when the timing and positioning of the offal discharge was most advantageous). This success is only possible because the setting operation takes only 10 to 15 minutes and almost all birds in the vicinity can be attracted to the offal, rather than to the baited hooks, throughout the setting period.

3.16 The report from Ukraine (CCAMLR-XIII/BG/14) indicates that streamer lines and appropriate offal discharge practice were in use on all three vessels operating in this fishery in 1993/94. An average of one to two birds is reported to be killed during each longline setting.

3.17 Further data on the potential for interactions between seabirds and *D. eleginoides* longlining in Division 58.5.1 are provided in WG-IMALF-94/11. A substantial proportion of wandering albatrosses breeding at Crozet Island have a foraging range including the western part of the Kerguelen shelf - the area to which longline operations are restricted; wandering albatrosses associate with longline vessels in substantial numbers. Wandering albatrosses breeding at Kerguelen are probably at even greater risk. Black-browed albatrosses from study colonies to the southeast of Kerguelen forage over the eastern shelf and do not appear to overlap with the longline fishery. Birds from northwest Kerguelen forage over the western shelf and are likely to be at risk. Northern giant petrels are also significantly at risk. However, provided that the *D. eleginoides* fishery on the Kerguelen shelf is maintained at its current level and the enforcement of measures to reduce incidental mortality is maintained, there should be very limited impact from this source on local seabird populations.

Indirect Information on Seabird/Longline Interactions

3.18 Information from South Georgia presented to CCAMLR last year (SC-CAMLR-XII/BG/7) suggested that in 1992/93 there had been an increase in the incidence of fishing debris, including longline hooks, associated with wandering and black-browed albatrosses at their breeding colonies.

3.19 Similar data for 1993/94 (SC-CAMLR-XIII/BG/4) indicate a six-fold increase in the incidence of such material. Hooks regurgitated by and attached to birds were all from longline fisheries and of a variety of types, including those characteristic of Korean, Chilean and Russian fisheries. The

incidence of hooks in pellets regurgitated by wandering albatross chicks suggested that some 20% of the population could be affected. This also raises the concern that in addition to the observed mortality associated with longliners, there may also be additional mortality of birds that have escaped with hooks in or attached to them.

3.20 Concern was also expressed that the number of birds ingesting hooks was difficult to reconcile with the data reported by the observers on the longline vessels. It was suggested that the existence of other fishing for *D. eleginoides* in Subarea 48.3 and waters adjacent to the CCAMLR Convention Area might be contributing to the problem.

3.21 Recent significant declines in adult survival rates of black-browed albatrosses (SC-CAMLR-XII/BG/21) are believed to be associated with the onset of the *D. eleginoides* fishery in the South Georgia area (see also SC-CAMLR-XII, paragraph 10.8).

Information from Outside the Convention Area

3.22 Papers describing incidental mortality in longline fisheries outside the Convention Area were tabled: one describing the tuna fishery off Southern Brazil (WG-IMALF-94/4); one on the tuna fishery off Uruguay (WG-IMALF-94/17); one on the Japanese southern bluefin tuna longline fishery in the Southern Ocean (WG-IMALF-94/6); and five discussing the tuna fishery in New Zealand waters (WG-IMALF-94/10, 21, 22 and 23). Catch rates of birds described in these papers are presented in Table 2. In addition, four papers were tabled that discussed the observed effects of longline fishing on seabird populations (WG-IMALF-94/7, 8, 11 and 18).

3.23 The Working Group stressed that the data discussed were obtained solely from observers on fishing vessels, not from data provided by fishing vessels without observers on board.

Southern Brazil

3.24 Substantial seabird mortality in the tuna longline fishery off southern Brazil was described in WG-IMALF-94/4. A total of 71 birds killed on the longlines was observed during 52 days of fishing. Of these birds, 64 were white-chinned petrels (*Procellaria aequinoctialis*), four were wandering albatrosses (*Diomedea exulans*), and two were black-browed albatrosses (*Diomedea melanophris*). Higher mortality occurs when seas are stormy, and during full and first quarter moon.

Uruguay

3.25 Paper WG-IMALF-94/17 described seabird mortality during sword fish and tuna longlining off the coast of Uruguay. Birds were caught during both setting and hauling. Two types of line design were used: the Florida type and the Spanish type (WG-IMALF-94/17). The mean mortality was 10.5 birds per thousand hooks for the Florida gear type, and 0.2 birds per thousand hooks for the Spanish type. Black-browed albatross was the species most frequently caught. All five bird bands retrieved during this study had been attached on South Georgia.

3.26 The Working Group noted that the average catch rate of 6.6 birds per thousand hooks in this fishery was higher than that presented in other papers. This may be due to the lack of mitigation measures in this fishery.

Australia

3.27 Paper WG-IMALF-94/6 described albatross mortality in the Japanese tuna longline fishery in the Southern Ocean. The paper compared catch rates between albatross species, concluding that the more aggressive species tend to be caught more frequently. It was noted that subsequent work on this fishery supports the findings of this paper.

3.28 New data (supplied by Mr Brothers) on the origin of 67 bands retrieved from albatrosses and giant petrels incidentally caught in the southern bluefin tuna fishery were presented and are set out in Table 1. These data show that birds taken on longlines come from most of the sub-Antarctic islands, both within and outside the Convention Area.

New Zealand

3.29 Two papers relating to the tuna longline fishery in the New Zealand region were presented by New Zealand. Paper WG-IMALF-94/10 reports the incidental mortality resulting from eight days of fishing by a New Zealand longliner to the east of the northern tip of New Zealand. Although a streamer line was deployed, a total of 134 hooked baits were taken, resulting in six seabirds, all albatrosses, being hooked. Bait takes occurred in daylight. It was noted that the relatively high rate of survival in hooking incidents was due to the lighter gear and short soak time (approximately six hours). Only approximately 4.5% of bait takes resulted in a bird being hooked.

3.30 Paper WG-IMALF-94/22 reports that night-time setting reduces considerably the by-catch of seabirds, although this may be counteracted when the moon is out. The streamer lines reduced mortality, but birds may become used to them. Their design is therefore important. Two additional papers note population trends and vulnerability of albatrosses and petrels (WG-IMALF 94/10 and 21) to tuna longline fishing. It is notable that both the larger albatrosses and the smaller petrels are vulnerable, and while the albatrosses may be deterred by streamer lines from taking the baits, the smaller petrels are not.

D. eleginoides Fisheries Outside the Convention Area

3.31 Extensive fisheries are operating in waters off southern Chile, over the Patagonian shelf and all oceanic banks adjacent to the Convention Area, and have recently commenced around the Falkland/Malvinas Islands. No data on incidental mortality of seabirds are currently available for any of these fisheries. However, black-browed and wandering albatrosses from South Georgia forage widely over the Patagonian shelf and have been reported caught in fishing gear around the Falklands and as far west as the west coast of southern Chile. There is, therefore, the potential for significant mortality of albatrosses from South Georgia, and indeed from other sites within the CCAMLR Convention Area, in these longline fisheries.

3.32 Any efforts that CCAMLR can make to influence these fisheries to adopt the fishing practices, including mitigating measures, in operation within CCAMLR would be highly beneficial.

3.33 The fisheries around the Falklands/Malvinas and on the Patagonian shelf are believed to use scientific observers, requested to report incidental mortality, on all vessels. CCAMLR should consider requesting access to these reports, in order to assess the magnitude of the by-catch of birds from the Convention Area, as a matter of priority.

Other Areas

3.34 The Working Group noted that while no data were available from the eastern Pacific or the Indian Ocean and waters around South Africa, there were known to be extensive longline fisheries, both pelagic and demersal, in these areas, some of which have extensive bird by-catch. Some of these fisheries are prosecuted by nations who are not Members of CCAMLR. The Working Group therefore concluded that the problem of incidental mortality of seabirds from the Convention Area clearly occurs in all three oceans bordering the Convention Area.

Evidence of Effects of Longline Fishing Outside the Convention Area on Seabird Populations of Sub-Antarctic Islands

3.35 The declines in wandering albatross populations, especially at Crozet and South Georgia Islands, in the 1980s are widely regarded as resulting from the rapid expansion of tuna longline fisheries (see e.g., CCAMLR-VIII/BG/6, SC-CAMLR-X/BG/8). More recently, declines in grey-headed albatross populations and reductions in recruitment and survival rates of grey-headed and black-browed albatrosses at South Georgia have been attributed, at least in part, to tuna longline fisheries (SC-CAMLR-XII/BG/21).

Crozet and Kerguelen Islands

3.36 Paper WG-IMALF-94/11 presented information on changes in the population size of large Procellariiformes breeding in the French sub-Antarctic islands. Studies carried out over the past three decades in the French austral territories indicate that most albatross and giant petrel populations have markedly declined. Demographic studies indicate that these declines are mainly the result of increased adult mortality. This high rate of mortality has been suspected to be the result of mortality incurred in longline fisheries. Satellite tracking studies of breeding birds and band recoveries of non-breeding birds indicate that during and outside the breeding season these populations are in contact with longline fisheries, mainly the pelagic Japanese tuna fishery.

Marion and Gough Islands

3.37 Paper WG-IMALF-94/18 reported the recovery of two tuna longline hooks from wandering albatross nests at Marion Island in the 1990s. The paper also reported that a total of 26 birds of three species banded at Marion and Gough Islands have been recovered at sea in the period 1951 to 1993.

3.38 An age-structured model of a wandering albatross population, developed to simulate population trends over time, was presented in WG-IMALF-94/8. The paper assumes that fishing operations affect juveniles more than adults, and that there is therefore a time-lag of 5 to 10 years before further decreases in population numbers are reflected in the breeding population. In addition, population growth rates will take approximately 30 to 50 years to stabilise after a perturbation. The authors concluded that caution should be exercised when interpreting population trends because short-term estimates may not provide good indications of longterm trends.

Macquarie Island

3.39 An analysis of the dynamics of the wandering albatross population on Macquarie Island was presented in WG-IMALF-94/7. The estimated breeding population of this species has declined since 1966 at an average rate of 8.1% per year, and this decline is correlated with the onset of a large-scale tuna longline fishery in the southern hemisphere.

Species Involved

3.40 Several papers reported that the species caught on tuna longlines tend to be the larger, more aggressive species (WG-IMALF-94/4 and 10). Smaller birds can dive up to 10 m (SC-CAMLR-XII/BG/14) and bring baits to the surface. These birds may get hooked but larger birds often take baits from smaller birds as they bring them to the surface, and it is these birds that can ultimately become hooked.

Summary of Interactions between Seabirds and Longline Fisheries

3.41 Table 2 gives a summary of estimated catch rates of seabirds by longline fisheries, both inside and outside the CCAMLR Convention Area, contained in the papers presented to the Working Group. The estimated catch rates were calculated from direct observations, collected by scientific observers, of seabirds captured on longlines. As such, they usually represent only a small proportion of the total number of hooks set in the fisheries represented, and therefore, the implied total mortalities are extrapolations subject to uncertainty. Large variations of seabird incidental catch data among areas, years and fisheries are to be expected. In addition, no data are available from a number of longline fisheries and areas. Therefore, an accurate estimate of total seabird mortality is not possible. Nevertheless, in the case of tuna fisheries, the total annual effort in the southern hemisphere has exceeded 100 million hooks. Therefore, although the catch rates are uncertain, they imply that substantial numbers of seabirds are captured each year. Apart from the example from the South Atlantic tuna fisheries off southern Brazil and Uruguay, the catch rates are similar across fisheries, despite the considerable differences in the near-surface longline gear employed in fisheries for tuna and the bottom lines used in the fishery for *D. eleginoides*.

3.42 The results from the Japanese tuna fishery in New Zealand waters with and without mitigation methods show that substantial reductions in catch rates may be achieved by setting longlines at night and by using bird-scaring streamer lines.

3.43 The results in the table show that the greater part of seabird incidental mortality relating to birds breeding within the Convention Area arises from fisheries outside the Convention Area. However, catch rates of seabirds in the longline fisheries within the Convention Area are comparable with those outside. Accordingly, future growth in these fisheries has the potential to lead to substantial incidental mortality unless mitigation measures are continued and improved.

3.44 Table 3 summaries the species composition of birds killed in longline fisheries, taken from the studies of incidental mortality of seabirds presented to the Working Group. This table shows clearly the prevalence of albatrosses, particularly black-browed and wandering albatrosses, of giant petrels and of white-chinned petrels as victims of longline fishing, especially in the Convention Area.

3.45 The Working Group noted that the data presented showed that many of the populations of seabirds that breed in the Convention Area were subject to incidental mortality on longlines outside the Convention area. However, as the species affected are from the Convention Area, CCAMLR has a responsibility under Article II of the Convention to address the problem in a proactive manner.

DATA ON INCIDENTAL MORTALITY ASSOCIATED WITH LONGLINE FISHING

4.1 Two forms are currently in use in CCAMLR for reporting information on incidental by-catch of seabirds and marine mammals during longline fishery:

- CCAMLR standard fine-scale catch and effort data form for longline fishery (Form C2, version 4); and
- form for reporting observations on incidental mortality of birds and mammals (Format 7, *Scientific Observers Manual*).

4.2 The Working Group reviewed the data provided by Members during the last two seasons. Only five cases of incidental mortality of seabirds were reported on form C2 by commercial fishing vessels. These five reports came from two longline vessels which carried out fishing for *D. eleginoides* in Subarea 48.3 (South Georgia) during the 1991/92 season. No reports on form C2

were received for the 1993/94 season, except a report of an incidental catch of one petrel, although completed C2 forms were received from all vessels authorised to take part in the fishery.

4.3 In view of the discrepancies between reports on C2 formats received from the commercial fishery and those made by observers (see paragraphs 3.5, 3.7 and 3.9), the Working Group agreed that there is a need to improve the collection of information on incidental mortality. Experience from the 1993/94 season had demonstrated that the only practical method of obtaining reliable data was from scientific observers. It was noted that the small number of vessels involved in the fishery and the high variability in rates of incidental mortality meant that observers are required for every vessel to achieve accurate and unbiased estimates of mortality. It was further noted that vessels without observers are likely to behave differently, which makes extrapolations of results from observed vessels to unobserved vessels questionable.

Advice to the Scientific Committee

4.4 The meeting identified some important requirements for improving the quality of seabird data. In particular, the meeting noted the need for improved observer coverage and the priority tasks for observers with respect to the collection of data for quantifying interactions between seabirds and longline fisheries. A number of aspects relevant to observer tasks need further detailed consultation with WG-FSA.

- (i) Whenever logistically possible (e.g., berth availability), two scientific observers should be present on each vessel.

Justification: To obtain adequate data on fish, fishery and seabird mortality from this fishery requires full observer coverage. One observer per vessel cannot undertake all tasks currently being specified. Ideally, one observer would record the seabird data and another the relevant data from the fish and fishery.

- (ii) For seabirds it is essential that all dead specimens are retained whole, appropriately labelled and returned to port for the necessary processing.

Justification: In order to overcome difficulties in accurately identifying seabird species, carcasses need to be retained for subsequent checking by a specialist ornithologist. Information on age and sex, which can only be obtained from specialist investigation of carcasses, is vital for species conservation purposes. Correct identification of seabirds caught in longline fishing is vital if the impact of such fishing is to be properly assessed.

- (iii) If it is not possible to retain the whole specimen, a minimum requirement would be retention of bird head, legs and bands and samples suitable for DNA analysis.

Justification: Retention of heads and legs at least will ensure accurate specific identification and perhaps ageing of each bird caught. The recovery of bands from seabirds will contribute to demographic studies and to determining the provenance of birds caught.

- (iv) Observers should be given training to a level where they can at least distinguish reliably the differences between ALBATROSS, SHEARWATER, PETREL (suggested minimum identification categories). Data sheets used to record the catch will then include provision for recording seabird identification by observers.

Justification: This would provide some minimum desirable data if the specimens retained were somehow lost.

- (v) A responsibility of each Member shall be to ensure that appropriate genetic material from each seabird specimen is retained for submission to a central storage/processing institute.

Justification: Determination, using molecular genetic techniques, of the provenance of birds caught by a fishery is a high priority if we are to understand the relationship between seabird by-catch in fisheries and seabird populations.

- (vi) Documentation of fishing equipment, techniques, vessel configuration and details of mitigation measures are essential. This will involve recording information on line setting as well as line hauling.

Justification: Accurate documentation of the nature and use of fishery equipment is essential to evaluate catch rates of seabirds, particularly in relation to the use of mitigating measures.

4.5 The Working Group agreed that the priorities for observations on commercial vessels in the longline fishery, as laid out in the pilot edition of the *Scientific Observers Manual*, should be updated. The following research priorities were identified which could be addressed by the collection of information by scientific observers:

- monitoring of total incidental bird mortality by species, sex and age;
- bird mortality per unit of fishing effort and relative vulnerability of different species;
- collection of bird bands and notification of other study markers;
- efficacy of mitigation measures;
- investigation of the practicalities of the implementation of different mitigation methods.

4.6 It is recommended that observers be equipped with the relevant documentation in order to assist with the education and dissemination of information to fishermen on the problem of incidental mortality and potential solutions.

4.7 The Working Group recommended the following:

- (i) reporting data on incidental mortality on form C2 to be continued; and
- (ii) the Secretariat to create data sheets in book format, based on information set out in Appendix D, for reporting observations conducted on board longline vessels by scientific observers designated under the CCAMLR Scheme of International Scientific Observation.

4.8 These data formats will need to be considered at the meeting of the Scientific Committee in 1995. The Working Group recognised that these formats would not be prepared in time for the 1994/95 fishing season. It was therefore suggested to circulate to Members the list of information required (Appendix D) in order to standardise the collection of information by scientific observers in the 1994/95 season.

4.9 An additional appendix to the *Scientific Observers Manual* should be prepared by the Secretariat to provide guidance for observers placed on longline vessels for the purposes of recording information relating to incidental mortality.

MEASURES FOR REDUCING AND/OR ELIMINATING INCIDENTAL MORTALITY ASSOCIATED WITH LONGLINE FISHING

Reports of Members' Work in the Convention Area

5.1 Paper WG-IMALF-94/12 described the dumping overboard of minced offal a few minutes before and during the setting of longline. This method, it was pointed out in discussion, is applicable only to short (10 to 15 minutes) settings in certain *D. eleginoides* fisheries, but would be of little use

in longer settings or in the tuna fishery (six-hour settings). Reduced seabird mortality with night setting and, further, at night with deck lights off, was shown.

5.2 The data in WG-IMALF-94/14 demonstrated increased mortality during daylight setting; the streamer line caused reduction of this by 79%. The authors pointed out problems with the CCAMLR-designed weight at the end of the streamer line and suggested its replacement by floats to maintain tension of the bird line. It was suggested that disposal of offal during hauling should be on the opposite side of the ship to where hauling occurred.

5.3 Paper SC-CAMLR-XII/BG/18 emphasised setting in pre-dawn hours (0300 to 0400) in Subarea 48.3, a time when least birds follow the ship. No offal was discharged from 30 minutes before setting. It also contained an illustration of a streamer line that had been useful (40 to 50 m, streamers at 1 m intervals).

Experience from Research and Fishing Operations Outside the Convention Area

5.4 Paper WG-IMALF-94/9 described a streamer line with 12 swivelled streamers which reduced seabird hooking significantly.

5.5 Paper SC-CAMLR-XII/BG/13 drew attention to three problems: the terminal weight or buoy on the streamer line tangling with the mainline; the streamers becoming wrapped around the streamer line during operation; and the first streamer tangling with baited hooks during setting. Modifications were proposed, including 100 m of rope with streamers at the end of the line to provide drag, instead of the weight.

5.6 Paper WG-IMALF-94/17 emphasised night setting to avoid mortality of seabirds, and the use of a weighted swivel (80 g) on the snoods (hook branch line) to aid the sinking of baited hooks. The reduction of deck-lighting at night reduced by-catch.

5.7 Paper WG-IMALF-94/23 stressed the importance of night setting to avoid incidental catch; the greatest risk of by-catch was during setting between 1200 to 1800 hours. Thawed baits caught fewer birds. Moon phase affected incidental catch, with highest mortality three nights either side of full moon.

5.8 Paper WG-IMALF-94/24 stressed the need for baits used in longline to be well-thawed so that they sink; intact fish need to have the swim bladder deflated.

Use and Effectiveness of Various Mitigation Methods Outside the Convention Area

Light Conditions

5.9 Three studies showed that setting longlines at night significantly reduced the incidental catch of seabirds (WG-IMALF-94/10, 23 and SC-CAMLR-XII/BG/14). However, these papers also noted that a full moon increases the activity of birds and hence the number that are caught. Anecdotal evidence described in WG-IMALF-94/4 supported these findings.

5.10 Papers WG-IMALF-94/10 and 22 suggested that the greatest seabird catches were taken on lines set during the afternoon.

Streamer Lines

5.11 Paper WG-IMALF-94/6 described streamer lines developed and used in Japanese longline vessels in tuna fisheries north of the Convention Area. This work formed the basis and original impetus for CCAMLR's adoption of Conservation Measure 29/XII. Subsequent investigations have shown that the deployment of such streamers has reduced considerably the incidental catch of seabirds in these fisheries.

5.12 Experience of streamer lines in other fisheries was also presented (WG-IMALF-94/9).

5.13 The principles of operation of the streamer lines are provided in WG-IMALF-94/19. It is important to note that their effectiveness depends principally on the scaring effect produced by the independent and unpredictable movement of the lines.

5.14 Some papers (e.g., WG-IMALF-94/10) stated that birds had become accustomed to the streamer lines, and that this had reduced the effectiveness of those lines. The Working Group agreed, however, that this indicated that the lines used were inadequately constructed or deployed.

5.15 WG-IMALF-94/10 and 22 concluded that two streamer lines might be more effective than one.

Offal Dumping

5.16 Several studies reported on the effect of throwing offal into the water at the time of setting and hauling to distract birds (WG-IMALF-94/4, 12 and 17; see also paragraph 3.15).

Weights

5.17 Bird catch was reduced by attaching an 80 g leaded swivel to the branch line, 3.6 m from the hook (WG-IMALF-94/17). The Working Group noted that this may have been even more effective had it been placed closer to the hook.

5.18 Paper SC-CAMLR-XII/BG/14, which discussed incidental mortality of seabirds in the Japanese tuna longline fishery in New Zealand waters, also recommended the use of 70 g swivels on branch lines, as close as possible to the hooks.

Bait Throwers

5.19 The Working Group noted that bait-casting machines had been developed in the Australian tuna fishery. These machines reduced incidental mortality and were also advantageous to the fisheries.

Bait Quality

5.20 WG-IMALF-94/24 identifies bait quality as an important factor in the rate at which baits sink so that they are less likely to be located by birds. Bait that is thawed, and has had the air in its swim bladder expelled, will sink. The paper also discussed the sink rates for various species of bait fish commonly used in the Japanese tuna longline fishery.

Advice to the Scientific Committee

5.21 The Working Group agreed that much of its discussion and review of information was directly relevant to the provisions set out in Conservation Measure 29/XII. These provisions aim to minimise incidental mortality of seabirds during longlining in the Convention Area.

5.22 In this context, the Working Group drew SC-CAMLR's attention to:

- the need to review Conservation Measure 29/XII as a matter of urgency;
- a major amendment to the above measure should ensure that scientific observers are placed on all longline vessels fishing in the Convention Area. Such placement necessitates both the collection and reporting of data by observers in a format specified by the Scientific Committee. This must be achieved in such a way that the observers' scientific impartiality is not compromised by a perception that they need to enforce compliance or report violations of conservation measures in force;
- the need to ensure that the setting of all longlines only takes place at night (i.e., between the times for nautical twilight) and only the minimum lights necessary for ship safety are used. This measure aims to minimise incidental mortality of albatrosses, although it increases the impact on petrels; this will require further research to develop appropriate mitigating measures;
- dumping of trash and/or offal during longline operations must be avoided if possible, but should it occur, it must be done as far away as possible from the area of the vessel where the longlines are being set or hauled. This will serve to reduce potential interactions between seabird foraging for offal and longline operations;
- the requirement that only thawed bait be used during longline operations;
- the continued need to ensure that longline fishing is conducted so that baited hooks sink as soon as possible after being put into the water;
- the need to deploy streamer lines at all times during the setting of longlines. The appendix to Conservation Measure 29/XII should be revised to allow an option to use weights, floats or other methods to maintain suitable tension of the streamer line;
- every effort should be made to ensure that birds captured during longlining are released alive and that wherever possible hooks are removed without jeopardising the life of the bird concerned.

5.23 The Working Group agreed on the need to investigate the effectiveness of any alternative streamer line configurations prior to recommendation. Principles to be considered are described in detail in WG-IMALF-94/19.

5.24 The Working Group further agreed that future development of mitigation of incidental mortality of longline fishing would require an experimental approach. Data arising from such an approach would augment that being collected by observers aboard commercial vessels.

5.25 Recognising the potential for interactions between cetaceans and longline fisheries in the Convention Area, the Working Group recommended that the Scientific Committee investigate how research on mitigating such interactions might be undertaken practically.

5.26 The Working Group agreed that CCAMLR should exchange information on the state of Antarctic seabird populations affected by longline fisheries, incidental catches in these fisheries, and relevant data on fishing effort with appropriate fisheries management authorities and international organisations.

5.27 It was noted that while it may not always be possible to transfer mitigation techniques used in one fishery into another fishery, experience in formulating and implementing conservation measures to mitigate incidental mortality in longline fisheries should be shared around various organisations (see Appendix E).

REQUIREMENTS FOR FUTURE WORK

6.1 The Working Group has identified areas where further work is needed:

- assessment of incidental mortality in the Convention Area;
- education of fishermen and involvement of the industry;
- development and evaluation of mitigation measures; and
- monitoring of bird populations in the Convention Area likely to be affected by longline activities.

6.2 Consequently, several actions were proposed:

- to maintain or increase monitoring of the bird populations involved;
- liaison with national and international fisheries agencies in adjacent waters concerning incidental mortality of seabirds from the Convention Area;

- to put in place a mechanism facilitating the identification and further processing of specimens collected by scientific observers;
- to develop data collection forms to be used by observers on board fishing vessels. These forms should be prepared in close liaison with WG-FSA;
- to produce a brochure relevant to CCAMLR fisheries and have it translated into the languages of the fishing nations. This task would be carried out by the Secretariat in contact with appropriate experts during the intersessional period addressing, *inter alia*, the conservation and economic advantages of reducing incidental mortality;
- to design and implement an experimental program using commercial longline and research vessels, aimed at improving bird-scaring devices. The program should also address vessel configuration, gear design and methods of its deployment.

ADOPTION OF THE REPORT
AND CLOSE OF THE MEETING

7.1 The report of the meeting was adopted.

7.2 In closing the meeting, the Convener thanked the participants, rapporteurs and the Secretariat for their hard work and cooperation during the meeting.

7.3 The meeting was closed at 0020 hours on 23 October 1994.

Table 1: Place of banding of a sample of albatrosses and giant petrels caught in the southern bluefin tuna longline fishery.

Location:	Number of Birds
Islands within the Convention Area:	
South Shetland Islands	2
Bird Island, South Georgia	21
Crozet Island	11
Kerguelen Island	6
Marion Island	6
Islands outside the Convention Area	
Gough Island	1
Amsterdam Island	1
Macquarie Island	1
Albatross Island, Tasmania	2
Mewstone Island, Tasmania	3
Auckland Island	1
Campbell Island	12

Table 2: Catch rates of seabirds in various longline fisheries from data collected by observers both inside and outside the CCAMLR Convention Area. Rough estimates of total mortality are extrapolated from estimates of total effort. These estimates may involve substantial extrapolation, and hence may be subject to considerable uncertainty.

Region	Fishery	Season	Number of Hooks Observed	Number of Birds Caught (Observed)	Incidental Catch Rate of Seabirds (No. per 1 000 hooks)	Total Effort in Fishery (Millions of hooks)	Annual Implied Total Seabird Mortality	Reference
South Atlantic off Brazil	Tuna	1990	18597	71	3.82	-	2650 ¹	WG-IMALF-94/4
South Atlantic off Brazil and Uruguay	Tuna	1994	55624	280	5.03	-	-	WG-IMALF-94/17
Australia, SW of Tasmania	Tuna (Japanese)	1987	108662	45	0.41	107.9 ⁵	44000	WG-IMALF-94/6
New Zealand (north)	Tuna (domestic)	1994	11200	6	0.27	-	-	WG-IMALF-94/10
New Zealand (w/o mitigation)	Tuna (Japanese)	1988-91	1269000	304	0.24	10.4	2500	SC-CAMLR-XII-BG/14
New Zealand (streamer lines + night-setting)	Tuna (Japanese)	1992	1032000	16	0.016	9.0	144 ²	SC-CAMLR-XII-BG/14
Fisheries in CCAMLR Convention Area								
South Georgia (Subarea 48.3)	<i>D. eleginoides</i>	1991	9000	6	0.67	5.2 ³	3000	WG-IMALF-94/5
“ (single vessel)	“	1994	239200	75	0.31	0.2392	75	SC-CAMLR-XIII-BG/9 Rev 1.
“	“	1994	25860	5	0.19	0.2504	55	WG-IMALF-94/14
“	“	1994	206720	98	0.47	0.2914 ⁴	138	WG-IMALF-94/15
Kerguelen (Division 58.5.1)	“	1994	174000	38	0.22	-	-	WG-IMALF-94/12

¹ Estimate calculated as birds per fishing day. Number of fishing days is an estimate only.

² Reported to be higher in 1993

³ Estimated

⁴ C. Moreno, pers. comm.

⁵ All hooks south of 30°S

Table 3: Summary of the species composition of birds killed in longline fisheries.

Region	Fishery	Season	No. of Killed Birds Identified	Composition by Species ^a (%)									Reference
				WA	BBA	GHA	YNA	SA	LMA	GP	WCP	Other	
South Atlantic off Brazil	Tuna	1990	71	6	3	-	-	-	-	-	90	1 ^b	WG-IMALF-94/4
South Atlantic off Brazil and Uruguay	Tuna	1994	45	13	82	-	2	-	-	-	2	-	WG-IMALF-94/17
Australia, SW of Tasmania	Tuna (Japanese)	1987	33	21	42	3	-	21	9	3	-	-	WG-IMALF-94/6
New Zealand (North)	Tuna (domestic)	1994	6	82	18	-	-	-	-	-	-	-	WG-IMALF-94/10
New Zealand (w/o mitigation)	Tuna (Japanese)	1988-91	135	19	19	4	-	-	-	1	-	57 ^e	SC-CAMLR-XII-BG/14
New Zealand (streamer lines + night-setting)	Tuna (Japanese)	1992											
Fisheries in the CCAMLR Convention Area													
South Georgia (Subarea 48.3)	<i>D. eleginoides</i>	1991	6	-	16	-	-	-	-	-	67	16 ^c	WG-IMALF-94/5
“ (single vessel)	“	1994	75	1	8	-	-	-	-	36	55	-	SC-CAMLR-XIII-BG/9 Rev 1.
“	“	1994	21	-	71	-	-	-	5	24	-	-	WG-IMALF-94/14
“	“	1994	98	-	21	27	-	-	-	15	15	12 ^d	WG-IMALF-94/15
Kerguelen (Division 58.5.1)	“	1994	38	-	-	5	-	-	-	-	95	-	WG-IMALF-94/12
Kerguelen	“	1991	8	-	50	-	-	-	-	13	37	-	SC-CAMLR-X/BG/14

^a WA wandering albatross; BBA black-browed albatross; GHA grey-headed albatross; YNA yellownose albatross; SA shy albatross; LMA light-mantled albatross; GP giant petrel; WCP white-chinned petrel

^b Antarctic fulmar

^c Albatross sp.

^d Cape petrel

^e Grey petrel 35%, Bullers albatross 16%, white-capped albatross 4%; cape petrel 1%, westland petrel 1%

AGENDA

Ad Hoc Working Group on Incidental Mortality
Arising from Longline Fishing
(Hobart, Australia, 21 and 22 October 1994)

1. Opening of the Meeting
2. Adoption of the Agenda
3. Data on Incidental Mortality Associated with Longline Fishing
 - (i) Data Reported as Part of CCAMLR Conservation Measures
 - (ii) Other Data
 - (iii) Data Reporting Forms
 - (iv) Advice to the Scientific Committee
4. Level of Incidental Mortality Arising from Longline Fishing and its Significance to Marine Animals found within the Convention Area
 - (i) Review of Submitted Papers
 - (ii) Advice to the Scientific Committee
5. Measures for Reducing and/or Eliminating Incidental Mortality Associated with Longline Fishing
 - (i) Reports of Members' Work in the Convention Area
 - (ii) Experience from Research and Fishing Operations Outside the Convention Area
 - (iii) Advice to the Scientific Committee
6. Requirements for Future Work
7. Adoption of the Report.

LIST OF PARTICIPANTS

Ad Hoc Working Group on Incidental Mortality
Arising from Longline Fishing
(Hobart, Australia, 21 and 22 October 1994)

E. BARRERA-ORO	Instituto Antártico Argentino Cerrito 1248 1010 Buenos Aires Argentina
N. BROTHERS	Parks and Wildlife Division Tasmanian Department of Environment and Land Management GPO Box 44A Hobart Tasmania 7001 Australia
L. CHAPMAN	Australian Fisheries Management Authority Department of Primary Industries and Energy Canberra ACT 2600 Australia
Z. CIELNIASZEK	Sea Fisheries Institute Kollataja 1 81-332 Gdynia Poland
A. CONSTABLE	Deakin University Warrnambool Campus Warrnambool Vic 3280 Australia
J. COOPER	FitzPatrick Institute University of Cape Town Rondebosch 7700 South Africa jcooper@botzoo.uct.ac.za

J. CROXALL
British Antarctic Survey
High Cross, Madingley Road
Cambridge CB3 0ET
United Kingdom

J. DALZIELL
Representative of Non-Governmental Organizations
c/- PO Box 800
Surry Hills NSW 2010
Australia
janet.dalziell@green2.dat.de

W. DE LA MARE
Australian Antarctic Division
Channel Highway
Kingston Tasmania 7050
Australia
bill_de@antdiv.gov.au

G. DUHAMEL
Ichtyologie générale et appliquée
Muséum national d'histoire naturelle
43, rue Cuvier
75231 Paris Cedex 05
France

I. EVERSON
British Antarctic Survey
High Cross, Madingley Road
Cambridge CB3 0ET
United Kingdom
I.Everson@bas.ac.uk

R. GALES
Parks and Wildlife Division
Tasmanian Department of Environment and Land
Management
GPO Box 44A
Hobart Tasmania 7001
Australia

E. GOUBANOV
YUGRYBPOISK
I. Kozlov, 6 str.
Kerch 334500
Crimea, Ukraine

R. HOLT
US AMLR Program
Southwest Fisheries Science Center
PO Box 271
La Jolla, Ca. 92038
rholt@ucsd.edu

M. IMBER
Department of Conservation
Conservation Sciences Centre
PO Box 10420
Wellington
New Zealand

K. KERRY
Australian Antarctic Division
Channel Highway
Kingston Tasmania 7050
Australia

N. KLAER
CSIRO Marine Laboratories
Department of Industry, Science and Technology
GPO Box 1538
Hobart Tas 7001
Australia

K.-H. KOCK
Chairman, Scientific Committee
Bundesforschungsanstalt für Fischerei
Institut für Seefischerei
Palmaille 9
D-22767 Hamburg
Germany
bfa.fisch@omnet.com

A. LINDQUIST
Institute of Marine Research
National Board of Fisheries
Box 4
S-453 00 Lysekil
Sweden

E. MARSCHOFF
Instituto Antártico Argentino
Cerrito 1248
1010 Buenos Aires
Argentina

D. MILLER
Sea Fisheries Research Institute
Private Bag X2
Roggebaai 8012
South Africa
dmiller@sfri.sfri.ac.za

C. MORENO
Convener, WG-IMALF
c/- Instituto de Ecología y Evolución
Universidad Austral de Chile
Casilla 567
Valdivia
Chile

G. PARKES
Renewable Resources Assessment Group
Imperial College
8, Prince's Gardens
London SW7 1NA
United Kingdom

J. PEACEY
New Zealand Industry Board
Private Bag 24-901
Wellington
New Zealand

T. POLACHECK
CSIRO Marine Laboratories
Department of Industry, Science and Technology
GPO Box 1538
Hobart Tas 7001
Australia

G. ROBERTSON
Australian Antarctic Division
Channel Highway
Kingston Tasmania 7050
Australia
graham_rob@antdiv.gov.au

K. TRUELOVE
Fisheries Policy Branch
Department of Primary Industries and Energy
GPO Box 858
Canberra ACT 2601
Australia

G. WATTERS
US AMLR Program
Southwest Fisheries Science Center
PO Box 271
La Jolla, Ca. 92038
watters@amlr.ucsd.edu

K. WEAVER
Australian Nature Conservation Agency
GPO Box 636
Canberra City ACT 2601
Australia
kweaver_ancacbra@anca.erin.gov.au

H. WEIMERSKIRCH
Centre d'Etudes Biologiques de Chize
Centre National de la Recherche Scientifique
F-79360 Beauvoir-Sur-Niort
France

D. WILLIAMS

Australian Antarctic Division
Channel Highway
Kingston Tasmania 7050
Australia

V. YAKOVLEV

YugNIRO
2 Sverdlov Street
Kerch 334500
Crimea, Ukraine

SECRETARIAT:

E. DE SALAS (Executive Secretary)
E. SABOURENKOV (Science Officer)
D. AGNEW (Data Manager)

CCAMLR
25 Old Wharf
Hobart Tasmania 7000
Australia

LIST OF DOCUMENTS

Ad Hoc Working Group on Incidental Mortality
 Arising from Longline Fishing
 (Hobart, Australia, 21 and 22 October 1994)

WG-IMALF-94/1	PROVISIONAL AGENDA
WG-IMALF-94/2	LIST OF PARTICIPANTS
WG-IMALF-94/3	LIST OF DOCUMENTS
WG-IMALF-94/4	SEABIRDS MORTALITY ON LONGLINE FISHING FOR TUNA IN SOUTHERN BRAZIL Vaske, T. 1991. <i>Ciencia e Cultura</i> , 43 (5): 388-390.
WG-IMALF-94/5	SEABIRD MORTALITY IN LONGLINE FISHERIES AROUND SOUTH GEORGIA Dalziell, J. and M. de Poorter. 1993. <i>Polar Record</i> , 29 (169): 143-145.
WG-IMALF-94/6	ALBATROSS MORTALITY AND ASSOCIATED BAIT LOSS IN THE JAPANESE LONGLINE FISHERY IN THE SOUTHERN OCEAN Brothers, N. 1991. <i>Biol. Conservation</i> , 55: 255-268.
WG-IMALF-94/7	POPULATION DYNAMICS OF THE WANDERING ALBATROSS (<i>DIOMEDEA EXULANS</i>) ON MACQUARIE ISLAND AND THE EFFECTS OF MORTALITY FROM LONGLINE FISHING William K. de la Mare and Knowles R. Kerry (Australia)
WG-IMALF-94/8	USE OF A POPULATION MODEL TO ASSESS THE IMPACT OF LONGLINE FISHING ON WANDERING ALBATROSS POPULATIONS Coleen L. Moloney, John Cooper, Peter G. Ryan and W. Roy Siegfried (South Africa)
WG-IMALF-94/9	REDUCED BAIT LOSS AND BYCATCH OF SEABIRDS IN LONGLINING BY USING A SEABIRD SCARER S. Løkkeborg and Å. Bjordal (Norway)
WG-IMALF-94/10	REPORT ON A TUNA LONG-LINING FISHING VOYAGE ABOARD <i>SOUTHERN VENTURE</i> TO OBSERVE SEABIRD BY-CATCH PROBLEMS M.J. Imber (New Zealand)

- WG-IMALF-94/11 CHANGES IN POPULATION SIZE OF LARGE PROCELLARIIFORMES BREEDING IN THE FRENCH SUB-ANTARCTIC ISLANDS: POTENTIAL INFLUENCE OF SOUTHERN FISHERIES AND PARTICULARLY LONG-LINING
Henri Weimerskirch and Pierre Jouventin (France)
- WG-IMALF-94/12 INTERACTIONS BETWEEN LONGLINE VESSELS AND SEABIRDS IN KERGUELEN WATERS AND A METHOD TO REDUCE SEABIRD MORTALITY
Yves Cherel, Henri Weimerskirch and Guy Duhamel (France)
- WG-IMALF-94/13 ENTANGLEMENTS AND INCIDENTAL MORTALITY OF BIRDS AND SEALS - SUMMARY OF REPORTS TO CCAMLR, 1985 TO 1993
Secretariat
- WG-IMALF-94/14 REPORT ON INCIDENTAL BIRD MORTALITY AND EFFECTIVENESS OF MITIGATION MEASURES DURING DEMERSAL LONG LINING BY *IHN SUNG 66* IN SUBAREA 48.3 - DECEMBER 1993 TO FEBRUARY 1994
Caradoc Jones and Graeme Parkes (UK)
- WG-IMALF-94/15 SEABIRD INTERACTION WITH LONG-LINING OPERATIONS FOR *DISSOSTICHUS ELEGINOIDES* AROUND SOUTH GEORGIA, APRIL AND MAY 1994
J.R. Ashford, J.P. Croxall (UK), P.S. Rubilar and C.A. Moreno (Chile)
- WG-IMALF-94/16 INTERACTIONS BETWEEN CETACEANS AND LONG-LINING OPERATIONS FOR PATAGONIAN TOOTHFISH *DISSOSTICHUS ELEGINOIDES* AROUND SOUTH GEORGIA
J.R. Ashford (UK) and P.S. Rubilar (Chile)
- WG-IMALF-94/17 MORTALITY OF ALBATROSSES AND OTHER SEABIRDS PRODUCED BY TUNA LONG-LINE FISHERIES IN URUGUAY
L. Barea, I. Loinaz, Y. Marin, C. Ríos, A. Saralegui, A. Stagi, R. Vaz-Ferreira and N. Wilson (Uruguay)
- WG-IMALF-94/18 SEABIRD MORTALITY FROM LONGLINE FISHERIES: EVIDENCE FROM MARION AND GOUGH ISLANDS
J. Cooper (South Africa)
- WG-IMALF-94/19 PRINCIPLES OF BIRDLINE CONSTRUCTION AND USE TO REDUCE BAIT LOSS AND BIRD DEATHS DURING LONGLINE SETTING
Nigel Brothers (Australia)
- WG-IMALF-94/20 CATCHING FISH NOT BIRDS
A GUIDE TO IMPROVING YOUR LONGLINE FISHING EFFICIENCY (ENGLISH VERSION)
Nigel Brothers (Australia)

WG-IMALF-94/21	POPULATION TRENDS AND VULNERABILITY TO TUNA LONGLINING BYCATCH OF ALBATROSSES, MOLLYMAWKS AND <i>PROCELLARIA</i> PETRELS OF NEW ZEALAND SEAS M.J. Imber (New Zealand)
WG-IMALF-94/22	ASPECTS OF SEABIRD BYCATCH AND ITS MITIGATION IN THE NZ LONGLINE FISHERY FOR TUNA M.J. Imber (New Zealand)
WG-IMALF-94/23	COOPERATIVE ANALYSIS OF NEW ZEALAND SEABIRD BYCATCH DATA - INTERIM REPORT (New Zealand)
WG-IMALF-94/24	INFLUENCE OF BAIT QUALITY ON SEABIRD MORTALITY AND ECONOMIC LOSSES IN LONGLINE FISHING: AN EXPERIMENTAL APPROACH Nigel Brothers and Andrew Foster (Australia)
CCAMLR-VIII/BG/6	RECOVERIES OF WANDERING ALBATROSSES <i>DIOMEDEA EXULANS</i> RINGED AT SOUTH GEORGIA 1958 - 1986 Delegation of United Kingdom
SC-CAMLR-VIII/BG/54	DEVELOPMENT OF A LONGLINE DATA RECORDING SHEET Secretariat
CCAMLR-X/BG/18	INFORMATION OF INTEREST TO CCAMLR COLLECTED BY M.V. <i>GONDWANA</i> ON GREENPEACE'S 1990/91 EXPEDITION ASOC Observer
SC-CAMLR-X/BG/4	INCIDENTAL CATCH OF SEABIRDS IN TRAWL FISHERIES Delegation of New Zealand
SC-CAMLR-X/BG/8	REPRODUCTIVE PERFORMANCE, RECRUITMENT AND SURVIVAL OF WANDERING ALBATROSSES <i>DIOMEDEA EXULANS</i> AT BIRD ISLAND, SOUTH GEORGIA Delegation of United Kingdom
SC-CAMLR-X/BG/14	INCIDENTAL MORTALITY ARISING FROM FISHERIES ACTIVITIES AROUND KERGUELEN ISLAND (DIVISION 58.5.1) Delegation of France
CCAMLR-XI/BG/17	REPORT ON ASSESSMENT AND AVOIDANCE OF INCIDENTAL MORTALITY IN THE CONVENTION AREA 1991/92 Russian Federation
SC-CAMLR-XII/BG/7	RECORDS OF FISHING HOOKS ASSOCIATED WITH ALBATROSSES AT BIRD ISLAND, SOUTH GEORGIA, 1992/93 Delegation of United Kingdom

SC-CAMLR-XII/BG/8 Rev.1	SEABIRD INTERACTIONS WITH LONG-LINING OPERATIONS DURING AN EXPLORATORY FISHING CRUISE FOR <i>DISSOSTICHUS ELEGINOIDES</i> TO SOUTH SANDWICH ISLANDS, ANTARCTICA Delegations of United Kingdom and Chile
SC-CAMLR-XII/BG/13	OBSERVATIONS ON CCAMLR SPECIFICATIONS FOR STREAMER LINES TO REDUCE LONGLINE BY-CATCH OF SEABIRDS Delegation of New Zealand
SC-CAMLR-XII/BG/14	INCIDENTAL CAPTURE OF SEABIRDS BY JAPANESE SOUTHERN BLUEFIN TUNA LONGLINE VESSELS IN NEW ZEALAND WATERS 1988 - 1992 Delegation of New Zealand
SC-CAMLR-XII/BG/18	REPORT ON MEASURES ON BOARD RUSSIAN VESSELS IN 1992/93 TO AVOID INCIDENTAL MORTALITY OF SEABIRDS Delegation of Russia
SC-CAMLR-XII/BG/21	POPULATION DYNAMICS OF BLACK-BROWED AND GREY-HEADED ALBATROSSES <i>DIOMEDEA MELANOPHRIS</i> AND <i>D. CHRYSOSTOMA</i> AT BIRD ISLAND, SOUTH GEORGIA Delegation of United Kingdom
SC-CAMLR-XII/BG/22	CO-OPERATIVE MECHANISMS FOR THE CONSERVATION OF ALBATROSS Delegation of Australia
SC-CAMLR-XIII/BG/9 Rev. 1	CCAMLR SCHEME OF INTERNATIONAL SCIENTIFIC OBSERVATION - PRELIMINARY REPORT OF THE SCIENTIFIC OBSERVER FV <i>MAKSHEEVO</i> , 7 FEBRUARY TO 18 APRIL 1994 Delegation of USA
SC-CAMLR-XIII/BG/14	SUMMARY REPORT OF THE UK NOMINATED SCIENTIFIC OBSERVERS ON FV <i>IHN SUNG 66</i> , 16 DECEMBER 1993 TO 7 FEBRUARY 1994 Delegation of United Kingdom
CCAMLR-XIII/BG/14	REPORT ON ASSESSMENT AND AVOIDANCE OF INCIDENTAL MORTALITY IN THE CONVENTION AREA 1993/94 Report of Observer (Ukraine)
CCAMLR-XIII/BG/15	REPORT ON ASSESSMENT AND AVOIDANCE OF INCIDENTAL MORTALITY IN THE CONVENTION AREA 1993/94 United States of America
SC-CAMLR-XIII/BG/4	FISHING GEAR, OIL AND MARINE DEBRIS ASSOCIATED WITH SEABIRDS AT BIRD ISLAND, SOUTH GEORGIA, 1993/94 Delegation of United Kingdom

**DATA TO BE COLLECTED AND REPORTED BY
SCIENTIFIC OBSERVERS ON LONGLINE VESSELS**

General items

Cruise date (trip start/finish date)*
 Observer name*
 Designating CCAMLR Member*
 Vessel name*
 Vessel type (longliner, converted, etc.)*
 Nationality
 Owner*
 Captain*
 Fishing master
 Vessel radio call sign*
 Target species*
 Registered length
 Gross weight (GRT)
 Electronic equipment
Comments

Fishing Gear Description

Start/end date of gear use
 Longline type (e.g. traditional, Spanish, automatic line, etc.)*
 Diagram of configuration of the longline
 Samples of fishing gear collected
 Mainline material
 Mainline diameter (mm)*
 Branch material
 Branch length (m)*
 Hook size*
 Hook type*
 Hook make/model*
 Height of hook setting off the bottom*
 Method of baiting (manual/automatic)
 Automatic baiting (random/precision)
 Vessel equipped with streamer line (Y/N)
 Floats
 Weights
Comments

Environmental Conditions

Wind speed/direction*
 Sea height/direction
 Swell height/direction
 Barometric pressure
 Barometer (rising/falling/steady)
 Cloud cover
 External air temperature
 Surface water temperature*
 Daylight period (dawn, dusk, day, night)
 Moonlight (full moon, half moon, none)
 Deck lights (On/Off)
Comments

Bait details

Bait species*
 Bait size
 Bait mix (proportion)
 Bait thawing (full thawed, half frozen, frozen)
Comments

Offal dumping (Y/N)

Time/date of observation
 Side of vessel (longline set/opposite)
 Start/stop time of dumping
Comments

Streamer Line Description

Diagram of the mitigation device
Samples of mitigation device collected
Bird pole length (m)
Bird pole position
Streamer line length (m)
Streamer line material
Streamer line diameter (mm)
Streamers length (m)
Streamers material
Streamers diameter (mm)
Streamers colour
Streamers distance apart (m)
Number of streamers
Height of attachment above water
Line over bait entry point ? (Y/N)
Distance from bait entry point and bird line
Comments

Set and Haul Details

Time zone
Start/end set time/date*
Start/end set latitude/longitude*
Start/end haul time/date*
Start/end haul latitude/longitude*
Setting speed/ship speed (knots)
Mainline length (km)
Number of hooks set
Distance between branches
Streamer line in use? (Y/N)
Comments

Bird and marine mammals abundance during line setting

Time/date of observation*
Estimated total no. of birds*
Estimated no. of albatrosses
Estimated no. of petrels
Estimated no. of penguins
Estimated no. of seals
Estimated no. of whales
Comments

Seabird By-catch Data

Time/Date of observation*
Species*
Time in on haul
Alive or dead
Cause of injury or death*
Sample retained (Y/N)
Type of sample (whole bird/head only)
Sample number
Band (Y/N)
Tag number
Number of hooks observed
Comments

Marine Mammals Interaction

Time/date of observation*
Species*
Number*
Interaction description*
Comments

* Data currently reported on the CCAMLR standard fine-scale catch and effort data form for the longline fishery (form C2, version 4) and the form for reporting observations on incidental mortality of birds and mammals (format 7, *Scientific Observers Manual*).

**INTERNATIONAL FISHERIES ORGANISATIONS WHOSE COMPETENCE
COVERS WATERS ADJACENT TO THE CCAMLR CONVENTION AREA**

Organisation	Fisheries Managed	Areas Covered
International Commission for the Conservation of Atlantic Tunas (ICCAT)	Tuna and tuna-like species	Atlantic Ocean between 50°N and 50°S
Indian Ocean Tuna Commission	Tuna and tuna-like species except southern bluefin tuna	Indian Ocean (FAO Areas 51 and 57) Western Pacific (FAO Area 71)
Indian Ocean Fisheries Commission (IOFC)	Species other than tuna and tuna-like species	Indian Ocean (FAO Areas 51 and 57)
South Pacific Commission (SPC)	Tunas (mainly skip jack, yellow fin, big eye and albacore); no management responsibility, research only	Western and Central Pacific (southern boundary at 45°S) between 150°E and 140°W
South Pacific Forum Fisheries Agency (FFA)	All species of finfish and shellfish	200-mile EEZ of South Pacific Ocean states
Commission for the Conservation of the Southern Bluefin Tuna (CCSBT)	Southern bluefin tuna	All areas where this species occurs, mainly to the south of 30°S
Inter-American Tropical Tuna Commission (I-ATTC)	All species of tuna and billfish	Eastern Pacific within FAO Area 87