# REPORT OF THE WORKING GROUP ON INCIDENTAL MORTALITY ASSOCIATED WITH FISHING

**(This text was adopted as part of the WG-FSA report and has been extracted here as a separate document)**

## INCIDENTAL MORTALITY OF MAMMALS AND SEABIRDS ARISING FROM FISHING

### Intersessional work of ad hoc WG-IMAF

7.1 The Secretariat reported on the intersessional activities of ad hoc WG-IMAF according to the agreed plan of intersessional activities for 2003/04 (SC-CAMLR-XXII, Annex 5, Appendix E). The report contained records of all activities planned and results of their completion and is available on the IMAF page of the CCAMLR website.

7.2 The Working Group thanked the Science Officer for his work on the coordination of IMAF activities and the technical coordinators for their extensive support. It also thanked the Scientific Observer Data Analyst for his work on the processing and analysis of data submitted to the Secretariat by international and national observers during the course of the 2003/04 fishing season.

7.3 The Working Group concluded that most tasks planned for 2003/04 had been successfully implemented. The list of current intersessional tasks was reviewed and a number of changes were agreed in order to consolidate specific tasks in future plans. The Working Group agreed that the plan of intersessional activities for 2004/05, compiled by the Convener and Science Officer, be appended to its report (Appendix D).

7.4 The Working Group especially welcomed to the meeting Mrs T. Neves (Brazil) and Ms P. Toschik (USA) who were attending the meeting for the first time. The Working Group continued to appreciate Mr M. McNeill's (New Zealand) expert advice on operational aspects of fishing and encouraged analogous input from other Members, including in relation to trawl fisheries. Members were asked to review their representation on WG-IMAF intersessionally, to suggest additional members and to facilitate the attendance of their representatives at the meetings.

### Incidental mortality of seabirds during regulated longline fishing in the Convention Area

7.5 Data were available from all 44 longline cruises conducted within the Convention Area during the 2003/04 season (details in WG-FSA-04/6 Rev. 1).

7.6 The Working Group noted that the proportion of hooks observed was similar to, or higher than, last year for Subareas 48.3 (28% (range 18–50) compared with 25% (range 17–63)) and 88.1 and 88.2 (61% (range 30–99) compared with 52% (range 35–62)), and with generally greater consistency across vessels. Only for one cruise (*Koryo Maru No. 11* (18%)) was the proportion of hooks observed lower than 20%; this compares with four such cruises last year.

7.7 As usual, the total observed seabird catch rate was calculated using the total number of hooks observed and the total seabird mortality observed (Table 7.1). The estimated total catch of seabirds by vessel was calculated using each vessel's observed catch rate multiplied by the total number of hooks set.

Subarea 48.3

7.8 The total estimated seabird mortality was 18 birds (Tables 7.1 and 7.2) compared with 8, 27 and 30 birds in the last three years (Table 7.3). The overall catch rate was 0.001 birds/thousand hooks compared to 0.0003 and 0.0015 in the previous two years (Table 7.3). The five birds observed killed (all at night) comprised one grey-headed albatross, one black-browed albatross and three southern giant petrels (Table 7.4).

7.9 This represents a slight increase in by-catch total and rate compared with last year but values are still the second lowest yet recorded for this area.

South African EEZ in Subareas 58.6 and 58.7

7.10 The total estimated seabird mortality was 39 birds (Tables 7.2 and 7.3) compared with seven, zero and 199 bird mortalities in the last three years (Table 7.3). The overall catch rate was 0.025 birds/thousand hooks compared to 0.003, zero and 0.018 in the previous three years (Table 7.3). Of the 11 birds observed killed, 10 (all at night) were giant petrels and one (in daytime) was a white-chinned petrel (Table 7.4).

7.11 Values this year represent increases over the previous two years and although the total estimated seabird by-catch level is only 20% of that in 2001, the by-catch rate is very similar to that year.

Subareas 88.1 and 88.2

7.12 After seven successive years of zero seabird by-catch in the fishery in Subarea 88.1, a single southern giant petrel was observed killed this year. For the third successive year there was no incidental mortality of seabirds in Subarea 88.2.

Subarea 48.6 and Divisions 58.4.2, 58.4.3b and 58.5.2

7.13 This was the first year that longline fishing had been conducted in Subarea 48.6 and Divisions 58.4.2 and 58.4.3b, and the second such year for Division 58.5.2. No incidental mortalities of seabirds were observed in fishing operations.

7.14 Dr Constable suggested that it would be very useful to estimate the mean level of seabird by-catch for vessels fully compliant with mitigation measures in each part of the Convention Area. This would provide an appropriate basis for identifying vessels which report values significantly different from these levels. This should assist identifying the reasons or circumstances involved.

French EEZs in Subarea 58.6 and Division 58.5.1

7.15 The Working Group welcomed the participation of Dr T. Micol as a French representative to ad hoc WG-IMAF for a second year, allowing presentation and discussion of the French fishery results.

2001/02 and 2002/03 fishing seasons

7.16 The requested French data for 2001/02 and 2002/03 had been submitted to the Secretariat in tabulated form analogous to the summaries prepared by the Secretariat for the rest of the Convention Area (WG-FSA-04/6 Rev. 1). These tables are appended as Tables 7.5 to 7.8.

7.17 The total reported seabird mortality in 2001/02 for Subarea 58.6 and Division 58.5.1 was 1 243 and 10 814 birds respectively (Tables 7.5 and 7.6). The corresponding catch rates (reported birds/total hooks set) were 0.167 birds and 0.936 birds/thousand hooks.

7.18 The total reported seabird mortality in 2002/03 for Subarea 58.6 and Division 58.5.1 was 720 and 13 926 birds respectively (Tables 7.7 and 7.8). The corresponding catch rates (reported birds/total hooks set) were 0.109 and 0.518 birds/thousand hooks.

7.19 For Subarea 58.6, the annual by-catch rates decreased from 0.167 in 2001/02 to 0.109 in 2002/03, a decrease of 53%. For Division 58.5.1, the annual by-catch rates decreased from 0.936 in 2001/02 to 0.518 in 2002/03, a decrease of 45%.

7.20 In respect of incidental mortality of seabirds, it was emphasised that the totals of 12 057 birds killed in 2001/02 (1 243 birds in Subarea 58.6 and 10 814 in Division 58.5.1) and 14 646 birds killed in 2002/03 (720 in Subarea 58.6 and 13 926 in Division 58.5.1) represent the numbers of birds reported killed.

7.21 The reported totals of birds killed in these two years are based on retention of all birds brought on board each vessel, rather than on subsampling by observing seabird by-catch on a proportion of the hooks set and extrapolating to derive the total estimated seabird mortality. However, Dr Micol indicated that observers were used to make checks, which confirmed that virtually all birds brought on board were retained.

7.22 Intersessionally, France commissioned an analysis of the 2001/02 and 2002/03 data from the French research group led by Dr H. Weimerskirch, which is reported in WG-FSA-04/11. Findings show that the mortality was mainly of white-chinned petrels (93%), followed by grey petrels (5%), the former mainly caught in October and between January and April, the latter mainly between April and November. Fishing effort varied by area, as did catch rates of seabirds, with higher catch rates around Kerguelen (Division 58.5.1) than in the Crozet area (Subarea 58.6), with fishers setting more hooks in the Kerguelen area. Autoline vessels caught many times more birds than vessels using the Spanish system. The multivariate analysis showed that not one single factor was responsible for the by-catch mortality of seabirds. However, a significant part of the mortality of white-chinned and grey petrels is explained by season, area and method of fishing. Recommendations were made to allow continued reduction of seabird mortality. These were chiefly for fishing closures in the

highest-risk periods for seabirds (February–March and October–November), using night setting, improved line weighting, using only white lines and redistributing fishing effort between the Crozet (lower risk) and Kerguelen (higher risk) areas.

### 2003/04 fishing season

7.23 In the first part of the 2003/04 season (until the end of February) the recording and reporting of by-catch was done in the same way as in previous years (paragraph 7.7). On cruises from March onwards, however, observers recorded by-catch on a proportion of the hooks set. These two datasets are shown separately in Table 7.9.

7.24 The total reported seabird mortality for Subarea 58.6 and Division 58.5.1 was 242 and 2 069 birds respectively (Table 7.9). The corresponding by-catch mortality rates were 0.080 and 0.127 birds/thousand hooks.

7.25 The Working Group noted that there was considerable variation between vessels in the levels of reported seabird by-catch. Thus in Subarea 58.6, 157 birds (65% of the total) were reported from cruise 2 of ship 5. In Division 58.5.1, 1 615 birds (78% of the total) were taken on one cruise each by ship 1 (700 birds), ship 2 (109 birds), ship 4 (144 birds), ship 5 (164 birds), ship 6 (349 birds) and ship 7 (149 birds). The Working Group requested analysis of the 2003/04 by-catch data to try to identify the factors responsible for the poor performance of these vessels, particularly in relation to interactions between timing and area of fishing and the nature of mitigation in use. It requested France to report the results of this analysis to the next meeting of the Working Group.

7.26 The reported seabird by-catch in Subarea 58.6 comprised 96% white-chinned petrels and 4% grey petrels; in Division 58.5.1 it comprised 94% white-chinned petrels and 5% grey petrels (Table 7.10).

7.27 For 3 of 18 cruises in Subarea 58.6 and 11 of 25 cruises in Division 58.5.1, the data on birds observed killed can be converted to estimates of total seabird by-catch mortality using reported data on the proportion of hooks observed. The mean proportions of hooks observed in Subarea 58.6 and Division 58.5.1 were 23.0% ($n$ = 9; range 5.8–34.9%) and 24.7% ($n$ = 11; range 6.0–33.4%). For the three cruises in Subarea 58.6, the observed by-catch of eight birds converts to an estimate of 100 birds killed (0.026 birds/thousand hooks). For the 11 cruises in Division 58.5.1, the observed by-catch of 334 birds converts to an estimate of 1 597 birds killed (0.125 birds/thousand hooks).

7.28 For the 2003/04 fishing season, therefore, probably the most accurate representation of seabird by-catch is given by combining the number of birds reported killed during the first half of the fishing season with the number of birds estimated killed in the second half of the season. On this basis, the totals for Subarea 58.6 and Division 58.5.1 would be 342 and 3 666 birds killed respectively, totalling 4 008 birds overall (Table 7.11).

7.29 Compared to last year, this represents reductions in seabirds killed of 42.5% (66.4% if reported data only are used) in Subarea 58.6, 73.7% (85.1% if reported data only are used) for Division 58.5.1 and 72.6% overall (84.2% if reported data only are used).

7.30 Similar comparison of by-catch rates indicated reductions of 26.6% for Subarea 58.6 (76.1% if estimated data only are used), 75.5% for Division 58.5.1 (75.9% if estimated data only are used) and 73.0% overall (85.7% if estimated data only are used).

7.31 All data available to the Working Group for seabird by-catch in the French EEZs in Subarea 58.6 and Division 58.5.1 are summarised in Table 7.11. The only statistics that can be compared directly across all years are the number of birds reported killed and the by-catch rates calculated on this basis. It was noted, however, that this would somewhat underestimate by-catch levels and rates for 2003/04 compared to other years.

7.32 Dr Micol indicated that for the 2004/05 fishing season data on seabird by-catch would be collected by observers on the basis of observing a proportion of the hooks set.

7.33 The Working Group agreed that this would be preferable and encouraged France to ensure that:

(i) this was done on every vessel
(ii) an appropriate proportion (not less than 25%) of hooks were observed on every vessel.

7.34 The Working Group noted that no data for 2000/01 appear to have been tabled at, or reported to, CCAMLR. It requested that France supply these data so that a comprehensive conspectus of the seabird by-catch history in this fishery is possible.

### Mitigation measures

7.35 Last year, the Working Group emphasised the potential benefits of a testing program to evaluate the efficacy of existing and potential mitigation measures used in the French EEZs (SC-CAMLR-XXII, Annex 5, paragraph 6.25). Dr Micol summarised various efforts, including some collaborative projects and ad hoc experiments on the efficacy of different mitigation technologies (WG-FSA-04/87 and 04/88).

(i) Line weighting – collaboration was conducted between France and Australia (Dr G. Robertson) on the sink rate of integrated weighted lines (IWLs) and externally weighted lines in the French fishery. Dr Robertson indicated that insufficient reliable data were collected to perform a statistical analysis, but higher sink rates observed than those expected could be linked to the direction of propeller rotation. It was recommended that more trials should be conducted.

(ii) An exchange of personnel between New Zealand and France was initiated. Mr McNeill, member of the Working Group and New Zealand fishing industry representative, visited fishing companies and French administration at La Réunion Island (WG-FSA-04/52). He reported that there was discussion of mitigation strategies with French fishers, mainly in relation to IWLs. Many mitigation options were being used, including the use of several streamer lines (up to nine). Large-scale deployment of IWLs had yet to be adopted, although some French fishers had already undertaken preliminary trials. Issues that French fishing companies needed to assess before adopting IWLs voluntarily included: ease of usage, gear loss potential, higher relative cost of the lines,

fitting through existing gear set-ups. Strengthening of magazine supports in some vessels would be necessary to handle the heavier lines. However, France is encouraging fishers to adopt IWLs.

(iii) Streamer lines – fishers used streamer lines in various numbers and configurations and these were found to be very useful in reducing seabird mortality. Significant reductions in seabird by-catch were achieved in the 2003/04 year compared with previous years. In part, increasing fishers' awareness of the issue and possible solutions played a role in achieving reductions in seabird mortality.

(iv) Colour of hookline – in 2002/03, vessels were equipped with either white or black hooklines. Those using white lines experienced significantly lower rates of seabird by-catch (WG-FSA-04/11).

(v) A former IUU vessel was converted into a patrol ship by France and a new system of satellite monitoring of vessels was established. This new system, linked to French navy vessels patrolling the zone, contributed to the deterrence of IUU vessels, with only one detected and arrested during the last year (to June 2004). Dr Micol noted that IUU fishing is presumably the most important mortality factor affecting seabirds and that combating IUU fishing is concomitantly saving birds.

(vi) France and French fishing companies were funding a study on population status of white-chinned and grey petrels on Kerguelen and Crozet, starting in November 2004.

7.36 The Working Group commended these initiatives, which it noted had already resulted in substantial reductions in by-catch rates and estimated total numbers of birds killed. Nevertheless these rates and totals still remained at levels which are a cause of serious concern and threat to the populations involved.

7.37 Mr McNeill commended the high level of feedback from the administration to vessel captains, companies and observers, particularly the monthly reporting of all birds killed for the zone and for the particular vessel, in order to encourage vessels to reduce their seabird by-catch.

7.38 Last year, Dr Micol provided a summary of the mitigation methods and measures used to reduce seabird by-catch on the vessels operating in the French EEZs (SC-CAMLR-XXII, Annex 5, paragraph 6.20(i–viii)). Based on an analysis of historical fishery and by-catch data, technical recommendations were made for changes to fishing practices.

7.39 In 2004, revisions to appropriate measures were made by the French authorities, reflecting recommendations from the analytical study and mitigation research. Thus, in addition to the existing requirements on offal discharge, night-setting, line weighting and streamer lines, the following revisions were enacted:

(i) at least two streamer lines, adhering to the provisions of Conservation Measure 25-02, must be used;

(ii) fishery closure during February (part of chick-rearing period of white-chinned petrels);

(iii) use of white-coloured hooklines.

7.40 Dr Micol also reported that the line-weighting regime was revised to require 8 kg/120 m on autoliners.

7.41 A variety of sanction measures, related to the daily reporting of seabird by-catch by individual vessels during fishing, was established. Vessels exceeding area-specific and time-bound seabird by-catch limits were sent a warning message in the first instance, and if seabird by-catch continued, vessels were required to move to a new subarea and to recommence fishing over 100 n miles from their current fishing location. Finally, subareas where upper limits for seabird by-catch had been reached would be closed to further fishing.

Recommendations to reduce seabird by-catch

7.42 The Working Group recognised the importance of the major reduction in seabird by-catch since the last fishing season. Given the annual review of seabird avoidance regulations by French authorities, the associated changes to improve the effectiveness of these requirements, and the apparent commitment to a mitigation research program, the Working Group expected that the necessary continued improvements are possible.

7.43 The Working Group discussed the need to provide incentives to fishers to further improve performance. Once fishers had adopted effective mitigation strategies, the Working Group suggested consideration could be given to reopening areas or seasons that have been restricted, particularly those in which fish catches are high and most profitable. This could even include daytime setting in appropriate cases, through a controlled experimental approach. This could have the advantage of a net decrease in fishing effort, with commensurably reduced risk to seabirds, where mitigation was fully effective. It was also recognised that closing the fishery in Division 58.5.1 between September and April, as in Subarea 48.3, would potentially greatly increase by-catch mortality of grey petrels, a globally threatened species.

7.44 Reduced seabird by-catch will be achieved through a suite of measures which have essentially constituted best practice in the Convention Area. This best practice includes: line weighting, night setting, use of streamer lines of a prescribed standard and performance, prohibition of offal discharge during the set, and fishery closures during times of high risk to breeding seabirds.

7.45 The Working Group recommended the following:

(i) Continue to undertake research programs and appropriate experiments to implement measures to further reduce seabird mortality to achieve levels and rates similar to those reported for other parts of the Convention Area.

(ii) Line weighting: use of IWL and weighting regimes that will ensure that longlines sink at >0.25 m/s. This sink rate can be achieved by compliance with the line sink rate requirements of Conservation Measure 25-02 (attachment to longlines of 5 kg weights at 50–60 m intervals) for autoliners.

(iii) Comply with the standards for streamer lines in Conservation Measure 25-02. However, paired streamer lines should be mandatory given the relatively high levels of seabird mortality that persist in the French EEZs. Where more than two sets of streamer lines are to be used, appropriate experiments should be conducted to demonstrate the utility of the additional streamer lines.

(iv) Maintain strict prohibitions on the discharge of offal at the set.

(v) Observer coverage and duties should be sufficient to ensure that at least 25% of hooks are observed on every vessel.

(vi) Maintain fishery closures in high-risk periods during seabird breeding seasons.

Implementation of Conservation Measures 25-02 and 25-03

7.46 Data from observer reports relating to compliance with these conservation measures in 2003/04 were provided in WG-FSA-04/6 Rev. 1 and 04/8 Rev. 1 and are summarised in Tables 7.1 and 7.12. Comparison with similar data from previous years is provided in Table 7.13. Observers did not provide all the required data on streamer line design for six cruises, so full assessments were not possible in these cases.

Streamer lines

7.47 Several specifications in Conservation Measure 25-02 had changed from the previous season, notably attachment height, line spacing and branched streamer length. Overall compliance with streamer line design has declined from 92% (34 of 37 cruises) last year to 64% (28 of 44 cruises) this year. The cruises where streamer lines did not comply failed on attachment height (7 cruises), total length (4 cruises) and branched streamer lengths (12 cruises) (Table 7.12). Although all vessels complied with the branched streamer spacing (a maximum of 5 m), one vessel only used two branched streamers. The conservation measure requires vessels to attach branched streamers along the whole aerial extent of the streamer line.

7.48 Two vessels failed on three different streamer line specifications (*Volna* and *Viking Bay*). Three other vessels failed on two specifications (*Mellas, Simeiz* and *Sonrisa*).

7.49 Vessels fishing in Subareas 48.6, 58.6, 58.7 and Divisions 58.5.2, 58.4.2 and 58.4.3b, used streamer lines on all sets. In Subarea 48.3, seven vessels undertook sets without using a streamer line. Of these, one vessel (*Isla Camila*) undertook more than 20 sets without a streamer line and the remaining vessels (*Polarpesca I, Tierra del Fuego, Ibsa Quinto,*

*Jacqueline, Isla Alegranza* and *Argos Georgia*) less than five sets. In Subareas 88.1 and 88.2, six vessels (*Antarctic III, Arnela, No. 707 Bonanza, Punta Ballena, America I* and *South Princess*) undertook some sets (five or less) without using a streamer line.

### Offal discharge

7.50 In Subarea 88.1, one vessel, the *Arnela*, was observed discharging offal during 4% of sets. Additionally, the *Arnela* logbook indicated offal was discharged during 24% of its hauls while fishing in Subareas 88.1 and 88.2. Offal discharge is prohibited in these subareas. This is the first year offal discharge has been reported in these subareas, other than one incident in 2002/03, and is particularly concerning because this could result in local seabirds learning to follow vessels.

7.51 With two exceptions, observer reports for other areas indicate full compliance with the requirements to hold offal on board or to discharge on the opposite side to where the line was hauled. In Subarea 48.3, the *Argos Helena* was observed discharging offal during one set and in Subarea 58.6, offal was discharged during setting on 6% of sets of the *Koryo Maru No. 11*.

### Discard of hooks

7.52 Observers on board eight vessels reported that fishing gear, snoods and hooks, were occasionally being disposed of at sea. Observers reported hooks being present in discards on eight vessels; on seven of these this was reported as a rare event. However, the report for the *Jacqueline* indicated that this was a daily occurrence.

### Night setting

7.53 In Subareas 58.6 and 58.7, 83% of sets occurred at night, down from 98 and 99% in the past two years. The *Koryo Maru No. 11* undertook 23 day sets (32%) and the *South Princess* 7 day sets (3%). In Division 58.5.2, 99% of sets occurred at night. In Subarea 48.3, 98% of sets occurred at night. Only one vessel, *Argos Georgia*, undertook a substantial number of day sets (55 sets, 19%).

7.54 In Subareas 48.6, 88.1, 88.2 and Divisions 58.4.2 and 58.4.3b, vessels fished under Conservation Measure 24-02, which contained exemptions to night setting south of 60°S for vessels which demonstrated a consistent minimum line sink rate of 0.3 m/s (paragraph 7.56).

### Line weighting – Spanish system

7.55 This year there was 87% compliance (13 of 15 cruises) with the required line-weighting regime in Subarea 48.3. This compared to full compliance in the previous year. The two vessels that did not comply (*Ibsa Quinto* and *Paloma V*) used 7 kg every 40 m

and 9 kg every 96 m respectively. Conservation Measure 25-02 requires either 6 kg every 20 m or 8.5 kg every 40 m. The single Spanish-system vessel fishing in Subareas 58.6 and 58.7 fully complied.

7.56 In Subareas 48.6 and 88.1, vessels fishing south of 60°S in daylight were required to use line weights to achieve a consistent minimum line sink rate of 0.3 m/s (Conservation Measure 24-02). All vessels met this requirement. The Working Group noted that the sink rates on the *Arnela* and *No. 707 Bonanza* were considerably higher than sink rates on other vessels using the same weighting regime (Figure 7.1). There was no obvious reason for this.

Line weighting – autoline system

7.57 In Subareas 48.6, 88.1, 88.2 and Division 58.4.2, vessels fishing south of 60°S in daylight were required to use line weights to achieve a consistent minimum line sink rate of 0.3 m/s (Conservation Measure 24-02). All vessels met this requirement. The Working Group noted that the sink rate achieved using the line weighting regime on the *Antarctic III* seemed high (Figure 7.1). WG-FSA-98/44 reported that weights of 6 kg used at spacings above about 70 m are unlikely to result in a measurable increase in sink rate of the line as compared to an unweighted line. The observer reported the vessel used 10 kg every 270 m.

General

7.58 The Working Group expressed concern that compliance with streamer line specifications had dropped considerably since last year. The lower level of compliance may in some cases be due to lack of awareness of the changes to Conservation Measure 25-02. The majority of the vessels that failed to fully comply this year would have complied under the previous specifications. However, the vessels that fully complied this year have demonstrated that the changes are practical and able to be implemented. The Working Group requested that vessel operators be reminded of the new specifications.

7.59 The majority of vessels that are still undertaking day sets in areas where this is prohibited have fished in the Convention Area for a number of years, and are familiar with Conservation Measure 25-02. The Working Group noted its disappointment that these vessels were still not fully complying with this requirement.

7.60 However, the Working Group was encouraged by the high compliance relating to offal discharge, line weighting and line sink rate requirements. The Working Group encouraged the few remaining non-compliant vessels to fully implement these measures.

7.61 The Working Group noted that if compliance with Conservation Measure 25-02 is interpreted strictly (i.e. 100% in all elements of the conservation measure), 13 of 40 vessels (33%) fully complied with all measures at all times throughout the Convention Area. This compares to 48% last year. The fully compliant vessels were the *Burdwood, Isla Sofía, Janas* (Australia), *Janas* (New Zealand), *Eldfisk, Gudni Olafsson, San Aotea II, Yantar, Piscis, American Warrior, Frøyanes, Avro Chieftain* and *San Liberatore*. As was noted last year, some vessels failed to comply by small margins, and the Working Group recommended that vessels should be advised to exceed the standards to prevent compliance failure.

### Implementation of Conservation Measure 25-03

7.62 Conservation Measure 25-03 prohibits the discharge of offal during the shooting or hauling of trawl gear. Four of eight vessels fishing in Subarea 48.3 were observed discharging offal during net shooting or hauling: *Betanzos* (9% shots and hauls), *Robin M Lee* (12% shots), *Dongsan Ho* (9% hauls) and *InSung Ho* (3% shots) (Table 7.14). This level of compliance is not as high as 2003, when only two vessels discharged offal during shooting or hauling of nets.

7.63 Dr L. Pshenichnov (Ukraine) observed that the definition of offal in conservation measures, particularly in Conservation Measure 25-02 and conservation measures applying to new and exploratory fisheries, would be improved if it was indicated that offal included discarded bait and fish by-catch (except as specified in measures relating to the live release of skates and rays).

### Research into and experiences with mitigation measures

#### Streamer lines

7.64 The streamer line requirement was changed substantially in 2003 (Conservation Measure 25-02) to reflect the importance of the aerial extent (which supports individual branched streamers of the streamer line) as a key component to streamer line effectiveness.

7.65 The Working Group noted that information on the aerial extent of the streamer line and on the number of streamer lines deployed, was not collected consistently by fishery observers in 2003/04. It also noted that the degree to which recommended practices within the appendix of the conservation measure were followed in 2003/04 could not be determined. These included the recommendations that efforts be made to maintain the towed object directly behind the streamer line attachment point to the vessels such that the aerial extent be maintained over the hookline and that branched streamers extend to the water in the absence of wind and swell.

7.66 The Working Group recommended that steps be taken to ensure that information on the aerial extent and the number of streamer lines deployed be collected consistently in the future (see SC-CAMLR-XXII, Annex 5, paragraphs 10.26 and 10.27). This information is fundamental to monitoring the proper deployment of streamer lines and to future improvements to the conservation measure.

7.67 The Working Group noted that it intended to revise Conservation Measure 25-02 as soon as adequate data on the aerial extent of streamer lines becomes available from the fishery.

#### Dyed bait and stealth gear

7.68 Mrs Neves reported that a subset of pelagic fishers in Brazil has been voluntarily using blue-dyed bait together with streamer lines for the past three years and that blue-dyed bait will be among the proposed mitigation measures required under Brazil's NPOA. A pilot study

showed no birds were caught and fish catch was highest when blue-dyed bait and a streamer line were used, compared to four albatrosses killed when no mitigation was used. SEAP (Special Secretariat of Aquaculture and Fisheries of the Presidency of the Republic) is planning more extensive research on the efficacy of blue-dyed bait and streamer lines in 2005.

7.69 The Working Group recollected that research in the Japanese southern bluefin tuna fishery found that blue-dyed bait was more effective than a streamer line at reducing seabird by-catch and suggested that the combination of both measures could substantially reduce the incidental catch of seabirds in tuna longline fisheries. This research also reported that, with the exception of southern bluefin tuna on one vessel, tuna catch was unaffected when blue-dyed bait was used.

7.70 The Working Group noted that dying bait at sea is very difficult and the lack of commercially available dyed bait greatly limits wide adoption of dyed bait as a seabird mitigation measure in pelagic fisheries.

7.71 Acknowledging that research results on the effect of dyed bait on seabirds, target catch and other protected species such as turtles have yielded mixed results across fisheries, Mr B. Baker noted that Australia is hoping to fund a study to assess the reflectance spectrum of dyes currently used to camouflage baits, and therefore to assess how the various dyes appear to seabirds. Because birds are particularly sensitive to UV wavelengths (light beyond the scope of human vision) and many dyes are active in the UV range, baits that appear white to humans may in fact appear very differently to seabirds. Thus dyes thought to be cryptic may in fact be conspicuous, suggesting that the successes and failures of dyed bait to date may be due to other mechanisms. Spectroradiometric techniques can also be used to quantify the rate of absorption and retention of dyes and to assess the appearance of the dyed baits at various depths in the water column. This research could rapidly advance the efficacy of dyed bait and stealth gear and possibly other mitigation applications to seabird conservation in fisheries.

7.72 WG-FSA-04/88 provided data showing that the rate of seabird by-catch (primarily white-chinned petrels) was significantly less on three of four vessels when white hooklines were used compared to black hooklines. Based on these results, white hooklines were required in Subarea 58.6 and Division 58.5.1 in 2003/04. The Working Group noted that these results were not intuitive and remain difficult to explain.

### Line weighting

7.73 WG-FSA-04/72 presented important evidence, complementary to that in WG-FSA-03/23, on the effectiveness of longlines containing 50 g lead/m integrated weight and a single streamer line in reducing the mortality of white-chinned petrels (*Procellaria aequinoctialis*) and sooty shearwaters (*Puffinus griseus*) – while not affecting fish catch – in the New Zealand ling (*Genypterus blacodes*) autoline fishery. White-chinned petrels and sooty shearwaters are two of the most difficult seabird species in the world to deter from baited hooks and are considered a worst-case scenario from a gear performance perspective. Information presented in WG-FSA-04/72 strongly supports inclusion in Conservation Measure 24-02 of provisions that autoline vessels use IWLs in the Convention Area.

7.74 IWLs sinking instantly when set and at an average of 0.24 m/s (range 0.2–0.3 m/s) to 20 m depth – compared to unweighted (normal) longlines (UWLs; average 0.11 m/s; range 0.06–0.15 m/s) – reduced white-chinned petrel mortality by 98% in 2002 and 93% in 2003. The reduction in mortality of sooty shearwaters in 2003 was 60%. Catch rates of white-chinned petrels were 0.005 birds/thousand hooks and 0.011 birds/thousand hooks in 2002 and 2003 respectively. Sink profiles through the water column, and sink rates to 20 m depth of IWLs were very similar to sink profiles for autolines deployed under the provisions of Conservation Measure 24-02 (Figure 7.2).

7.75 Catch rates of ling by UWL (208 ± 71 kg/thousand hooks) and IWL (197 ± 81 kg/thousand hooks) were similar ($\chi^2 = 0.09$; d.f. = 1; P = 0.767; $n$ = 52 pairs of UWLs and IWLs). Similarly, catch rates of all non-target fish species were not affected by IWLs. It was noted, however, that sample sizes for differences between IWLs and UWLs in catch rates of fish species were small. Compared to UWLs with external weights attached in accordance with Conservation Measure 24-02, IWLs may increase catch rates of *D. eleginoides* by up to one-third (WG-FSA-03/23).

7.76 The effectiveness of IWLs (in combination with streamer lines) in reducing mortality of white-chinned petrels has also been demonstrated in 2003/04 by France in Division 58.5.1, further demonstrating that very large reductions in seabird mortality can be achieved by use of IWLs by autoline vessels in the Convention Area.

7.77 Operationally, there are considerable advantages to IWLs. IWLs coil more uniformly and run through magazine racks more efficiently than UWLs. Compared to UWLs with external weights attached (necessary to comply with the provisions of Conservation Measure 24-02), IWLs are less time consuming to haul since there are no line weights to retrieve and stow. This also has implications for crew safety, since there are no external weights to be manually delivered from hauling to setting positions on vessels, which can be a hazardous practice in rough sea conditions.

7.78 Disadvantages to IWLs include the additional weight (magazine supports may have to be strengthened on some vessels), the higher purchase price than UWLs and the fact that currently there is only one international manufacturer producing IWLs with the specifications of the line used in the experiments reported here.

7.79 The Working Group acknowledged the importance of this new information and its relevance to modifications to Conservation Measure 24-02 to permit the use of IWLs by autoline vessels in the Convention Area in the 2004/05 fishery.

### Proposed line-weighting trial in Subareas 88.1 and 88.2

7.80 WG-FSA-03/17 sought permission to conduct an IWL-weighting trial in Subareas 88.1 and 88.2. The trial sought to determine the difference, if any, between IWLs and UWLs in the catch rates of *D. eleginoides* and non-target fish species. The purpose of the trial was to gather information of relevance to line-weighting provisions for autoline vessels in the Convention Area and to aid in the promulgation of integrated weight gear in autoline fisheries outside the Convention Area. The trial was supported by the provisions of Conservation Measure 24-03.

7.81 For a variety of reasons, principally the large extent of sea-ice in Subareas 88.1 and 88.2 in the 2002/03 season and the number of seamounts on the fishing grounds (not conducive to conducting the trial), the trial could not be undertaken. Since it is not intended to conduct the trial in the 2004/05 season, it is not necessary to maintain Conservation Measure 24-03 and the Working Group recommended that it should lapse.

### Underwater setting

7.82 Dr Robertson informed the Working Group of cooperative research by Dr H. Sakai, a mechanical engineer from Tokyo University of Marine Science and Technology and currently on sabbatical at the Australian Antarctic Division, who is developing an underwater setting device designed for high-seas tuna fisheries. The device uses a conveyor belt concept whereby a baited hook attached to a traditional snood is impaled on a pin, transported down the vertical plane of the conveyor, and released subsurface from the pin at a depth 3 to 4 m below the surface – beyond the propeller wash of a typical Japanese longline vessel.

7.83 The Working Group encouraged this work and noted that Dr Sakai's design differs from that of the previous underwater setting device trialled in multiple pelagic fisheries, which has had limited adoption in pelagic fisheries.

### Proposed removal of the night-setting requirement in Division 58.5.2

7.84 WG-FSA-04/73 sought support to allow line-setting operations by autoline vessels fishing in Division 58.5.2 to occur at any time of the day/night cycle. The proposal formed part of an adaptive approach to management, which considers the risk status of the fishery, knowledge on the effectiveness of mitigation measures, mitigation performance record of the vessel, seabird mortality levels and assessment of the likely effects of individual mitigation measures to total mitigation response.

7.85 Since the introduction of longline fishing in Division 58.5.2 in 2002, seabird by-catch mitigation requirements have exceeded those required by CCAMLR. Evidence from Subarea 48.3, where both the hooking effort and number and abundance of longline-vulnerable seabird species is far greater than in Division 58.5.2, suggested that winter fishing with appropriate mitigation presents a very low risk to seabirds. This is supported by the results of the first two years of longline fishing in Division 58.5.2: a total of 2.2 million hooks have been set and no seabirds caught during line-setting operations. Possible reasons why seabirds have not been caught are the very low abundance of longline-vulnerable seabird species on the fishing grounds between May and September, night setting, the requirement for a minimum line sink rate, the use of paired streamer lines and no offal discharge. Evidence from IWL experiments presented in WG-FSA-04/72 suggested that the absence of seabird mortality in Division 58.5.2 is due to the low incidence of longline-vulnerable seabirds in winter, the minimum line sink rate and the use of streamer lines. Removal of the night-setting requirement is unlikely to result in an increased risk to seabirds in Division 58.5.2.

7.86 The Working Group supported the proposed recommendations that autoline vessels fishing in Division 58.5.2:

- restrict fishing to the period from 1 May to 14 September (as currently required);
- use paired streamer lines during all sets of longlines (as currently required);
- retain on board fish offal and discards (as currently required);
- be permitted to set longlines at any time in the day/night cycle;
- comply with the provisions of Conservation Measure 24-02 or use longlines containing 50 g lead/m integrated weight such that lines sink to 10 m depth at no less than 0.2 m/s, with a preferred average rate of no less than 0.24 m/s;
- abide by all other seabird conservation provisions in Conservation Measure 25-02;
- in the event that three seabirds are caught during daylight setting of lines, vessels must revert to night setting of longlines (as currently applies under Conservation Measure 24-02).

7.87 However, the Working Group noted that it would be premature at this stage to carry forward these provisions to other subareas and divisions until the effect of this adaptive approach to the management of seabird by-catch in Division 58.5.2 is known.

Research requirements

7.88 The Working Group expressed concern about the lack of empirical information on the effectiveness of certain mitigation measures that are routinely recommended to reduce seabird mortality in fisheries operating both inside and outside the Convention Area. Particularly important is the need to undertake manipulative experiments on the effectiveness of streamer lines in deterring from baited hooks deep-diving species such as white-chinned petrels, grey petrels and *Puffinus* species of shearwaters. These taxa include many globally threatened species to which information on the effectiveness of streamer lines and other mitigation measures would be especially relevant.

7.89 The Working Group also highlighted the importance of conducting experiments in a manner that allowed quantification of the contribution to by-catch reduction of measures used both singly and in concert – that is by adopting experimental designs aimed at de-coupling the effects of mitigation treatments. The Working Group believed that the results of such experiments should be applicable to a large number of fisheries operating in both northern and southern hemispheres, and would provide relevant fisheries management authorities with much-needed confidence in attempts to decisions regarding seabird-safe longline fishing practices.

7.90 The Working Group encouraged researchers to consider these points when conducting research on Convention Area seabirds and mitigation measures applicable to this area.

## Revision of Conservation Measures 24-02 and 25-02 (2003)

7.91 The Working Group in its 2003 review of Conservation Measure 25-02 noted that changes to the measure were likely to be proposed in 2004 to make line-weighting prescriptions mandatory for autoline vessels (SC-CAMLR-XXII, Annex 5, paragraph 6.93). Such recommendations were dependent on the outcomes of trials of IWLs within New Zealand waters (paragraphs 7.73 to 7.79) and in Subareas 88.1 and 88.2 (paragraphs 7.80 and 7.81), and the collation of existing information describing weighting regimes for standard autoline gear.

7.92 The Working Group considered proposing changes to Conservation Measure 25-02 to accommodate line-weighting provisions for autoline vessels (both external weighting and IWLs), but recognised that no additional information on various external weighting regimes for autoline vessels had been provided and suggested that a revision of Conservation Measure 25-02 in 2004 would be premature.

7.93 The Working Group recommended that research be undertaken in 2004/05 on the sink rate of externally weighted autolines to allow a more informed revision of Conservation Measure 25-02 in 2005, with the intention of combining Conservation Measures 24-02 and 25-02, if possible. Research to explore relating the current values of line sink rate to values that include both vessel speed and sink rate is also planned. This would allow more flexible prescriptions to be developed for the conservation measure.

7.94 The Working Group recognised, however, that the results of the New Zealand trial (WG-FSA-04/72) proved that IWLs (50 g/m) are highly effective as a seabird by-catch mitigation method (in areas of high risk of seabird by-catch) without affecting fishing efficiency. The Working Group agreed that IWLs should be endorsed as a viable alternative to the provisions of Conservation Measure 24-02, which currently requires the attachment of external weights to UWLs.

7.95 The Working Group recommended that Conservation Measure 24-02 be revised, via the addition of an extra protocol, to accommodate the use of IWLs as an alternative line-weighting option. In reviewing the entire conservation measure, the Working Group recommended additional changes be made at the same time based on tabled papers and other available information to simplify implementation of line-weighting regimes in the Convention Area.

## Experimental trials

7.96 Conservation Measure 24-02 was initially adopted to allow experimental line-weighting trials. The measure is now applied in most new and exploratory fisheries in high latitudes to allow daytime setting, subject to line sink rate targets being met and specified seabird by-catch limits. The measure has also been adopted in some mid-latitude fisheries to extend fishing seasons.

7.97 The Working Group recommended that Conservation Measure 24-02 now be considered part of the suite of tools available for mitigating seabird by-catch in the Convention Area, rather than confined to new and exploratory fisheries or to experimental contexts.

### Longline sink rate testing prior to entering the CCAMLR Convention Area

7.98 The requirement to set five longlines with four sample points on each longline to ensure fishers' ability to comply with this measure prior to entering the Convention Area is an unnecessary burden given the constant line sink rate monitoring regime in place in the fishery. However, some pre-fishery longline sink rate testing is recommended to ensure vessels are fully able to comply with CCAMLR requirements prior to entering the fishery.

7.99 Accordingly, the Working Group proposed that these requirements be made clear in all conservation measures and that the requirement for five pre-fishery test lines be reduced to setting two pre-fishery longlines with four sample points on each longline.

7.100 The length of the longline used determines the likely minimum line sink rate (WG-FSA-01/44). The Working Group recommended that line sink rate tests should be undertaken on longlines of the maximum length planned to be used during fishing in the Convention Area.

7.101 The placement of a TDR or bottle immediately adjacent to a weight on externally weighted longlines will give a rapid line sink rate result. The slowest sink rates are recorded midway between attached weights. As the target is a minimum line sink rate of 0.3 m/s (for externally weighted lines), line sink rate tests should always involve placement of TDR or bottle midway between attached weights.

7.102 Noting that fishing gear may be lost during line sink rate testing and not replaced prior to entry to the fishery, and that not all gear on board a vessel may be used during longline sink rate testing, the Working Group recommended that longline gear of the same specifications be required rather than specifying the same longline gear.

7.103 The Working Group noted that one distinct advantage of the bottle-test method was the ability to calculate an answer immediately after the test and provide that result to the fishing vessel to allow modification of practice at the time of the set if required. Text to clarify this aspect of the bottle test is recommended.

### Longline sink rate monitoring whilst fishing in CCAMLR waters

7.104 The Working Group recommended that one sink rate test every 24 hours is sufficient to monitor ongoing compliance of the longline sink rate during the voyage, in conjunction with the four sample points on one longline every seven days.

7.105 The Working Group reiterated that the 0.3 m/s longline sink rate for externally weighted longlines was a minimum requirement rather than a target.

7.106 The Working Group recommended that longline sink rate tests be reported to the relevant national agency daily, and to CCAMLR at the end of the fishing season.

Protocol for IWL

7.107 The use of IWLs requires that line sink rate standards be reduced to 0.2 m/s for this type of gear only. As IWLs begin to sink immediately, and have a linear sink profile, an IWL sink rate of 0.2 m/s is assumed to be of equivalent conservation benefit to a UWL achieving a sink rate of 0.3 m/s by attaching external weights.

7.108 The Working Group recommended the addition of a new protocol for vessels monitoring longline sink rate with either TDRs or bottle tests. The new protocol applies to IWLs with integrated weights of no less than 50 g/m and designed to sink instantly with a linear profile at greater than 0.2 m/s without the addition of external weights.

7.109 The Working Group noted that either longline sink rate test method could be used on IWLs and recommended that the new protocol be worded to allow both bottle testing and TDR testing.

7.110 In the conduct of longline sink rate tests for IWLs, the Working Group noted that as no external weights are attached, tests can be undertaken anywhere on the middle one-third of the longline, and the requirement to test midway between weights is not relevant.

7.111 Taking account of the foregoing information and suggestions, the Working Group prepared a draft revision of Conservation Measure 24-02.

Incidental mortality of seabirds during unregulated
longline fishing in the Convention Area

7.112 As no information is available on seabird by-catch rates from the unregulated fishery, estimates of the incidental mortality of seabirds during IUU fishing within the Convention Area present a number of difficulties, requiring various assumptions to be made.

7.113 In previous years, the Working Group has prepared estimates using both the average catch rate for all cruises from the appropriate period of the regulated fishery in a particular area and the highest catch rate for any cruise in the regulated fishery for that period. Justification for using the worst catch rate from the regulated fishery is that unregulated vessels accept no obligation to use any of the mitigation measures prescribed in CCAMLR conservation measures. Therefore catch rates, on average, are likely to be considerably higher than in the regulated fishery.

7.114 As no information is available on seabird by-catch rates from the unregulated fishery, estimates have been made by bootstrapping the observed catch rates from fishing operations in 1996/97. The fleet in 1996/97 implemented relatively few mitigation measures and has been considered to provide the best estimate the Working Group has of likely rates in the unregulated fishery. The method used to prepare estimates of the incidental mortality of seabirds during IUU fishing within the Convention Area is described in full in SC-CAMLR-XXIII/BG/23 and in SC-CAMLR-XXII, Annex 5, paragraphs 6.112 to 6.117.

7.115 The Working Group agreed that the following values should be applied to the toothfish removals data to estimate seabird by-catch in IUU *Dissostichus* spp. fisheries in the

Convention Area in 2004, and also agreed that these values should be used to generate similar estimates for previous years. The resulting median and 95% confidence intervals for seabird by-catch rates (birds/thousand hooks) for the unregulated fishery are shown below. It should be noted that where by-catch rates are not available for a regulated fishery within a statistical area, the rate for an adjacent area of similar level of risk (SC-CAMLR-XXIII/BG/23) has been used. Thus, because a regulated fishery has never existed in Division 58.4.3 the rate applied is that for Division 58.4.4.

| Subarea/Division | Season | Lower 95% | Median | Upper 95% |
|---|---|---|---|---|
| 48.3 | Summer | 0.39 | 0.741 | 11.641 |
| | Winter | 0 | 0 | 0.99 |
| 58.6, 58.7, 58.5.1, 58.5.2 | Summer | 0.45 | 0.55 | 1.45 |
| | Winter | 0.01 | 0.01 | 0.07 |
| 58.4.3, 58.4.4 | Summer | 0.27 | 0.33 | 0.87 |
| | Winter | 0.006 | 0.006 | 0.042 |
| 88.1 | Summer | 0.27 | 0.33 | 0.87 |
| | Winter | Not applicable, access not possible in winter | | |

7.116 The estimates of potential unregulated seabird by-catch in the Convention Area in 2003/04 and comparison with estimates for previous years are provided in detail in SC-CAMLR-XXIII/BG/23.

7.117 The overall estimated total for the whole Convention Area in 2003/04 indicates a potential seabird by-catch in the unregulated fishery of 5 311 (95% confidence interval 4 352–14 166) seabirds. The values for this and previous years are summarised in respect of different parts of the Convention Area in Table 7.15.

7.118 In comparison with estimates for previous years, calculated in identical fashion, the value for 2003/04 is the lowest reported since estimates started in 1996. The 2003/04 value is about 30% of the values for 2003 (SC-CAMLR-XXIII/BG/23). This presumably reflects a commensurate reduction in toothfish removals or changes in the areas from where IUU fishing occurs.

7.119 Based on the data since 1996 (SC-CAMLR-XXIII/BG/23), an estimated total of 176 063 (95% confidence interval 143 289–516 934) seabirds have been killed by these vessels. Of these:

(i) 39 457 (95% confidence interval 31 904–125 492) were albatrosses, including individuals of four species listed as globally threatened using the IUCN threat classification criteria (BirdLife International, 2004);

(ii) 6 974 (95% confidence interval 5 695–19 557) were giant petrels, including one globally threatened species;

(iii) 110 404 (95% confidence interval 90 001–317 264) were white-chinned petrels, a globally threatened species.

7.120 As in previous years, it was emphasised that these values are very rough estimates (with potentially large errors). The present estimates should only be taken as indicative of the potential levels of seabird mortality occurring in the Convention Area due to unregulated fishing and should be treated with caution.

7.121 Nevertheless, even taking this into account, the Working Group endorsed its conclusions of recent years that:

(i) the levels of loss of seabirds from the populations of these species and species groups are still broadly consistent with such data as exist on the population trends of these taxa, including deterioration in conservation status as measured through the IUCN criteria;

(ii) although considerably reduced from previous years, such levels of mortality probably still continue to be unsustainable for some of the populations of albatrosses and giant and white-chinned petrels breeding in the Convention Area.

7.122 Many albatross and petrel species are facing potential extinction as a result of longline fishing. The Working Group again urgently requested the Commission to continue to take action to prevent further seabird mortality by unregulated vessels in the forthcoming fishing season.

Incidental mortality of seabirds during longline fishing
outside the Convention Area

7.123 Chile, New Zealand and Uruguay were the only countries submitting new information about incidental mortality of seabirds outside the Convention Area.

7.124 Chile presented the results of the incidental mortality assessment, conducted in 2002, for its *D. eleginoides* industrial fishery (WG-FSA-04/13). The total number of birds estimated killed was 2 162 (0.343 birds/thousand hooks), most of which (96%) were black-browed albatrosses presumed to breed in the Chilean EEZ. The vessels involved in the assessment used no mitigation measures. Although part of this fleet also fishes in Subarea 48.3 during winter, they relax their mitigation measures in Chile presumably, in part, because they are not mandatory there. In addition, the greater depth of the fishing grounds in Chile (up to 2 000 m) is stated to impose serious restrictions for the line-weighting regime and to preclude applying the same regime as required in the Convention Area (Conservation Measure 25-02). Consequently, further development on mitigation measures in Chile is required. In view of these results, Chile is elaborating its NPOA-Seabirds in order to reduce the present levels of incidental mortality (WG-FSA-04/14).

7.125 Chile also presented an assessment of the incidental mortality of seabirds in its domestic fleet (boats <18 m long) fishing for austral hake and *D. eleginoides* in the southern Chilean EEZ (WG-FSA-04/54). The impact of the domestic austral hake fishery is minimal, capturing 23 birds in 1999 with an overall catch rate of 0.030 birds/thousand hooks. During

2002, the domestic *D. eleginoides* fishery caught a total of 437 birds, with an overall catch rate of 0.047 birds/thousand hooks. All birds caught were white-chinned petrels, doubtless from populations breeding in the Convention Area.

7.126 Uruguay presented a report on an exploratory fishery conducted in its EEZ between August and November 2001 (WG-FSA-04/38), as was encouraged last year (SC-CAMLR-XXII, Annex 5, paragraph 6.130). During this short exploratory fishery 2 175 birds were killed. The fishing gear used was a modification of the traditional bottom Spanish longline, using floats attached to the mother line, resulting in a zigzag configuration on the sea bottom. This configuration greatly increased the time that hooks remain near the surface, resulting in very high seabird mortality rates (>3 birds/thousand hooks), mainly of white-chinned petrels (50%), presumably from the South Georgia population. Vessels fished during day and night and streamer lines were used in only 8% of the sets. This fishery no longer exists in Uruguay; however, this kind of gear configuration is possibly used in other South American countries, with potential high levels of incidental seabird mortality. The Working Group encouraged the assessment and development of appropriate mitigation for such fisheries, which have the potential to kill many birds from the Convention Area.

7.127 New Zealand presented an assessment of incidental seabird mortality in four major commercial fishing operations in its EEZ for the seasons 2000/01, 2001/02 and 2002/03 (WG-FSA-04/55 to 04/57). Incidental mortality rates were different for each fishery. Pelagic longlining for tuna has low overall seabird mortality (54 and 136 birds in 2000/01 and 2002/03 respectively) and catch rates (0.026 and 0.048 birds/thousand hooks in 2000/01 and 2002/03 respectively) throughout the study period, presumably reflecting high compliance with mitigation measures. Demersal longlining for ling has substantially reduced its catch from 2 367 in 2000/01 to 543 in 2002/03, reflecting a significant reduction in the overall bird catch rate (up to 0.218 in 2000/01 and <0.08 birds/thousand hooks in 2002/03) due to a substantial increase in their line-weighting regime. Trawl fisheries, particularly for squid, are still presenting high mortality rates (0.097 and 0.058 birds per trawl in 2000/01 and 2002/03 respectively) and overall catches (1 651 birds in 2000/01 and 1 110 birds in 2002/03). Most of the birds caught breed in New Zealand waters; however, a high proportion of the birds caught each year were white-chinned petrels (27–52%) and grey petrels (13–19%, but 1% in 2001/02), species known to breed in the Convention Area.

7.128 Mrs Neves reported on the high levels of incidental seabird mortality in Brazilian waters, involving more than 10 000 albatrosses and petrels per year during the late 1990s, including three species that breed in the Convention Area (wandering albatross, white-chinned petrel and southern fulmar). These estimates only relate to incidental mortality arising from the domestic demersal and pelagic fleets. Additionally, a chartered foreign longline fleet operates off the Brazilian coast, of which fishing effort is much higher than that of the domestic fleet. SEAP (Special Secretariat of Aquiculture and Fisheries of the Presidency of the Republic) is already coordinating a National Observers Program that includes 100% coverage of the chartered fleet. Mrs Neves also mentioned that mitigation measures, such as blue-dyed baits and streamer lines, should be adopted as an obligation, in agreement with Brazil's NPOA-Seabirds which is ready for signature.

7.129 Brazil was requested to provide the Working Group with data on the above topic, particularly in respect of by-catch rates for seabird species breeding in the Convention Area.

Research into the status and distribution of seabirds

7.130 Following last year's renewed request for information summarising national research on seabirds (albatrosses and *Macronectes* and *Procellaria* petrels) vulnerable to longline fisheries interactions, papers were presented by Australia (WG-FSA-04/81), New Zealand (WG-FSA-04/53) and the USA (WG-FSA-04/22). Reference to research on albatrosses by Chile was included in WG-FSA-04/12 and 04/13, and research by Uruguay in WG-FSA-04/39 and by the UK in WG-FSA-04/71. Of countries known to be conducting relevant research, no reports were received from Argentina, France, South Africa and the UK.

7.131 Previously, the USA's research summary included details of current research into methods to monitor and mitigate seabird by-catch. This initiative was considered by the Working Group as an important contribution to its work. Consequently, as in previous years, all Members were requested to include details of mitigation research in their annual research summaries to update the Working Group on the current status of relevant mitigation research programs (SC-CAMLR-XXI, Annex 5, paragraph 6.111). As the USA again was the only Member to provide this information, the Working Group reiterated the request for inclusion of mitigation research in national research reports.

7.132 In order to compare assessments of levels of fishing effort and seabird by-catch with seabird population dynamics and foraging ranges, Members have been requested to provide any new or outstanding details of seabird population and foraging studies on an annual basis. As in previous years, only Australia and New Zealand provided this information (WG-FSA-04/53 and 04/81), so the review of the level of information available for each population that was previously forecast (SC-CAMLR-XXI, Annex 5, paragraph 6.113) remains outstanding.

7.133 Information on population dynamics and foraging studies provided to date has been summarised in SC-CAMLR-XXIII/BG/22, which updates SC-CAMLR-XXII/BG/18. All Members were again requested to provide more comprehensive and representative national research reports so that appropriate assessments can be undertaken.

7.134 Last year the Working Group recommended, in order to streamline and achieve more complete and representative reporting, that the group would review the report templates and that the Secretariat would forward a reminder to all Members to submit reports during the intersessional period (SC-CAMLR-XXII, Annex 5, paragraph 6.137). Australia was the only Member to submit substantive revisions to the report templates. Provision of seabird population status and foraging range information was restricted to Australia and New Zealand (WG-FSA-04/53 and 04/81 respectively). Consequently, comprehensive application of the revised formats remains outstanding. All Members are again requested to provide comprehensive and contemporary information so that assessments encompassing the Convention Area can be undertaken.

7.135 The most recent assessments of the global conservation status of albatrosses, giant petrels and *Procellaria* petrels were reflected in SC-CAMLR-XXII/BG/18. This summary shows the current status of the 20 seabird species that have been identified as being at risk from longline fisheries in the Convention Area. The conservation status of these species is unchanged from that summarised last year (SC-CAMLR-XXII, Annex 5, paragraph 6.144) and comprises two species that are Critically Endangered, five species that are Endangered, nine Vulnerable species and four species currently listed as Near-Threatened.

7.136 In order to monitor these threatened species and more effectively mitigate the threats they face, the Working Group has previously encouraged Members to undertake a range of activities and initiatives with respect to increasing the understanding of albatross and petrel population status and distribution (SC-CAMLR-XXII, Annex 5, paragraph 6.146).

7.137 Observations of seabird and marine mammals observed during toothfish longline fishing operations in Subareas 88.1 and 88.2 from 2000 to 2002 are summarised in WG-FSA-04/42. Few birds were seen diving on baits during fishing, although a greater number attended the haul. The presence of species in proximity to vessels was noted by SSRU, following the CCAMLR protocol of observing abundance within a 500 $m^2$ area behind the vessel. Albatross species observed within the Convention Area included some species not previously seen at these southern latitudes (northern giant petrel and sooty albatross). The Working Group considered the utility of these seabird abundance data, and concluded that except for specific operations, and involving highly trained observers, error in the seabird identifications and application of methodology made the data gathered using these protocols difficult to interpret. It was recommended that when a need to gather seabird abundance data is identified, a review of appropriate recording methods be undertaken. Until then, this task could be removed from observer duties, until such time as new data collection protocols are available.

7.138 Records of seabird species occurring in Uruguayan waters and the South Atlantic Ocean collected between 1994 and 2003 were reported in WG-FSA-04/39. Twenty-two species were identified in the Atlantic Ocean, in an area between 20°–55°S and 30°–60°W. These records provide useful information of the presence of seabirds including those vulnerable to fishery interactions, in waters adjacent to the Convention Area.

7.139 WG-FSA-04/46 described the distribution of seabirds on the Alaskan fishing grounds derived from post-haul seabird counts conducted in the course of longline fish stock assessment surveys. The protocol consists of counting all birds by species within a 50 m hemisphere at the stern of the vessel immediately prior to, or immediately after, the last hook is hauled, when seabirds are most aggregated and easily enumerated. This simple protocol takes no more than 10 minutes to complete and is easily learned and performed by observers with minimal seabird experience. These data yield estimates of the seabird species present or absent in specific areas at specific times and the relative distribution of the common species on the fishing grounds. These data, however, are not comparable with traditional ship transect abundance estimates, and are of limited use for measuring change in seabird populations.

7.140 The Working Group acknowledged that the current CCAMLR observer protocol for enumerating seabirds within a 500 m square at the stern of the vessel is difficult to perform by fisheries observers. These data are collected inconsistently by CCAMLR observers, and the resulting data have yet to be analysed or used. The simpler post-haul protocol may yield consistent data useful for CCAMLR management purposes.

7.141 WG-FSA-04/12 presented data on grey-headed albatross diet at Diego Ramírez Islands, Chile. The report supplied evidence that during the breeding season this albatross population has minimal interaction with fishing operations in southern Chile, feeding mostly on *M. hyadesi* which is distributed at the Antarctic Polar Front. This is further supported by the at-sea distribution and high survival of breeding grey-headed albatrosses at Diego Ramírez Islands presented in WG-FSA-02/18.

7.142 The areas used by grey-headed and Campbell albatrosses during foraging flights in the chick-rearing period from Campbell Island are described in WG-FSA-04/59. A small number of individuals of both species were satellite-tracked during trips to the Polar Front, where both species fed on *M. hyadesi*. Campbell albatrosses travelled into Subareas 88.1 and 88.2, whereas grey-headed albatrosses foraged in Subarea 88.1 and passed just north of Subarea 88.2. The findings confirm that these albatrosses, breeding at Campbell Island, should be considered in the risk assessments for CCAMLR areas in the Ross Sea.

7.143 The foraging areas of black-browed and grey-headed albatrosses breeding on Macquarie Island are reported in WG-FSA-04/49 with respect to overlap with local MPAs. This recognises that MPAs are often established to protect threatened top-order predators, but there are few data that can be used to evaluate their effectiveness in achieving this purpose. The spatial extent of the MPAs around Macquarie Island appears to adequately cover much of the foraging distribution of Macquarie Island black-browed albatrosses during the breeding season; however most of this was in the EEZ not covered by the Macquarie Island Marine Park. Grey-headed albatrosses spent significantly more time in waters outside these areas and are at higher risk from fisheries activities and other threats. Both species foraged in waters inside the Convention Area, black-browed and grey-headed albatrosses spending 5 and 12% of their respective foraging time in Subarea 88.1. Further information on albatross movements is required to assess the efficacy of MPAs in protecting foraging habitats outside the breeding season.

7.144 Prof. J. Croxall (UK) reported that the BirdLife International Seabird Conservation Programme has established a GIS database for archiving and analysing satellite and geolocation tracking data for albatrosses and petrels. The first global procellariform tracking workshop was held in South Africa in September 2003 and a meeting to finalise the workshop report was held in Uruguay in August 2004. The final report will be published in November 2004. Of considerable interest to CCAMLR will be the consolidated information on the pelagic distribution of albatross and petrel populations and the extent to which these data can be used to quantify the marine areas used by these birds and the location of fishing effort. This information will also assist in the identification of RFMOs with prime responsibility for the management of fisheries with significant risk of incidental by-catch of albatrosses and petrels.

7.145 It was recommended that the Working Group request BirdLife International to analyse the data for all southern hemisphere species to determine the proportion of time that each relevant species (and source population where appropriate and feasible) spends in each part (area, subarea, division, subdivision as appropriate) of the Convention Area. Such information should contribute substantially to clarifying distribution in relation to the risk assessments for the Convention Area in respect of longline fisheries (e.g. SC-CAMLR-XXIII/BG/21).

7.146 The population dynamics of Campbell and grey-headed albatrosses breeding at Campbell Island were described for 1984 to 1996 (WG-FSA-04/58). During this period, the Campbell albatross population trends increased at rates of 1–2% at different colonies. In a preceding era, declines in this population were noted by comparing counts of photographs from the 1940s–1990s, and ground counts from 1984–1996. These declines coincided with mortality of this species in the longline fishing activities for tuna in the New Zealand zone,

where the species was caught. The Working Group noted that the survival rates reported for adult Campbell albatrosses (94.5%) are considerably higher (by 3%) than survival rates reported for the closely related black-browed albatross.

7.147 Grey-headed albatrosses at Campbell Island were found to be in decline during the period from 1984 to 1996, at rates of 3.0–4.8% per annum in different colonies. Comparison of historical photo-count data for this species showed that decreases in breeding numbers to around 11–25% of initial counts during the period from the 1940s to the 1990s had occurred.

7.148 Trends in breeding numbers and survival of black-browed and grey-headed albatrosses breeding on Macquarie Island are described in WG-FSA-04/48. Population dynamics and trends of both populations appear to have remained relatively stable since the 1970s. There is no conclusive evidence of survival varying over time and it is unlikely that these populations have been impacted significantly by extra mortality due to fisheries activities. This is in contrast to most other populations of these species and may be attributed to their foraging ranges not overlapping significantly with areas of high fisheries activities. However, both species forage in areas of both legal and illegal fishery operations. Due to their extremely small population size (45 pairs and 95 pairs breeding each year for black-browed and grey-headed albatrosses respectively (WG-FSA-04/81)), these populations remain extremely vulnerable to any increase in mortality rate.

7.149 The wandering albatross is a globally threatened species and the Macquarie Island breeding population is particularly vulnerable as it comprises fewer than 20 breeding pairs (WG-FSA-04/50). Demographic trends and population numbers show that the population status has varied significantly during the 1900s. Breeding numbers declined from a peak in 1964 to near extinction levels in the mid-1980s. Underlying this decline was a significant decrease in juvenile survival and, to a lesser extent, adult survival. These survival changes were coincident with changes in fishing effort in the eastern Indian Ocean. Breeding numbers slowly increased on Macquarie Island through the 1980s, reaching a total of 19 pairs in the mid-1990s, and the population remains at this level today. Trends in population numbers and survival are most similar to those observed in Indian Ocean populations. The very small population size of wandering albatrosses on Macquarie Island makes the population extremely vulnerable to any activities that elevate mortality rates.

7.150 Black-browed albatrosses breeding at Gonzalo Island in southern Chile have been surveyed on six occasions since 1980 (WG-FSA-04/13). The census results suggest a decrease in the population between 1980 and 1997, followed by an increase in numbers from 1997 to 2002. The most recent population estimate in 2002 would indicate an increase in numbers from 2001 estimates that exceeds the maximum natural rate of increase. The Working Group considered the data and suggested that while they illustrate broad population trends (and a clear increase in numbers between 1999 and 2001), differences in survey methodology between some of the years confound other annual estimates of rates of population change.

7.151 South Georgia is an important breeding location for four albatross species. Surveys of all known breeding sites of three of these species (wandering, black-browed and grey-headed albatrosses) were carried out at South Georgia in the 2003/04 breeding season (WG-FSA-04/71). In total an estimated 1 553 pairs of wandering albatrosses, 75 500 pairs of black-browed albatrosses and 47 800 pairs of grey-headed albatrosses were breeding at South Georgia in the 2003/04 season. A combination of ground counts and boat-based digital

photography provided comprehensive population estimates for remote and inaccessible locations that were both time and cost effective. The Working Group welcomed the application of the new survey methodologies and endorsed their use at other sites.

7.152 Comparison of population trends reported for Bird Island and for other South Georgia colonies show that the trends at Bird Island colonies are representative for the South Georgia region. Populations of all three species have declined since the 1980s. Black-browed albatrosses have decreased by 4% per annum from 1989 to 2003, and grey-headed albatrosses have decreased by 2.9% per annum from 1990 to 2003. The decline in wandering albatrosses is even more pronounced, 30% (1.8% per annum) since the previous comprehensive survey in 1984. The magnitude of these population decreases is alarming, given the long time span and the consistent downward pattern. Of particular concern is the acceleration since 1997 in the rate of decrease of wandering albatrosses at Bird Island which now averages 4.5% per annum. If these sustained population declines are not halted or reversed, the long-term survival of the populations of these albatross species at South Georgia is in jeopardy.

7.153 Prof. Croxall informed the Working Group that Prof. H. Caswell and Dr C. Hunter (USA) have been holding discussions and a workshop to consider the development of new population models for albatrosses. The first steps towards developing a basic life-cycle model to use as a framework for parameter estimation and demographic analyses for albatrosses and petrels took place at a meeting of a group of procellariiform biologists and statisticians from France, New Zealand, UK and the USA, held at Woods Hole Oceanographic Institute (USA) in September 2004. A further meeting is scheduled for 2005 to further develop and apply the demographic analyses.

7.154 The Working Group noted that the Third International Albatross and Petrel Conference was held in Montevideo, Uruguay, in August 2004. Oral and poster sessions conducted during the meeting included molecular ecology and systematics, general biology and behaviour, population dynamics, population dynamics and status, feeding ecology and foraging areas, and incidental mortality and mitigation. A volume of abstracts of the oral and poster presentations was made available for consultation by the Working Group. Members of the Working Group welcomed the staging of the conference, and encouraged publication of the presentations and asked the organisers and/or sponsors to facilitate access to an electronic version of the abstracts volume.

## International and national initiatives relating to incidental mortality of seabirds in relation to longline fishing

### Agreement on the Conservation of Albatrosses and Petrels (ACAP)

7.155 This Agreement came into force on 1 February 2004 (WG-FSA-04/51) and the first meeting of the six Parties (Australia, New Zealand, Ecuador, Spain, South Africa and the UK) that have currently ratified the Agreement will take place in Hobart, Australia, from 10 to 12 November 2004. A scientific meeting will precede the Meeting of Parties on 8 and 9 November for the purpose of providing early advice on recent scientific developments of relevance to the conservation of albatrosses and petrels, and to advise on priority activities to implement the ACAP Action Plan.

7.156 The Working Group noted that CCAMLR had been invited to attend the meeting as an official observer and that the Secretariat, assisted by the Convener of WG-IMAF, had tabled a paper reviewing CCAMLR's work of potential relevance to ACAP (CCAMLR-XXIII/BG/23). The Working Group looked forward to the development of close links between ACAP and CCAMLR, particularly in respect of the many elements of mutual interest to the two bodies.

7.157 The Working Group again encouraged Members of CCAMLR to ratify ACAP and to support the active participation of scientists and fishers concerned with, and working on, the conservation of albatrosses and petrels. The Working Group also encouraged Parties to ACAP to establish its advisory committee and commence implementation of its Action Plan as soon as possible.

7.158 The Working Group recognised that some of the data and information currently compiled and maintained by CCAMLR (e.g. on the status, population trends and distribution of albatrosses and petrels) would be of considerable interest and relevance to the work of ACAP. Indeed, some such data might better be maintained on a global or southern hemisphere basis by ACAP, providing that Members of CCAMLR could enjoy unrestricted access and use. Those attending the first Meeting of Parties of ACAP with experience of CCAMLR were encouraged to bring these issues to the early attention of ACAP.

### FAO's International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (IPOA-Seabirds)

7.159 FAO submitted a status report on the implementation of IPOA-Seabirds (WG-FSA-04/15), reporting the information summarised last year in SC-CAMLR-XXII, Annex 5, paragraph 6.173. New and updated information is available on the FAO's webpage at www.fao.org/figis/servlet/static?dom=org&xml=ipoa_seabirds.xml. FAO intends to prepare a technical paper, based on its Fisheries Circular No. 937, that will mainly focus on a review of the various studies carried out to test the performance and efficacy of mitigation measures.

7.160 Last year the Commission noted summaries of progress with certain FAO NPOA-Seabirds (SC-CAMLR-XXII, Annex 5, paragraph 6.174; SC-CAMLR-XXII, paragraphs 5.31 and 5.32) and concurred that progress with implementation was still very slow (CCAMLR-XXII, paragraph 5.15).

7.161 The Working Group noted the following new information regarding the status of development of NPOA-Seabirds:

(i) Mr J. Arata reported on the status of Chile's NPOA-Seabirds (WG-FSA-04/14). The NPOA is in development by a collaborative working group including representatives from the fishing industries, scientists and government agencies. A set of suitable mitigation measures has been identified and evaluations are being conducted on the efficacy of streamer lines and line weighting regimes. The draft NPOA will be available at www.fip.cl.

(ii) Mrs Neves reported that Brazil's NPOA-Seabirds has been completed. The preliminary version was prepared by Instituto Albatroz, a non-governmental organisation dedicated to the albatross conservation issue, and BirdLife

International – Programa do Brasil, and supported by FAO. This version was submitted to 34 scientists, governmental and non-governmental representatives, and vessel owners, for discussion during a national workshop in April 2004.

Brazil's NPOA-Seabirds identifies several procellariform species known to be incidentally taken in Brazilian longline fisheries, including three that breed in the Convention Area (wandering albatross, white-chinned petrel and southern fulmar). Several mitigation measures are identified for use by Brazilian longline vessels (streamer lines, blue-dyed bait and night setting). The NPOA-Seabirds establishes a goal of reducing the by-catch of the migratory species to 0.001 birds/thousand hooks.

The final version of Brazil's NPOA will be available at www.projetoalbatroz.com.br/planacao and final approval and signature by IBAMA (Brazilian Institute of the Environment) and by SEAP (Special Secretariat of Aquaculture and Fisheries of the Presidency of the Republic) is planned for November 2004.

(iii) New Zealand's NPOA was finalised in April 2004 and is available at www.doc.govt.nz.

(iv) The Falkland/Malvinas Plans of Action for both longlines and for squid and finfish trawl fisheries were finalised and implemented in 2004.

(v) Although not a member of FAO, Taiwan has indicated that it is preparing an NPOA-Seabirds.

7.162 In December 2003, the South American Workshop on Implementation of NPOA-Seabirds and Conservation of Albatrosses and Petrels was held in Futrono, Chile, and jointly sponsored by FAO and BirdLife International (SC-CAMLR-XXIII/BG/7). Participants from CCAMLR nations included: Argentina, Brazil, Chile, New Zealand, Norway, Peru, Spain, UK, USA and Uruguay. South American participants reported on progress of seabird by-catch assessments of longline fisheries, mitigation measures in use or being evaluated, and development of NPOAs. Several of the reports reflected the by-catch of albatross and petrel species from the Convention Area. Workshop recommendations addressed fishery assessments, mitigation research and a continued collaboration between FAO and BirdLife International, including holding a third workshop in 2005.

7.163 The Working Group commended this South American regional group for its collaborative efforts, which represent a successful initiative to address the issue in an effective and meaningful manner.

7.164 The Working Group was encouraged that some progress has occurred on NPOA development and continued to highlight the need for nations and fishing entities to develop and implement effective NPOAs for fisheries that interact with seabirds from the Convention Area.

RFMOs, tuna commissions and international governmental organisations

7.165 For several years the Commission has tried to collaborate with those RFMOs with responsibilities for areas adjacent to the Convention Area where seabirds from the Convention Area, are, or may be, killed, in order to promote the adoption by these RFMOs of appropriate mitigation measures for the fisheries actually or potentially involved (CCAMLR-XXII, paragraph 5.17). The Working Group recollected its earlier advice, endorsed by the Commission, that the greatest threats confronting the conservation at sea of albatrosses and petrels breeding in the Convention Area are the levels of mortality likely to be associated with IUU longline fishing inside the Convention Area, and with longline fishing for species other than *Dissostichus* in areas adjacent to the Convention Area (CCAMLR-XX, paragraph 6.33).

7.166 Intersessionally, the CCAMLR Secretariat requested Members (particularly those nominated as CCAMLR observers) to provide feedback on discussions concerning seabird by-catch and potential cooperation and data exchange (COMM CIRC 04/54). Information was received on CCSBT, IATTC and ICCAT.

7.167 The CCAMLR Observer reported on the fifth meeting of the CCSBT ERSWG held in Wellington, New Zealand, in February 2004 (WG-FSA-04/33 Rev. 1). The meeting was attended by member countries of CCSBT (Australia, Japan, Republic of Korea, New Zealand and Fishing Entity of Taiwan) and Indonesia attended as an observer. The meeting involved sharing of information on national projects relating to mitigation research, data collection and education. The report of the meeting is pending approval from the Commission, which will be meeting from 19 to 22 October 2004. The CCAMLR Observer noted that there would be items of relevance to CCAMLR in the papers tabled, in particular data on incidental capture of seabirds that breed in the CCAMLR Convention Area. The Working Group requested the CCAMLR Secretariat obtain and circulate copies of the report and papers tabled at the meeting from the CCSBT Secretariat.

7.168 The CCAMLR Observer to ICCAT (European Community) briefly referenced the ICCAT Resolution on Incidental Mortality of Seabirds (02-14) in its submitted report (CCAMLR-XXIII/BG/25), but no substantive discussion on this topic occurred at ICCAT's annual meeting in Dublin, Ireland, in November 2003.

7.169 Ms K. Rivera reported that the USA will sponsor a booth on by-catch at the 2004 annual meeting of ICCAT in New Orleans, USA, in November. Information about the incidental mortality of seabirds and sea turtles in longline fisheries will be provided as well as effective and practicable mitigation methods that have been identified for each.

7.170 The IATTC Secretariat conveyed that although no discussion of seabirds occurred at its 2004 annual meeting, seabird by-catch was discussed at the meeting of the IATTC's Bycatch Working Group in Kobe, Japan, in January 2004. The minutes of the Bycatch Working Group indicated that the USA explained its efforts with regard to mitigating the effects on seabirds of fisheries around Hawaii, and proposed that the pertinent provisions of the IATTC by-catch resolution should also apply to seabirds. Japan, Spain and the Fishing Entity of Taiwan reported on their efforts to reduce seabird mortality associated with longline fisheries in the Pacific.

7.171 As a result of an examination two years ago of fisheries data provided by IOTC, the Working Group noted that the pelagic longline effort by Japan and Taiwan in the Indian Ocean south of 40°S overlaps with the foraging distribution of several albatross species that breed in the Convention Area (SC-CAMLR-XXI, Annex 5, paragraph 6.146).

7.172 Thus, the CCAMLR Secretariat sent a request in November 2002, via the IOTC Secretariat, to delegations at the annual IOTC meeting which represented countries that are also CCAMLR Members. The request was to ensure that the issue of seabird by-catch be included for consideration by IOTC. The request was repeated in June 2004 (COMM CIRC 04/54). No response to this has been received to date.

7.173 The Working Group continued to be discouraged by the lack of progress on the seabird by-catch issue at pertinent RFMOs.

Other international organisations and initiatives,
including non-governmental organisations

7.174 A status report of Southern Seabird Solutions' activities was received (WG-FSA-04/35) detailing some of its activities, such as: its establishment as a charitable trust, fostering exchange of crew and technologies between fleets in different countries (e.g. New Zealand and France); hosting national and regional fishers' forums to enable fishers from different fleets to exchange ideas and information; developing and testing new mitigation technologies; establishing similar groups to Southern Seabird Solutions in other countries; and producing various outreach materials to build awareness of the issue and solutions (e.g. 'Fishing the Seabird Smart Way' video).

7.175 The Working Group again commended the work of Southern Seabird Solutions as it recognised the value of this group to aiding in reductions of seabird by-catch of birds breeding in the Convention Area. The Working Group encouraged active participation in Southern Seabird Solutions by CCAMLR Members.

7.176 Prof. Croxall reported that the BirdLife International Global Seabird Programme has several ongoing activities of note that relate to albatrosses and petrels that breed in the Convention Area:

(i) a review of the environmental performance of RFMOs, including CCAMLR, in respect of by-catch mitigation, especially albatrosses;

(ii) a report analysing global data on the distribution of albatrosses and petrels as revealed by remote-recording and a review of implications of marine conservation;

(iii) publication of the report from the technical workshop co-hosted with FAO in Chile in December 2003 (SC-CAMLR-XXIII/BG/7) and further development of NPOA initiatives;

(iv) publication of results of a technical workshop for Asian nations, particularly distant-water fleets, in Taiwan in January 2004;

(v) a variety of projects collecting observer data on seabird by-catch and trialling mitigation techniques, particularly in southern America and Africa.

7.177 The Working Group commended BirdLife International for these numerous activities and was encouraged by continued work to address the critical areas of South American fisheries and the distant-water fleets of Asian nations, both of which relate to the foraging distributions of albatrosses and petrels breeding in the Convention Area.

7.178 The Third International Conference on Albatrosses and Petrels was held in Montevideo, Uruguay, in August 2004 (paragraph 7.154). Many of the conference participants were from CCAMLR nations.

7.179 The Working Group noted the forthcoming workshop at the Fourth International Fisheries Observer Conference in Sydney, Australia, on 8 November 2004 – 'Development of Best Practices for the Collection of Longline Data to Facilitate Research and Analysis to Reduce By-catch'. The workshop will focus on identifying important elements for programs that collect data on protected species' interactions, including seabirds. Such data collection is critical in efforts to accurately monitor levels of by-catch in fisheries and in the development of effective programs to reduce such interactions. The Working Group encouraged the participation by CCAMLR nations at this workshop and conference and feedback to CCAMLR of relevant information.

Incidental mortality of seabirds in relation to new and exploratory fisheries

Assessment of risk in CCAMLR subareas and divisions

7.180 As in previous years, the Working Group assessed the numerous proposals for new and exploratory fisheries and the potential for these fisheries to lead to substantial increases in seabird incidental mortality.

7.181 In order to address these concerns, the Working Group reviewed its assessments for relevant subareas and divisions of the Convention Area in relation to:

(i) timing of fishing seasons
(ii) need to restrict fishing to night time
(iii) magnitude of general potential risk of by-catch of albatrosses and petrels.

7.182 Comprehensive assessments on the potential risk of interaction between seabirds and longline fisheries for all statistical areas in the Convention Area are carried out each year and have been combined into a background document for use by the Scientific Committee and Commission (last year this was SC-CAMLR-XXII/BG/17).

7.183 This year new data derived from a satellite tracking study was provided on the at-sea distribution of grey-headed and Campbell albatrosses that breed on Campbell Island (WG-FSA-04/59). In addition, all references to the Amsterdam albatross were deleted from the assessments as there is no empirical evidence to support the occurrence of this species within the Convention Area. This information was used to update the assessment of potential

risk of interaction between seabirds and longline fisheries for Subareas 88.1 and 88.2. The revised assessments incorporating new information made available at the meeting (with changes/additions underlined) have been issued as SC-CAMLR-XXIII/BG/21.

### New and exploratory longline fisheries operational in 2003/04

7.184 Of the 29 proposals last year for new and exploratory longline fisheries in 16 subareas and divisions, only 15 were actually undertaken: by Australia in Division 58.4.2; by Australia in Division 58.4.3b; by Japan in Subarea 48.6; by Argentina, Republic of Korea, New Zealand, Norway, Russia, South Africa, Spain, Ukraine, UK, USA and Uruguay in Subarea 88.1; and by New Zealand in Subarea 88.2.

7.185 No seabird by-catch was reported to have been observed in fisheries in Divisions 58.4.2 and 58.4.3b and Subareas 48.6 and 88.2 and only one incident of an individual seabird by-catch was reported observed in Subarea 88.1. Clearly the strict adherence in Subareas 48.6 and 88.2 and Divisions 58.4.2 and 58.4.3b to the specific requirements set out in Conservation Measure 24-02 with respect to line-weighting regimes, combined with fishing in an area of average-to-low and average risk, has proven successful in achieving zero incidental by-catch of seabirds. The less than 100% compliance reported from Subarea 88.1 this year does not appear to be linked to the observed mortality, as the vessel involved was reported as fully compliant with Conservation Measures 24-02 and 25-02.

### New and exploratory longline fisheries proposed for 2004/05

7.186 The Working Group reviewed the risk assessment framework used historically for providing advice on new and exploratory fishery proposals (SC-CAMLR-XXII/BG/17). Several inconsistencies in the approach were noted; in particular subareas with identical risk levels have had different seabird by-catch mitigation requirements applied in the conservation measures.

7.187 As part of the review of the risk assessment framework, the Working Group considered its historical advice on observer coverage levels and suggested observer coverage levels appropriate for monitoring by-catch and mitigation in relation to risk assessment level.

7.188 The Working Group emphasised that reported values for observer coverage of incidental seabird mortality during hauling and setting must reflect the number of hooks directly observed by scientific observers (not the number of hooks hauled whilst the observer is working).

7.189 Recently, where one observer is used, coverage of 60–80% of the set and 20–30% of the haul is generally achieved; where two observers are used, coverage of 85–100% of the set and 35–45% of the haul is generally achieved. In general, in areas where risk of incidental mortality is assessed as average to high (risk levels 3–5), the Working Group agreed that higher levels of observer coverage of both the haul and set would usually be appropriate. The recommended levels of observer coverage, related to assessed risk level, are incorporated into Table 7.16.

7.190 The Working Group confirmed the general approach, updated the framework to standardise the application of mitigation measures across subareas that are assessed as having the same risk level, and incorporated an assessment of recommended levels of observer coverage. The updated framework is set out in Table 7.17. The standardisation is also incorporated into SC-CAMLR-XXIII/BG/21 (the update of SC-CAMLR-XXII/BG/17).

7.191 In respect of the actual levels of risk adopted in SC-CAMLR-XXII/BG/17, no changes were suggested in SC-CAMLR-XXIII/BG/21. Some minor changes to distributional information have been corrected (see paragraph 7.183). It was noted that the risk levels published last year for Divisions 58.4.1 and 58.4.2 (SC-CAMLR-XXII, Annex 5, Table 6.9) were incorrect and should have been levels 2 and 3 respectively.

7.192 Thirty-five applications for new and exploratory longline fisheries, submitted by 13 countries, were received by CCAMLR in 2004. The areas for which these proposals were received were:

| | |
|---|---|
| Subarea 48.6 | Japan, Republic of Korea, New Zealand |
| Division 58.4.1 | Chile, Republic of Korea, New Zealand, Spain, Ukraine |
| Division 58.4.2 | Chile, Republic of Korea, New Zealand, Spain, Ukraine |
| Division 58.4.3a | Australia, Republic of Korea, Spain |
| Division 58.4.3b | Australia, Chile, Japan, Republic of Korea, Spain |
| Subarea 88.1 | Argentina, Australia, New Zealand, Norway, Russia, South Africa, Spain, Ukraine, UK, Uruguay |
| Subarea 88.2 | Argentina, New Zealand, Norway, Russia. |

7.193 All the areas listed above were assessed in relation to the risk of seabird incidental mortality according to the approach and criteria set out in SC-CAMLR-XXIII/BG/21. A summary of risk level, risk assessment, the Working Group's recommendations relating to mitigation measures, including fishing season and any inconsistencies between these and the proposals for new and exploratory longline fisheries in 2004, is set out in Table 7.16.

7.194 The only obvious inconsistency needing resolution is:

- The UK proposals for Subareas 88.1 and 88.2 note the intention to comply with the provisions of Conservation Measure 24-02 to permit day setting of longlines, and deploy streamer lines in accordance with the appendix to Conservation Measure 25-02. However, the status of compliance with Conservation Measure 25-02 is unclear, as is the intent to seek derogation to the night-setting requirements of this conservation measure by implementing the provisions of Conservation Measure 24-02, as approved last year in Conservation Measure 41-09.

7.195 The UK confirmed that it was its intention to comply with all necessary CCAMLR conservation measures, including Conservation Measure 25-02 in full, together with any such modifications as were adopted by the Commission.

7.196 Dr M. Naganobu indicated that Japan wished to maintain its proposal to fish in Subarea 48.6 from December to August inclusive (despite the fishing season last year having been restricted to 1 March to 31 August north of 60°S (Conservation Measure 41-04)) and noted that this extension to the fishing season would not conflict with the advice provided by ad hoc WG-IMAF.

7.197 In previous years, fishing proposals in high-latitude exploratory fisheries in subareas with average or less risk (risk levels 1–3) have obtained an exemption from the requirement of Conservation Measure 25-02 to set longlines at night (SC-CAMLR-XXII, Annex 5, paragraph 6.208). Such exemptions were given providing that vessels complied fully with measures specified in Conservation Measure 24-02, designed to ensure that a line sink rate of at least 0.3 m/s was achieved during daytime fishing operations. Any vessel catching a total of three (3) seabirds was to immediately revert to night setting in accordance with Conservation Measure 25-02.

7.198 Also in recent years, fishing proposals in high-latitude exploratory fisheries in divisions with average risk (risk level 3) have obtained an exemption from the requirement to fish during a specified season where this is recommended (e.g. Conservation Measure 41-06). Such exemptions were given providing that vessels complied fully with measures specified in Conservation Measure 24-02, designed to ensure that a line sink rate of at least 0.3 m/s was achieved during daytime fishing operations. Additionally, should a total of three (3) seabirds be caught by a vessel operating under the exemption, the vessel would cease fishing immediately and not be permitted to fish during the protected season for the remainder of the fishing year.

7.199 In reviewing the risk assessment framework, the Working Group suggested that in future, such exemptions should be considered within the risk assessment framework and should apply automatically on the basis of assessed risk level, rather than on a case-by-case basis as in the past. Advice on risk levels to which these exemptions should apply is noted in Table 7.16.

7.200 Setting of longlines within the Convention Area during daylight hours using currently approved fishing gear still represents a risk for seabirds, even in areas of low to average risk. In all instances where the provisions of Conservation Measure 24-02 are applied, there remains the need for continued review of performance with respect to incidental mortality of seabirds during fishing operations. The Working Group recommended that any vessel operating under the provisions of this conservation measure, and which catches a total of three (3) seabirds, as defined in SC-CAMLR-XXII, Annex 5, paragraphs 6.214 to 6.217, shall revert to night setting in accordance with Conservation Measure 25-02. Similar provisions were specified for the 2003/04 season in Conservation Measures 41-04, 41-05, 41-09, 41-10 and 41-11.

7.201 With respect to the prescription of a seabird by-catch level, the Working Group noted the successful implementation of the definition of the status of birds 'caught' (SC-CAMLR-XXII, Annex 5, paragraphs 6.214 to 6.217). The Working Group recommended the continued use of the definition and requested feedback from scientific observers on the ability to apply this definition whilst at sea.

7.202 The Working Group recommended that reference to this definition be appended to each conservation measure which specifies maximum permitted levels of seabird by-catch. Failure to do so last year clearly created some confusion (e.g. COMM CIRC 04/18), which may have resulted in incorrect categorisation and reporting of the status of birds caught and released alive.

Other incidental mortality

Interactions involving marine mammals
with longline fishing operations

7.203 One southern elephant seal (*Mirounga leonina*) mortality was observed on the *Janas* (Australia), fishing in Division 58.5.2. One incidental mortality of a whale was observed, possibly a minke whale (*Balaenoptera acutorostrata*) although its identification has yet to be confirmed. The whale was entangled in the mainline of the *Piscis* in Subarea 88.1 (WG-FSA-04/6 Rev. 1).

7.204 Interactions between seabirds and marine mammals and observed fishing operations for toothfish were reported for Subareas 88.1 and 88.2 for the years 2000 to 2002 (WG-FSA-04/42). Marine mammal captures were limited to two cetaceans (humpback whale and another small cetacean) that were tangled in lines. Both were released alive. These data had previously been reported to the Working Group.

Interactions involving marine mammals and seabirds
with trawl fishing operations

Data for 2003/04

7.205 Marine mammals captured in icefish trawl fisheries for 2003/04 were summarised in WG-FSA-04/7 Rev. 1. In Subarea 48.3, no marine mammal captures were observed. In Division 58.5.2, three Antarctic fur seals were reported dead, recovered from the codend.

7.206 Eight trawl vessels targeting icefish were observed in the CCAMLR Convention Area in 2003/04 (WG-FSA-04/7 Rev. 1). 100% of vessels were observed. In Subarea 48.3, 87 seabirds were killed and 136 were released alive. The birds involved were mainly white-chinned petrels (68%) and black-browed albatrosses (24%). In Division 58.5.2, seven seabirds were caught and all were released alive (Table 7.18).

7.207 In Subarea 48.3, the Working Group noted that for four of the six vessels, mortalities of seabirds were 16–18 birds, close to the per-vessel limit of 20 birds. This was due to the active management of the fishery, whereby vessels received daily reports as they approached this limit.

7.208 In reviewing performance of vessels between years, the Working Group noted that the *Argos Vigo* consistently had a higher seabird by-catch rate than others (Table 7.18). Other vessels that had notably high by-catch rates in at least one year include *Sil, InSung Ho, Dongsan Ho, Robin M Lee* and *Betanzos*.

7.209 The Working Group noted that seabird mortality totals and rates of capture had substantially increased since the previous year. In the 2004 season, 87 birds were killed, more than double the 42 seabirds killed in 2003. Previously 68 birds were observed killed in 2002 and 92 in 2001. When scaled to fishing operation and catch limit in Subarea 48.3, it appeared that seabird mortality rates had increased. In 2004, 30 birds were killed per 1 000 tonnes

(catch limit 2 887 tonnes), compared to 18 birds per 1 000 tonnes (catch limit 2 181 tonnes) in 2003, 12 birds per 1 000 tonnes (catch limit 5 557 tonnes) in 2002, and 14 birds per 1 000 tonnes in 2001 (catch limit 6 760 tonnes).

7.210 When expressed as the number of birds killed per trawl observed, a similar pattern emerges. In 2004, the mean number of birds killed per trawl was 0.37 birds (238 trawls), compared to 0.20 birds in 2003 (182 tows), 0.16 birds in 2002 (431 trawls) and 0.29 birds in 2001 (315 trawls).

7.211 The Working Group noted with concern that birds caught were likely to be breeding individuals, due to the timing of the fishery. This would therefore have a greater effect on populations of the species concerned, due to the disruption of breeding pairs, and likely death of chicks, as well as the removal of breeding-age individuals from the population.

7.212 The Working Group also noted that the 87 birds observed killed in trawling operations in Subarea 48.3 in 2004 is a substantially higher number than the 18 birds estimated killed in longline fishing operations in the same subarea in 2004.

7.213 The Working Group noted that the species concerned are all listed as globally threatened. The species reported killed include black-browed albatrosses (Endangered) and grey-headed albatrosses and white-chinned and southern giant petrels (Vulnerable). More black-browed albatrosses were killed in 2004 than in the previous three years, and a greater number of white-chinned petrels were killed in 2004 than in all years. The black-browed albatross population at South Georgia is currently decreasing at a rate of 4% per annum (WG-FSA-04/71).

7.214 Given these factors, the Working Group recommended a reduction in by-catch limits, at both the vessel level and for the wider icefish trawl fishery in Subarea 48.3. The following options were proposed:

(i) To reduce the per-vessel limit of seabirds from 20 birds killed per vessel to 10 birds killed per vessel.

or

(ii) To set vessel limits based on the threatened status of the seabird species. The Working Group recommended setting a limit for globally Endangered species (including black-browed albatrosses) at three (3) birds, and a second limit of five (5) birds for species listed as Vulnerable (including grey-headed albatrosses and white-chinned petrels). A limit for non-listed species would be set at 12, resulting in maintenance of the 20 bird limit per vessel.

and

(iii) To introduce an annual seabird mortality limit that would apply to all vessels in the icefish fishery in Subarea 48.3. It was noted that similar limits had been effectively employed to limit by-catch of skates, where the subarea limit was lower than the sum of the total of the individual vessel limits for vessels fishing in an area. The Working Group recommended a limit of 15 birds for Endangered species, and 25 birds for Vulnerable species. A total limit for each subarea would be 100 birds.

7.215 Means of employing area-specific total by-catch limits within a fishery were discussed, with recognition of the desirability of allowing increased fishing access to vessels that were shown to perform better than others in limiting seabird mortalities.

7.216 In further discussion Dr Agnew observed that while supportive of the aims of paragraph 7.214, the considerable current difficulties of devising effective mitigation of seabird by-catch in this fishery in Subarea 48.3 meant that options (i) and (ii) above could have the effect of prematurely and unnecessarily closing the fishery to many vessels, including those with good past records. He indicated, however, that option (iii), coupled with sensitive management of its application, might be an appropriate response to consider at this stage. He believed that all three options should be considered as alternatives rather than suggesting that option (iii) should be regarded as additional or complementary to options (i) and (ii).

7.217 Drs Constable and R. Holt (USA), while recognising the potential difficulties posed for the management of this fishery by some of the options set out in paragraph 7.214, nevertheless felt that all of these options should be retained for further discussion at the Scientific Committee.

Mitigation measures and experiences

7.218 All vessels in the icefish fishery in Subarea 48.3 used a variety of mitigation measures in attempts to reduce the number of bird mortalities. These included:

(i) Streamer lines – a variety of different streamer lines (paired and single) were trialled, with one vessel also trialling the Brady bird baffler. Observers reported that these devices were of little use in reducing seabird activity around the codend, with some reporting birds being tangled in the streamers or being attracted to them. The main problem reported by observers was the fact that the effective coverage was not far enough to get to the codend, which can be up to 50 m away from the stern of the vessel. There were also problems with the streamers being tangled in the trawl warps.

(ii) Acoustic devices – bells and strings of cans were used to scare birds away from the vessel during shooting and hauling, but were found to be ineffective.

(iii) Water jets – high-pressure water jets were used on several occasions, but were only effective up to 5 m from the stern of the vessel. This distance is not far enough to prevent birds from landing on the codend. It was also noted that increasing the pressure of the water jet could also harm birds or force them onto the net.

(iv) Net weights – several observers reported the use of weights, ranging from a few kilograms on the codend up to 500 kg on each wing of the net, to reduce the amount of time the net was at the surface during shooting and hauling, and thereby reducing the opportunities for birds to get caught in the mesh. It was not clear how effective these experiments had been.

(v) Net cleaning – most observers felt that cleaning the net before shooting was one of the most effective methods of reducing birds from being attracted to the net.

7.219 Specific measures trialled on the *Robin M Lee* in 2003/04 in Subarea 48.3 were reported in WG-FSA-04/80. Three birds were killed, entangled during the shooting of the net following the use of fish oil to deter birds, some of which fell onto the net before deployment. Measures to avoid birds becoming entangled during setting and hauling were examined. Tori lines with an aerial extent of 140 m were recommended, to enable coverage of the zone where large meshes are exposed at the surface during setting. The large meshes (200–800 mm) are considered to pose greatest risk to seabirds. Binding of the body of the net at 2 m intervals down the net using biodegradable string was trialled, to mitigate seabird entanglements during shooting of the net. This was used with the intention of increasing the net sink rate as it reduces open mesh available for seabirds to become entangled in. The bindings were designed to break when trawl doors opened, but in the four sets made the bindings were insufficiently strong to avoid the net opening at the surface. Recommendations on deployment of the method in the future were made.

7.220 A proposal was submitted to test these mitigation techniques in Subarea 48.3 in 2004/05, requiring relaxing of the restriction on seabird mortality to 40 birds for the vessel (Appendix to WG-FSA-04/80). The Working Group supported the proposal.

7.221 WG-FSA-04/79 reported the results of the first attempt to compare the effectiveness of mitigation measures to reduce seabird mortalities resulting from strikes with warp cables on a factory trawler. Both streamer lines and a warp scarer were significantly more effective at reducing the rate of seabird contacts with warp cables (0.29 and 0.93 heavy contacts per hour respectively) than the Brady bird baffler and a control of no deterrent (9.71 and 17.46 heavy contacts per hour respectively). Seabird mortalities resulting from strikes reflect this same hierarchy (control 0.70; Brady bird baffler 0.14 birds/haul; warp scarer 0.06 birds/haul; and streamer lines 0 birds/haul). The steamer line deterrent performed marginally better than the warp scarer. Economic aspects of the deterrent devices were also discussed with minimal costs identified for warp scarers and streamer lines.

7.222 Dr E. Melvin (USA) reported that in a limited trial in the Alaskan pelagic trawl fishery in the Bering Sea, approximately 1 000 gallons of pollock oil was discharged into the starboard discharge plume for 15 minutes to determine if seabirds avoided fish oil. The fish oil appeared to eliminate seabirds from the starboard sector of the vessels out beyond 100 m for at least 30 minutes post application. This approach should be further tested in carefully designed experiments as a mitigation alternative provided potential detrimental effects to seabirds can be ruled out. The Working Group cautioned that further ad hoc trials of fish oil should be discouraged.

7.223 The USA submitted an annotated bibliography of research on trawl operations and seabird interactions and of cooperative research programs between fishing operators and researchers to address seabird mortalities in trawl fisheries (WG-FSA-04/47). The Working Group commended the initiative, noting that a similar review of research on longline mitigation would be useful. The Working Group encouraged the development of an internet-based bibliographic summary of research on mitigation of seabird mortality.

7.224 The Working Group noted that the UK had submitted a proposal to conduct exploratory bottom trawling for icefish in Subarea 48.3 (CCAMLR-XXIII/16) in order to mitigate the effects of trawl fishing using current fishing gear (see SC-CAMLR-XXII, Annex 5, paragraphs 6.242 and 6.243).

### Interactions involving marine mammals and krill fishing operations

#### 2002/03 season

7.225 Last year, anecdotal reports indicated that some trawlers fishing for krill frequently caught Antarctic fur seals, some of which were killed (SC-CAMLR-XXII, Annex 5, paragraphs 6.226 and 6.229). Further evaluation for Subarea 48.3 required reports from scientific observers, which were unavailable at that time.

7.226 In Subarea 48.3 in 2002/03, international observers were present on 6 of 9 (66%) of krill fishing cruises.

7.227 Observers on board two vessels reported incidental mortalities of Antarctic fur seals: *Dongsan Ho* – 25 dead, 4 released alive; *Top Ocean* – 2 dead, 11 released alive. The observer on board the *Dongsan Ho* attributed the high seal mortality to a lack of experience as the vessel was new to the fishery. In an attempt to reduce the seal mortality, diamond-shaped holes were cut across the net and the winch speed was increased during shooting to allow the net to drop vertically through the water. The two dead seals from the *Top Ocean* drowned during the same haul, which occurred when the net could not be retrieved in time due to a mechanical malfunction (WG-FSA-04/7 Rev. 1).

7.228 Overall, for Area 48 in 2002/03, combining data from scientific observers and Reports of Members' Activities, 114 fur seals were caught, 53 being killed and 61 released alive.

#### 2003/04 season

7.229 During the 2003/04 season, one krill trawl operation was observed in Area 48 on the US-flagged vessel *Top Ocean* by a Ukrainian international scientific observer. A total of 683 trawls was conducted, with 521 (76%) being observed (WG-FSA-04/7 Rev. 1).

7.230 A total of 142 fur seals was observed killed and 12 seals were released alive. The vessel used several different net configurations described in the observer's cruise report in an attempt to reduce seal by-catch.

7.231 In addition, the UK deployed scientific observers for short periods (2–4 weeks) between June and August on 6 of 9 vessels fishing for krill in Subarea 48.3 (WG-FSA-04/83). This report, chiefly focusing on entrapment mitigation issues, indicated that a minimum of 292 fur seals were entrapped (185 on *Top Ocean*, 83 on *InSung Ho*, 13 on *Nitake Maru*, 11 on *Atlantic Navigator*, none on *Esperanza* and *Konstruktor Koshkin*).

7.232 Some inconsistencies were identified in the information submitted to CCAMLR from the vessel *Top Ocean*. In particular, the number of seals reported as entrapped was inconsistent among the Captain's cruise report, the Captain's daily log, the CCAMLR observer's daily log and the observations of the UK observer.

7.233 The international observer was on board the vessel *Top Ocean* from 21 February to 21 September 2004. Trawling for krill was conducted in Subarea 48.3 from 8 to 15 June and 23 June to 2 August 2004. The UK observer was present on the vessel in Subarea 48.3 from 20 June to 20 July 2004.

7.234 The international observer reported that fur seals were always present in association with the vessel in Subarea 48.3; however no seal entrapments were reported on trawls occurring from 8 to 15 June 2004. Of the 142 observed Antarctic fur seal mortalities on the *Top Ocean*, 138 were reported between 23 June and 2 August 2004, coincident with the presence of the UK observer.

7.235 Mitigation measures were introduced on the vessel on 3 July 2004, including several modifications of the two trawl nets. The international observer's summary report indicated that only three seal mortalities were observed after successful implementation of the mitigation measures. However, the daily log of this observer indicated that 34 seals were killed between 3 July and 2 August 2004. Notes in the mitigation section of the CCAMLR observer's summary report refer to seal mortality on trawls that were not included in the daily log of the observer.

7.236 Due to the unknown extent of incidental mortality associated with the krill trawl fisheries, the Working Group recommended that the Commission require an observer on board krill trawl vessels to guide future management efforts. The Working Group noted that reliable data on seal incidental mortality can only be obtained through scientific observers. Current observer data are inconsistent and inadequate for this purpose. It is essential that observer data forms are completed in an accurate, consistent and comprehensive manner, in particular the sections addressing incidental mortality.

7.237 The Working Group noted that it would be helpful if the UK submitted the original data collected by its observers in 2004 to the CCAMLR Secretariat.

### Mitigation

7.238 As recommended by the Working Group in the 2003 report of WG-FSA (SC-CAMLR-XXII, Annex 5, paragraph 6.230), some Members investigated and documented the use of mitigation devices to reduce seal entrapment in krill trawl nets. The Working Group commended these parties for their efforts and requested them to continue reporting on the efficacy of seal-exclusion devices.

7.239 In 2002/03, Japan tested two seal-exclusion methods (NISSUI and MARUHA) on two krill trawl ships, described in WG-FSA-04/17. The NISSUI system consisted of an escapement panel with large mesh size (1.6 $m^2$), fitted on the top of the net with an area of 6 x 4 m; a sloping panel of 300 mm mesh was fitted below the escapement panel. The MARUHA net system consisted of an escapement hatch (1.5 x 2.1 m) in the top of the net; a sloping panel made of 150–200 mm mesh was fitted below the hatch. Both systems allow

fish to pass through to the codend, while guiding large organisms to the escapement panel or hatch in the top of the net. In the description of the seal-exclusion devices, a recommendation was made that the wings of the trawl net are put to one side and the mouth of the trawl net is closed when setting or hauling. There were no records of seal entanglements in the 2002/03 krill fishing season on either vessel.

7.240 Dr Naganobu indicated that the NISSUI and MARUHA systems had both proved very effective on vessels in the Japanese krill fishery; he encouraged other vessels fishing for krill to consider using these systems.

7.241 The UK submitted a report from scientific observers on krill fishing vessels around South Georgia (WG-FSA-04/83). Various methods were tested to mitigate seal mortality associated with krill trawls, including physical barriers, physical barriers with escape hatches, prefabricated seal-exclusion devices and modification of gear configuration. Several of the tested methods were effective at reducing or preventing seal mortality on individual vessels after the exclusion methods were implemented, as compared to seal entrapments recorded before the exclusion measures were implemented.

7.242 The Working Group recommended that the information on various seal-exclusion devices described in WG-FSA-04/17 and 04/83 be combined into a single document describing each of the methods tried, including information regarding their success. This paper should be distributed to CCAMLR Members and other interested organisations to encourage further testing of the effectiveness of the various methods for preventing seal mortality or injury associated with krill trawl fishing.

7.243 Given the increasing evidence of seal entrapment in krill fisheries, and the apparent efficacy of some of the seal-exclusion methods tested this year, the Working Group recommended that krill fishing vessels employ gear modifications that reduce seal entrapment, mortality and injury. At this time, a particular design cannot be recommended due to the lack of sufficient data on any specific method. The Working Group advised Members to exercise caution in design and implementation of seal-exclusion devices based on experiences with marine mammal exclusion devices used outside CCAMLR waters, as it is possible that animals escaping from the net through some exclusion devices are seriously injured. The Working Group discouraged use of seal-exclusion devices that would allow moribund animals to fall out of the bottom of the net, as this would lead to inaccurate estimates of seal incidental mortality.

Other business

7.244 Prof. Croxall and Mr Baker were retiring as Convener and Deputy Convener respectively at the end of the present meeting. They were thanked for all their work for ad hoc WG-IMAF over many years. The Working Group recommended that Ms Rivera and Mr N. Smith (New Zealand) should be appointed as Co-conveners of WG-IMAF.

Advice to the Scientific Committee

General

7.245 The plan of intersessional work (Appendix D) summarises requests to Members and others for information of relevance to the work of the Working Group (paragraphs 7.1 to 7.3). Members are particularly invited to review the membership of the Working Group, to suggest additional members and to facilitate attendance of their representatives at meetings (paragraph 7.4).

Incidental mortality of seabirds during regulated longline fishing in the Convention Area in 2004

7.246 (i) For Subarea 48.3, the total estimated seabird by-catch in 2004 was 18 birds at a rate of 0.001 birds/thousand hooks, a slight increase compared with last year but values are still the second lowest yet recorded for this area (paragraphs 7.8 and 7.9 and Tables 7.1 to 7.3).

(ii) Within the South African EEZ in Subareas 58.6 and 58.7, the total estimated seabird by-catch was 39 birds at a rate of 0.025 birds/thousand hooks, increased values over the previous two years. The total estimated seabird by-catch rate is only 20% of that in 2001 (paragraphs 7.10 and 7.11 and Tables 7.1 to 7.3).

(iii) A single seabird was observed killed in Subarea 88.1 after seven successive years of zero incidental mortality. No incidental mortality of seabirds was observed in Subarea 88.2 (for the third successive year) (paragraph 7.12), nor in Subarea 48.6, Divisions 58.4.3b, 58.5.2 (first year of longline fishing in these areas) and 58.4.2 (for the second successive year) (paragraph 7.13 and Tables 7.1 to 7.3).

(iv) These totals represent slight increases in the estimated seabird by-catch in parts of the Convention Area, compared with the data reported in the last two years (paragraph 7.9 and Table 7.3).

7.247 Historical data from longline fishing in the French EEZs in Subarea 58.6 and Division 58.5.1 was received for the 2001/02 and 2002/03 fishing seasons (paragraphs 7.16 to 7.19 and Tables 7.5 to 7.8). The reported totals of birds killed in these two years are based on retention of all birds brought on board each vessel, rather than on subsampling by observing some proportion of the total hooks set (paragraphs 7.20 and 7.21).

(i) In Subarea 58.6 (Crozet) in 2001/02, 1 243 birds were reported killed during setting of 7.4 million hooks, at a rate of 0.167 birds/thousand hooks. In 2002/03, 720 birds were reported killed during the setting of 6.6 million hooks, at a rate of 0.109 birds/thousand hooks, a decrease in annual by-catch rate of 53% (paragraphs 7.16 to 7.19).

(ii) In Division 58.5.1 (Kerguelen) in 2001/02, 10 814 birds were reported killed during setting of 11.5 million hooks, at a rate of 0.936 birds/thousand hooks. In

2002/03, 13 926 birds were reported killed during the setting of 26.9 million hooks, at a rate of 0.518 birds/thousand hooks, a decrease in annual by-catch rate of 45% (paragraphs 7.16 to 7.19).

7.248 Intersessionally, by-catch data analysis, collaborative interactions and experiments formed the basis for technical recommendations for changes to fishing practices (paragraphs 7.35 and 7.36).

(i) France commissioned an analysis of the 2001/02 and 2002/03 data (paragraph 7.22). Findings included: seabird mortality was mainly of white-chinned petrels (93%) in October and between January and April, followed by grey petrels (5%) caught between April and November; higher seabird catch rates occurred around Kerguelen, the more heavily fished area; autoline vessels caught many times more birds than vessels using the Spanish system; and a significant part of the mortality of white-chinned and grey petrels is explained by season, area and method of fishing.

(ii) Collaborative interactions and mitigation experiments (paragraph 7.35) included: testing of IWLs, technical exchange of mitigation information, evaluation of coloured hookline, and initiation of a study on the population status of white-chinned and grey petrels on Kerguelen and Crozet.

7.249 In 2004, existing fishing practices (on offal discharge, night setting, line weighting, and streamer lines) were revised to further require: use of two streamer lines that adhere to the provisions of Conservation Measure 25-02, fishery closure during February, use of white-coloured hookline and a line-weighting regime of 8 kg/120 m on autoliners (paragraphs 7.39 and 7.40).

7.250 Data from the 2003/04 fishing season were also submitted to CCAMLR (paragraphs 7.23 to 7.30) with data to February 2004 reported as for the two previous years. From March onward, data were recorded as by-catch observed on a proportion of the hooks set. Combining the totals of birds reported killed during the first half of the fishing season with the number of birds estimated killed in the second half of the season indicates that 342 birds and 3 666 birds were killed in Subarea 58.6 and Division 58.5.1 respectively (paragraph 7.28 and Tables 7.9 and 7.10). Compared to last year this represents reductions in birds killed of 42.5% (66.4% if reported data only are used) in Subarea 58.6 and 73.7% (85.1% if reported data only are used) for Division 58.5.1 (paragraph 7.29 and Table 7.11).

7.251 Whereas the changes in fishing regulations and practices and subsequent reductions in number of birds killed and by-catch rates are substantial, continued improvements are possible and necessary as these rates and totals still remain at levels which are a cause of serious concern and threat to the populations involved (paragraphs 7.36 and 7.42 to 7.44). It is recommended that:

(i) IWL and weighting regimes that will ensure that longlines sink at >0.25 m/s be used (paragraph 7.45(ii));

(ii) standards for streamer lines as outlined in Conservation Measure 25-02 be complied with (paragraph 7.45(iii));

(iii) observer coverage and duties should be sufficient to ensure that at least 25% of hooks are observed on every vessel (paragraph 7.45(v));

(iv) fishery closures in high-risk periods during seabird breeding seasons be maintained (paragraph 7.45(vi));

(v) France supply 2000/01 data so that a comprehensive conspectus of the history of seabird by-catch in this fishery is possible (paragraph 7.34);

(vi) France conduct an analysis to evaluate vessel-specific factors contributing to high levels of by-catch (paragraph 7.25).

Implementation of Conservation Measures 24-02, 25-02, 25-03, 41-09 and 41-10

7.252 Reported compliance with the streamer line component of Conservation Measure 25-02 dropped considerably since last year, possibly due to lack of awareness of the changes to the measure. The majority of the vessels that failed to fully comply this year would have complied under the previous specifications (paragraph 7.58). Vessel operators should be reminded of the new specifications. Also, it is of concern that for the first time since a single incident in 2002/03, two vessels in Subareas 88.1 and 88.2 failed to comply with the offal discharge prohibition. Compliance with Conservation Measure 25-02 is summarised as follows:

(i) Streamer lines – compliance with streamer line design was 64% compared with 92% last year (paragraph 7.47). Vessels in Subareas 48.6, 58.6, 58.7 and Divisions 58.4.2, 58.4.3b and 58.5.2 used streamer lines on all sets; in Subarea 48.3, seven of 16 vessels undertook sets without using a streamer line; and in Subareas 88.1 and 88.2, six vessels undertook some sets without using a streamer line (paragraph 7.49 and Table 7.12).

(ii) Offal discharge – in Subareas 88.1 and 88.2, two vessels did not comply with requirements to not discharge offal (Conservation Measures 41-09 and 41-10). One vessel in Subarea 48.3 and one vessel in Subarea 58.6 were observed discharging offal during the set (paragraphs 7.50 and 7.51 and Table 7.13).

(iii) Discard of hooks – fishing gear, snoods and hooks, were occasionally being disposed of at sea on eight vessels. Hooks were present in discards on eight vessels, a daily occurrence on one of them (paragraph 7.52).

(iv) Night setting – in Subareas 58.6 and 58.7 compliance was 83%, compared to 98 and 99% in the past two years; in Division 58.5.2 compliance was 99%; in Subarea 48.3 compliance was 98% (paragraph 7.53).

(v) Line weighting (Spanish system) – in Subarea 48.3 compliance was 87% compared to 100% last year; the single Spanish-system vessel fishing in Subareas 58.6 and 58.7 fully complied (paragraph 7.55).

(vi) Line weighting (autoline system) – the requirement to achieve a line sink rate of 0.3 m/s when fishing in daylight in Subareas 48.6, 88.1 and 88.2 and Division 58.4.2 was met by all vessels (paragraph 7.57 and Figure 7.1).

7.253 In relation to overall compliance with Conservation Measure 25-02, 13 of 40 vessels (33%) fully complied with all measures at all times throughout the Convention Area, compared to 48% last year (paragraph 7.61). Some vessels failed to comply by small margins and it was re-emphasised that vessels should be advised to exceed the standards to prevent compliance failure.

7.254 With respect to Conservation Measure 25-03, four of eight vessels did not comply with the prohibition of discharge of offal during the shooting and hauling of gear. This level of compliance is not as high as 2003, when only two vessels discharged offal (paragraph 7.62 and Table 7.14).

Revision of Conservation Measures 24-02
and 25-02 and related matters

7.255 With respect to future improvements to Conservation Measure 25-02:

(i) consistently collected data on the aerial extent of the streamer line is a key requirement for improving this element of the conservation measure (paragraph 7.66);

(ii) research on the sink rate of externally weighted autolines is essential to allow mandatory line-weighting regimes for autoliners to be included in the conservation measure (paragraph 7.93 and Figure 7.2).

7.256 However, with respect to Conservation Measure 24-02, the success of trials of IWLs, reducing white-chinned petrel by-catch by 98% in 2002 and 92% in 2003 in New Zealand areas comparable to the highest risk levels in the Convention Area (paragraph 7.74), coupled with successful trials in Division 58.5.1 (paragraph 7.76) enables a protocol for using IWLs in new and exploratory fisheries to be added to the conservation measure (paragraphs 7.94 and 7.95).

7.257 The rationale for this new element of Conservation Measure 24-02 and other proposed changes to the measure are described in paragraphs 7.95 to 7.110.

7.258 The Working Group supported a request for exemption from night-setting requirements for autoline vessels operating in Division 58.5.2 in 2005, subject to the conditions proposed in paragraph 7.86.

### Assessment of incidental mortality of seabirds during IUU longline fishing in the Convention Area

7.259 The methods used to estimate seabird by-catch associated with IUU fishing were the same as revised and adopted last year. IUU removals were reported for the first time from Division 58.4.3 and this was allocated the same seabird by-catch rate as Division 58.4.4 (paragraphs 7.113 to 7.115).

7.260 The much lower estimates of IUU toothfish removals are directly reflected in the estimates of IUU seabird by-catch which, at 5 311 birds (95% confidence interval 4 352–14 166 birds) is the lowest ever reported for the Convention Area and 30% less than the value for 2003 (paragraph 7.117 and Table 7.15). Full data, including all historical data, are provided in SC-CAMLR-XXIII/BG/23.

7.261 Nevertheless, the Working Group concluded that even these reduced levels of IUU seabird by-catch were of substantial concern and likely unsustainable for some of the populations concerned (paragraph 7.121). The Commission was encouraged to continue to take action in respect of seabird mortality caused by IUU fishing (paragraph 7.122).

### Incidental mortality of seabirds during longline fishing outside the Convention Area

7.262 New data on mortality of seabirds outside the Convention Area relevant to fisheries and/or seabirds within the Convention Area was presented as follows:

(i) In 2002 the Chilean domestic fishery for *D. eleginoides* caught 437 seabirds at a rate of 0.047 birds/thousand hooks; all were white-chinned petrels doubtless from breeding populations in the Convention Area (paragraph 7.125).

(ii) Chilean longline vessels which operate both in Subarea 48.3 and in the Chilean EEZ relax seabird mitigation matters in the latter, partly because regulations are not mandatory and partly because they appear unable to use the CCAMLR line-weighting provisions in the areas where they fish domestically (paragraph 7.124).

(iii) An exploratory longline fishery in Uruguay using modified Spanish-system gear killed 2 175 seabirds, including seabirds from the Convention Area, at very high by-catch rates; although the fishery in Uruguay is discontinued, similar fishing practices may be used elsewhere in the region (paragraph 7.126).

(iv) New Zealand summarised seabird by-catch data from major fisheries within its EEZ between 2000/01 and 2002/03. By-catch rates in tuna fisheries were low (0.026–0.048 birds/thousand hooks) due to good compliance with mitigation measures; rates in ling fisheries improved from 0.218 to <0.08 birds/thousand hooks due to increased line-weighting requirements. Squid trawl fishery by-catch rates ranged from 0.058 to 0.097 birds/trawl. Although most birds caught originated from New Zealand, some white-chinned and grey petrels were probably from the Convention Area (paragraph 7.127).

(v) Brazil was requested to supply details of by-catch rates in fisheries in its EEZ, especially as they affect bird species breeding in the Convention Area (paragraphs 7.128 and 7.129).

Research into the status and distribution of seabirds at risk

7.263 In response to the revised reporting format devised intersessionally, national research summaries and details of data on status, trends and distribution (at sea) of albatross and petrel populations had been received only from Australia, New Zealand and the USA (paragraph 7.130). Reports from other Members were essential to enable the linking of data on fishing effort and seabird by-catch with population dynamics and foraging range. Argentina, France, South Africa and the UK were particularly urged to make relevant data available as soon as possible (paragraphs 7.130 to 7.134).

7.264 There had been no changes since last year to the global conservation status (as reviewed annually by BirdLife International on behalf of IUCN) of albatross and petrel species of relevance to the Convention Area (paragraph 7.135).

7.265 New data on foraging range and areas of grey-headed, black-browed and Campbell albatrosses are summarised in paragraphs 7.141 to 7.143. Data in a global review by BirdLife International of remote-recorded at-sea distributions of albatrosses and petrels will be of considerable relevance to CCAMLR and BirdLife is requested to provide results from appropriate analyses (paragraphs 7.144 and 7.145).

7.266 Data on long-term population trends of Campbell (1–2% per annum increase) and grey-headed (3–5% per annum decrease) albatrosses at Campbell Island, of grey-headed, black-browed and wandering albatrosses (all stable but very small populations) at Macquarie Island and of black-browed albatrosses in southern Chile (increasing 1999 to 2001) are reported (paragraphs 7.146 to 7.150). Summary data are incorporated into SC-CAMLR-XXIII/BG/22.

7.267 A comprehensive survey of all colonies of black-browed, grey-headed and wandering albatrosses throughout South Georgia indicated:

(i) continuing declines for all species;

(ii) that trends at the Bird Island colonies monitored annually are representative of the overall South Georgia population;

(iii) that the rate of decline in wandering albatrosses may be increasing (paragraphs 7.151 and 7.152).

International and national initiatives relating to incidental mortality of seabirds in relation to longline fishing

7.268 Information was reported on current international initiatives under the auspices of:

(i) ACAP – now in force; CCAMLR attending inaugural meeting as observer, tabling paper summarising work of relevance to ACAP and hoping to develop close links (paragraphs 7.155 to 7.158);

(ii) FAO (NPOA-Seabirds) – noting the adoption of plans by New Zealand and Falkland/Malvinas Islands, the completion of a draft plan by Brazil and progress towards plans by Chile and Taiwan (paragraphs 7.161 to 7.163);

(iii) RFMOs – recollecting renewed attempts last year for more effective collaboration (SC-CAMLR-XXII, paragraph 5.28), progress with the main tuna commissions was regarded as discouraging (paragraphs 7.165 to 7.173);

(iv) NGOs – new initiatives with Southern Seabird Solutions and BirdLife International of considerable interest to CCAMLR were commended and Members urged to collaborate (paragraphs 7.174 to 7.177);

(v) the potential importance of feedback to CCAMLR from the forthcoming Fourth International Fisheries Observer Conference was noted (paragraph 7.179).

Incidental mortality of seabirds in relation to new and exploratory fisheries

7.269 Of the 29 applications for exploratory longline fisheries for 2003/04, 15, relating to Divisions 58.4.2 (1), 58.4.3b (1) and Subareas 48.6 (1), 88.1 (11) and 88.2 (1) were undertaken (paragraph 7.184).

7.270 Only in Subarea 88.1 was any seabird by-catch (1 bird) reported and this cannot be attributed to any failure of compliance with the suite of mitigation measures employed, which remain highly effective at avoiding seabird by-catch in these areas (paragraph 7.185).

7.271 The assessment of potential risk of interactions between seabirds and longline fisheries for all statistical areas in the Convention Area was reviewed, revised, and provided as advice to the Scientific Committee and Commission as SC-CAMLR-XXIII/BG/21. There were no changes this year to levels of risk (paragraphs 7.181 to 7.183 and 7.191 and Figure 7.3).

7.272 However, a substantial review of the summary presentation of advice to simplify and improve consistency was undertaken and incorporated into SC-CAMLR-XXIII/BG/21 and is summarised in Table 7.16 (paragraphs 7.186 to 7.190).

7.273 The 35 proposals by 13 Members for new and exploratory fisheries in seven subareas/divisions of the Convention Area in 2004/05 were addressed in relation to the advice in SC-CAMLR-XXIII/BG/21 and Table 7.17. The results, summarised in Table 7.16,

indicate that, with the single potential inconsistency resolved at the meeting, all are in conformity with advice relating to incidental mortality of seabirds (paragraphs 7.194 and 7.195).

7.274 Issues relating to:

(i) exemptions from setting longlines at night;

(ii) exemptions in respect of recommended closed seasons;

(iii) maintaining maximum permitted seabird by-catch levels as in Conservation Measure 24-02, with reversion to the provisions of Conservation Measure 25-02 when these are reached;

(iv) including reference to the definition of birds caught (as adopted last year) in all relevant conservation measures;

are addressed in SC-CAMLR-XXIII/BG/21 and/or in paragraphs 7.197 to 7.202.

Interactions involving marine mammals and seabirds
and trawl finfish fishery operations

7.275 Three Antarctic fur seals were reported killed in the icefish fishery in Division 58.5.2. The only seabird mortality observed in trawl fishing operations in 2003/04 was in the icefish fishery in Subarea 48.3 where 87 seabirds were killed and another 136 released alive (paragraph 7.206 and Table 7.18).

7.276 In this fishery, following reduction in total birds killed in each of the last three years, values had more than doubled in 2004. Mortality rates were nearly double those last year (paragraphs 7.209 and 7.210 and Table 7.18).

7.277 Despite extensive attempts to devise and improve mitigation measures for use in this fishery, limited success was reported (paragraphs 7.218 and 7.219).

7.278 Taking into account the increase in by-catch, the status of the birds killed and the continued difficulties with mitigation, the Working Group made various suggestions as to how the situation might be improved, including:

(i) a reduction in the vessel seabird by-catch limit;

(ii) an overall seabird by-catch limit for all vessels in this fishery;

(iii) supporting an application for further trials of mitigation measures in 2004/05, including a relaxation of the vessel seabird by-catch limit (paragraphs 7.211 to 7.217).

Interactions involving marine mammals and krill fishing operations

7.279 Revised data for 2002/03 indicate that a minimum of 114 Antarctic fur seals were caught in krill fishing operations in Area 48, 53 of which were killed and 61 released alive (paragraph 7.228).

7.280 Data for 2003/04 comprise a report from Area 48 of the international scientific observer on the *Top Ocean* which records 154 seals entrapped, of which 142 were killed and reports from UK observers on six vessels (including *Top Ocean*) in Subarea 48.3 which indicated entrapment of 292 seals (paragraphs 7.229 to 7.231).

7.281 A variety of mitigation devices, including those developed by Japan in recent years and tested in 2002/03, were used on vessels fishing for krill (paragraphs 7.238 to 7.241). Each device either greatly reduced or eliminated entrapment of fur seals (paragraphs 7.239 to 7.241).

7.282 The Working Group recommended that:

(i) information on all devices should be combined and circulated to CCAMLR Members and other interested parties (paragraph 7.242);

(ii) every vessel fishing for krill should employ a device for excluding seals or facilitating their escape from the trawl net (paragraph 7.243);

(iii) observers should be required on krill trawl vessels to collect reliable data on seal entrapment and on the effectiveness of devices used to mitigate this (paragraph 7.236);

(iv) noting experiences on the *Top Ocean* this year (paragraphs 7.232 to 7.235), data forms should be completed accurately, consistently and comprehensively by all observers (paragraph 7.236);

(v) the UK be requested to submit their observer data to the Secretariat (paragraph 7.237).

Other

7.283 Ms Rivera and Mr Smith should be appointed a Co-conveners of WG-IMAF, following the retirements of Prof. Croxall and Mr Baker.

Table 7.1: Reported and observed incidental mortality of seabirds in the longline fisheries for *Dissostichus* spp. in Subareas 48.3, 58.6, 58.7, 88.1, 88.2 and Divisions 58.4.2 and 58.5.2 during the 2003/04 season. Sp – Spanish method; Auto – autoliner; N – night-time setting; D – daytime setting (including nautical dawn and dusk); O – opposite side to hauling; S – same side as hauling; * – information obtained from cruise report.

| Vessel | Dates of fishing | Method | Sets deployed | | | | No. of hooks (thousands) | | | No. of birds caught | | | | | | Observed seabird mortality (birds/thousand hooks) | | | Streamer line in use % | | Offal discharge during | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Dead | | Alive | | Total | | | | | | | | |
| | | | N | D | Total | %N | Obs. | Set | % observed | N | D | N | D | N | D | N | D | Total | N | D | Set (%) | Haul (%) |
| **Subarea 48.3** | | | | | | | | | | | | | | | | | | | | | | |
| *Globalpesca I* | 8/5–18/7/04 | Sp | 43 | 1 | 44 | 98 | 194.1 | 387.0 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | O (0) |
| *Isla Camila* | 1/5–30/6/04 | Sp | 115 | 1 | 116 | 99 | 147.7 | 524.3 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 100 | | O (1) |
| *Isla Santa Clara* | 1/5–23/7/04 | Sp | 175 | 2 | 177 | 99 | 285.2 | 1144.7 | 24 | 1 | 0 | 1 | 0 | 2 | 0 | 0.004 | 0 | 0.004 | 100 | 100 | | O (100) |
| *Isla Sofía* | 1/5–4/7/04 | Sp | 136 | 0 | 136 | 100 | 264.7 | 771.6 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | | | O (82) |
| *Polarpesca I* | 1/5–14/8/04 | Sp | 295 | 4 | 299 | 99 | 309.3 | 1412.7 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 99 | 100 | | O (98) |
| *Tierra del Fuego* | 3/5–14/8/04 | Sp | 178 | 0 | 178 | 100 | 254.0 | 1095.0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 98 | | | O (99) |
| *Ibsa Quinto* | 2/5–25/6/04 | Sp | 57 | 0 | 57 | 100 | 329.8 | 1308.1 | 25 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 96 | | | O (100) |
| *Viking Bay* | 1/5–13/7/04 | Sp | 145 | 0 | 145 | 100 | 204.9 | 789.9 | 25 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 100 | | | O (82) |
| *Argos Georgia* | 2/5–15/8/04 | Sp | 233 | 55 | 288 | 81 | 595.6 | 1227.6 | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 98 | | O (99) |
| *Argos Helena* | 2/5–16/8/04 | Auto | 352 | 0 | 352 | 100 | 461.0 | 1736.4 | 26 | 1 | 0 | 6 | 0 | 7 | 0 | 0.002 | 0 | 0.002 | 100 | | (<1) | O (3) |
| *Burdwood* | 5/5–17/8/04 | Sp | 194 | 0 | 194 | 100 | 423.2 | 1483.7 | 28 | 3 | 0 | 0 | 0 | 3 | 0 | 0.007 | 0 | 0.007 | 100* | | | O (3) |
| *Jacqueline* | 3/5–7/7/04 | Sp | 54 | 0 | 54 | 100 | 268.4 | 970.5 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 98 | | | O (98) |
| *No. 22 InSung* | 1/5–19/8/04 | Sp | 202 | 3 | 205 | 99 | 406.5 | 1890.1 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | O (99) |
| *Isla Alegranza* | 2/5–23/7/04 | Sp | 139 | 0 | 139 | 100 | 333.7 | 1302.4 | 25 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 98 | | | O (96) |
| *Paloma V* | 21/7–19/8/04 | Sp | 53 | 0 | 53 | 100 | 143.6 | 509.8 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | | | O (96) |
| *Koryo Maru No. 11* | 12/5–20/8/04 | Sp | 181 | 1 | 182 | 99 | 321.4 | 1723.5 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | O (86) |
| Total | | | | | | 98 | 4943.1 | 18277.3 | 28 | | | | | | | 0.001 | 0 | 0.001 | | | | |
| **Subarea 48.6** | | | | | | | | | | | | | | | | | | | | | | |
| *Shinsei Maru No. 3* | 7/3–21/3/04 | Sp | 12 | 17 | 29 | 41 | 40.4 | 173.8 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | O (0) |
| Total | | | | | | 41 | 40.4 | 173.8 | 23 | | | | | | | 0 | 0 | 0 | | | | |
| **Divisions 58.4.2, 58.4.3b** | | | | | | | | | | | | | | | | | | | | | | |
| *Eldfisk* | 30/11/03–24/1/04 | Auto | 0 | 70 | 70 | 0 | 125.0 | 319.7 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100 | | O (0) |
| Total | | | | | | 0 | 125.0 | 319.7 | 39 | | | | | | | 0 | 0 | 0 | | | | |
| **Division 58.5.2** | | | | | | | | | | | | | | | | | | | | | | |
| *Janas* | 30/4–24/6/04 | Auto | 141 | 0 | 141 | 100 | 291.0 | 881.6 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | | | O (0) |
| *Janas* | 20/7–10/9/04 | Auto | 133 | 3 | 136 | 98 | 244.9 | 716.7 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | O (0) |
| Total | | | | | | 99 | 535.9 | 1598.3 | 34 | | | | | | | 0 | 0 | 0 | | | | |
| **Subareas 58.6, 58.7, Area 51** | | | | | | | | | | | | | | | | | | | | | | |
| *Koryo Maru No. 11* | 19/2–30/3/04 | Sp | 50 | 23 | 73 | 68 | 263.8 | 700.8 | 37 | 0 | 1 | 10 | 1 | 10 | 2 | 0 | 0.012 | 0.004 | 100 | 100 | (6) | O (91) |
| *South Princess* | 19/5–7/7/04 | Auto | 231 | 7 | 238 | 97 | 175.4 | 637.6 | 27 | 10 | 0 | 0 | 0 | 10 | 0 | 0.058 | 0 | 0.057 | 100 | 100 | | S (0) |
| Total | | | | | | 90 | 439.2 | 1338.4 | 32 | | | | | | | 0.028 | 0.012 | 0.025 | | | | |

(continued)

Table 7.1 (continued)

| Vessel | Dates of fishing | Method | Sets deployed | | | | No. of hooks (thousands) | | | No. of birds caught | | | | | | Observed seabird mortality (birds/thousand hooks) | | | Streamer line in use % | | Offal discharge during | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | N | D | Total | %N | Obs. | Set | % observed | Dead | | Alive | | Total | | N | D | Total | N | D | Set (%) | Haul (%) |
| | | | | | | | | | | N | D | N | D | N | D | | | | | | | |
| **Subareas 88.1, 88.2** | | | | | | | | | | | | | | | | | | | | | | |
| *Antarctic II* | 7/2–4/3/04 | Auto | 11 | 69 | 80 | 14 | 141.9 | 275.5 | 51 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 93 | | (0) |
| *Antarctic III* | 1/1–3/3/04 | Auto | 8 | 174 | 182 | 4 | 510.6 | 550.7 | 92 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | (0) |
| *Arnela* | 29/12/03–3/3/04 | Sp | 0 | 119 | 119 | 0 | 331.4 | 923.8 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 98 | (4)* | O (24) |
| *Argos Helena* | 21/2–7/3/04 | Auto | 0 | 36 | 36 | 0 | 73.2 | 154.4 | 47 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100 | | (0) |
| *No. 707 Bonanza* | 10/1–3/3/04 | Sp | 2 | 83 | 85 | 2 | 791.8 | 795.8 | 99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 98 | | (0) |
| *No. 829 Yeon Seong* | 30/1–3/3/04 | Sp | 8 | 38 | 46 | 17 | 399.6 | 506.3 | 78 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | (0) |
| *Gudni Olafsson* | 27/12/03–10/2/04 | Auto | 0 | 76 | 76 | 0 | 221.4 | 509.0 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100 | | (0) |
| *San Aotea II* | 12/12/03–21/2/04 | Auto | 0 | 134 | 134 | 0 | 241.1 | 641.2 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100 | | (0) |
| *Volna* | 15/12/03–9/3/04 | Sp | 1 | 104 | 105 | 1 | 332.8 | 802.4 | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | (0) |
| *Yantar* | 15/12/03–9/3/04 | Sp | 1 | 116 | 117 | 1 | 928.8 | 994.7 | 93 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | (0) |
| *Mellas* | 2/1–3/3/04 | Sp | 20 | 72 | 92 | 22 | 445.0 | 490.3 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | (0) |
| *Simeiz* | 15/12/03–7/3/04 | Sp | 4 | 106 | 110 | 4 | 802.9 | 862.4 | 93 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | (0) |
| *Sonrisa* | 10/2–4/3/04 | Auto | 0 | 10 | 10 | 0 | 55.6 | 62.6 | 88 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100 | | (0) |
| *Piscis* | 12/1–7/3/04 | Sp | 16 | 82 | 98 | 16 | 646.3 | 781.4 | 82 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0.002 | 0.002 | 100 | 100 | | (0) |
| *Punta Ballena* | 11/1–3/3/04 | Auto | 3 | 68 | 71 | 4 | 134.0 | 438.9 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 67 | 94 | | (0) |
| *America I* | 12/12/03–5/3/04 | Sp | 7 | 101 | 108 | 6 | 368.0 | 627.3 | 58 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 100 | 94 | | (0) |
| *American Warrior* | 8/1–3/3/04 | Auto | 0 | 118 | 118 | 0 | 232.0 | 689.0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100 | | (0) |
| *South Princess* | 15/12/03–4/3/04 | Auto | 1 | 199 | 200 | 1 | 313.6 | 755.2 | 41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 99 | | (0) |
| *Frøyanes* | 23/1–4/3/04 | Auto | 3 | 128 | 131 | 2 | 319.5 | 609.5 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | (0) |
| *Avro Chieftain* | 1/12/03–19/3/04 | Auto | 19 | 165 | 184 | 10 | 495.3 | 977.4 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | (0) |
| *Janas* | 12/12/03–24/2/04 | Auto | 0 | 118 | 118 | 0 | 321.9 | 648.8 | 49 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100 | | (0) |
| *San Liberatore* | 1/2–6/3/04 | Auto | 1 | 113 | 114 | 1 | 261.5 | 505.4 | 51 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | | (0) |
| Total | | | | | | 5 | 8368.2 | 13602.0 | 61 | | | | | | | 0 | <0.001 | <0.001 | | | | |

Table 7.2: Estimated total seabird mortality for those vessels where seabird mortalities were observed in Subareas 48.3, 58.6, 58.7, 88.1 and 88.2 during the 2003/04 season.

| Vessel | Hooks observed (thousands) | Hooks set (thousands) | Percentage of hooks observed | % Night sets | Estimated number of birds caught dead | | |
|---|---|---|---|---|---|---|---|
| | | | | | Night | Day | Total |
| Subarea 48.3 | | | | | | | |
| *Isla Santa Clara* | 285.2 | 1144.7 | 24 | 99 | 5 | 0 | 5 |
| *Argos Helena* | 461 | 1736.4 | 26 | 100 | 3 | 0 | 3 |
| *Burdwood* | 423.2 | 1483.7 | 28 | 100 | 10 | 0 | 10 |
| Subtotal | | | | | 18 | 0 | 18 |
| Subareas 58.6, 58.7 | | | | | | | |
| *Koryo Maru No. 11* | 263.8 | 700.8 | 37 | 68 | 0 | 3 | 3 |
| *South Princess* | 175.4 | 637.6 | 27 | 97 | 36 | 0 | 36 |
| Subtotal | | | | | 36 | 3 | 39 |
| Subareas 88.1, 88.2 | | | | | | | |
| *Piscis* | 646.3 | 781.4 | 82 | 16 | 0 | 1 | 1 |
| Subtotal | | | | | 0 | 1 | 1 |
| Total | | | | | 54 | 4 | 58 |

Table 7.3: Total estimated seabird by-catch and by-catch rate (birds/thousand hooks) in longline fisheries in Subareas 48.3, 58.6, 58.7, 88.1 and 88.2 from 1997 to 2004.

| Subarea | Year | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| Subarea 48.3 | | | | | | | | |
| Estimated by-catch | 5 755 | 640 | 210* | 21 | 30 | 27 | 8 | 18 |
| By-catch rate | 0.23 | 0.032 | 0.013* | 0.002 | 0.002 | 0.0015 | 0.0003 | 0.001 |
| Subareas 58.6, 58.7 | | | | | | | | |
| Estimated by-catch | 834 | 528 | 156 | 516 | 199 | 0 | 7 | 39 |
| By-catch rate | 0.52 | 0.194 | 0.034 | 0.046 | 0.018 | 0 | 0.003 | 0.025 |
| Subareas 88.1, 88.2 | | | | | | | | |
| Estimated by-catch | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| By-catch rate | - | 0 | 0 | 0 | 0 | 0 | 0 | 0.0001 |

* Excluding *Argos Helena* line-weighting experiment cruise.

Table 7.4: Species composition of birds killed in longline fisheries in Subareas 48.3, 58.6, 58.7, 88.1 and 88.2 during the 2003/04 season. N – night setting; D – daylight setting (including nautical dawn and dusk); DIC – grey-headed albatross; DIM – black-browed albatross; MAH – northern giant petrel; MAI – southern giant petrel; PRO – white-chinned petrel; PRX – petrels unidentified; () – % composition.

| Vessel | Dates of fishing | No. birds killed by group | | | | | | Species composition (%) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Albatrosses | | Petrels | | Total | | DIC | DIM | MAH | MAI | PRO |
| | | N | D | N | D | N | D | | | | | |
| Subarea 48.3 | | | | | | | | | | | | |
| *Isla Santa Clara* | 1/5–23/7/04 | 1 | 0 | 0 | 0 | 1 | 0 | | 1 (100) | | | |
| *Argos Helena* | 2/5–16/8/04 | 1 | 0 | 0 | 0 | 1 | 0 | 1 (100) | | | | |
| *Burdwood* | 5/5–17/8/04 | 0 | 0 | 3 | 0 | 3 | 0 | | | | 3 (100) | |
| Subareas 58.6, 58.7 | | | | | | | | | | | | |
| *Koryo Maru No. 11* | 19/2–30/3/04 | 0 | 0 | 0 | 1 | 0 | 1 | | | | | 1 (100) |
| *South Princess* | 19/5–7/7/04 | 0 | 0 | 10 | 0 | 10 | 0 | | | 4 (40) | 6 (60) | |
| Subareas 88.1, 88.2 | | | | | | | | | | | | |
| *Piscis* | 12/1–7/3/04 | 0 | 0 | 0 | 1 | 0 | 1 | | | | 1 (100) | |
| Total (%) | | 2 | 0 | 13 | 2 | 15 | 2 | 1 (6) | 1 (6) | 4 (23) | 10 (59) | 1 (6) |

Table 7.5: Reported and observed incidental mortality of seabirds in the longline fisheries for *Dissostichus* spp. in Subarea 58.6 and Division 58.5.1 during the 2001/02 season (September to August). Sp – Spanish method; Auto – autoliner; N – night-time setting; D – daytime setting (including dawn and dusk); NC – not collected.

| Vessel | Dates of fishing | Method | Sets deployed | | | | No. of hooks (thousands) | | | Hooks baited (%) | No. of birds caught | | | | | | Observed* seabird mortality (birds/1 000 hooks) | | | Streamer line in use % | | Offal discharge during haul (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | N | D | Total | %N | Obs. | Set | % Observed | | Dead | | Alive | | Total | | | | | | | |
| | | | | | | | | | | | N | D | N | D | N | D | N | D | Total | N | D | |
| **Subarea 58.6** | | | | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 3/7–24/7/02 | Auto | 42 | 0 | 42 | 100 | NC | 495.0 | NC | NC | 2 | 0 | NC | 0 | 2 | 0 | 0.004 | 0 | 0.004 | 100 | 0 | (0) |
| *Ship 2* | 15/4–14/5/02 | Auto | 108 | 0 | 108 | 100 | NC | 502.0 | NC | NC | 77 | 0 | NC | 0 | 77 | 0 | 0.153 | 0 | 0.153 | 100 | 0 | (0) |
| *Ship 3* | 11/9–26/9/01 | Auto | 36 | 0 | 36 | 100 | NC | 347.3 | NC | NC | 1 | 0 | NC | 0 | 1 | 0 | 0.003 | 0 | 0.003 | 100 | 0 | (0) |
| *Ship 3* | 20/3–18/5/02 | Auto | 119 | 0 | 119 | 100 | NC | 1 348.2 | NC | NC | 152 | 0 | NC | 0 | 152 | 0 | 0.113 | 0 | 0.113 | 100 | 0 | (0) |
| *Ship 5* | 4/10–18/10/01 | Auto | 27 | 0 | 27 | 100 | NC | 318.1 | NC | NC | 34 | 0 | NC | 0 | 34 | 0 | 0.107 | 0 | 0.107 | 100 | 0 | (0) |
| *Ship 5* | 6/5–26/6/02 | Auto | 131 | 0 | 131 | 100 | NC | 1 155.2 | NC | NC | 60 | 0 | NC | 0 | 60 | 0 | 0.052 | 0 | 0.052 | 100 | 0 | (0) |
| *Ship 7* | 29/11–2/12/01 | Auto | 5 | 0 | 5 | 100 | NC | 50.0 | NC | NC | 11 | 0 | NC | 0 | 11 | 0 | 0.220 | 0 | 0.220 | 100 | 0 | (0) |
| *Ship 7* | 11/3–27/3/02 | Auto | 29 | 0 | 29 | 100 | NC | 308.0 | NC | NC | 388 | 0 | NC | 0 | 388 | 0 | 1.260 | 0 | 1.260 | 100 | 0 | (0) |
| *Ship 7* | 21/6–14/7/02 | Auto | 54 | 0 | 54 | 100 | NC | 512.0 | NC | NC | 6 | 0 | NC | 0 | 6 | 0 | 0.012 | 0 | 0.012 | 100 | 0 | (0) |
| *Ship 8* | 24/1–29/3/02 | Auto | 207 | 0 | 207 | 100 | NC | 1 206.0 | NC | NC | 314 | 0 | NC | 0 | 314 | 0 | 0.260 | 0 | 0.260 | 100 | 0 | (0) |
| *Ship 9* | 25/9–30/9/01 | Sp | 5 | 0 | 5 | 100 | NC | 61.3 | NC | NC | 0 | 0 | NC | 0 | 0 | 0 | 0.000 | 0 | 0.000 | 100 | 0 | (0) |
| *Ship 9* | 7/12–25/12/01 | Sp | 18 | 0 | 18 | 100 | NC | 252.0 | NC | NC | 11 | 0 | NC | 0 | 11 | 0 | 0.044 | 0 | 0.044 | 100 | 0 | (0) |
| *Ship 9* | 22/2–19/3/02 | Sp | 28 | 0 | 28 | 100 | NC | 336.0 | NC | NC | 186 | 0 | NC | 0 | 186 | 0 | 0.554 | 0 | 0.554 | 100 | 0 | (0) |
| *Ship 9* | 14/5–18/5/02 | Sp | 6 | 0 | 6 | 100 | NC | 50.4 | NC | NC | 0 | 0 | NC | 0 | 0 | 0 | 0.000 | 0 | 0.000 | 100 | 0 | (0) |
| *Ship 9* | 1/6–15/7/02 | Sp | 60 | 0 | 60 | 100 | NC | 491.4 | NC | NC | 1 | 0 | NC | 0 | 1 | 0 | 0.002 | 0 | 0.002 | 100 | 0 | (0) |
| Total | | | | | | 100 | NC | 7 432.8 | NC | | 1 243 | 0 | NC | 0 | 1 243 | | 0.167 | 0 | 0.167 | | | |
| **Division 58.5.1** | | | | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 18/3–26/5/02 | Auto | 132 | 0 | 132 | 100 | NC | 1 575.5 | NC | NC | 1 318 | 0 | NC | 0 | 1 318 | 0 | 0.837 | 0 | 0.837 | 100 | 0 | (0) |
| *Ship 2* | 17/5–8/6/02 | Auto | 61 | 0 | 61 | 100 | NC | 423.8 | NC | NC | 106 | 0 | NC | 0 | 106 | 0 | 0.250 | 0 | 0.250 | 100 | 0 | (0) |
| *Ship 2* | 28/6–28/7/02 | Auto | 80 | 0 | 80 | 100 | NC | 603.5 | NC | NC | 91 | 0 | NC | 0 | 91 | 0 | 0.151 | 0 | 0.151 | 100 | 0 | (0) |
| *Ship 3* | 30/9–3/11/01 | Auto | 74 | 0 | 74 | 100 | NC | 795.9 | NC | NC | 1 213 | 0 | NC | 0 | 1 213 | 0 | 1.524 | 0 | 1.524 | 100 | 0 | (0) |
| *Ship 3* | 14/12/01–14/1/02 | Auto | 56 | 0 | 56 | 100 | NC | 764.4 | NC | NC | 28 | 0 | NC | 0 | 28 | 0 | 0.037 | 0 | 0.037 | 100 | 0 | (0) |
| *Ship 5* | 21/10–6/12/01 | Auto | 116 | 0 | 116 | 100 | NC | 1 079.0 | NC | NC | 447 | 0 | NC | 0 | 447 | 0 | 0.414 | 0 | 0.414 | 100 | 0 | (0) |
| *Ship 5* | 25/4/01–2/5/02 | Auto | 19 | 0 | 19 | 100 | NC | 173.9 | NC | NC | 13 | 0 | NC | 0 | 13 | 0 | 0.075 | 0 | 0.075 | 100 | 0 | (0) |
| *Ship 5* | 11/1–18/3/02 | Auto | 151 | 0 | 151 | 100 | NC | 1 501.7 | NC | NC | 4 811 | 0 | NC | 0 | 4 811 | 0 | 3.204 | 0 | 3.204 | 100 | 0 | (0) |
| *Ship 7* | 4/12/01–31/1/02 | Auto | 81 | 0 | 81 | 100 | NC | 1 059.0 | NC | NC | 1 292 | 0 | NC | 0 | 1 292 | 0 | 1.220 | 0 | 1.220 | 100 | 0 | (0) |
| *Ship 7* | 1/4–15/5/02 | Auto | 93 | 0 | 93 | 100 | NC | 688.0 | NC | NC | 966 | 0 | NC | 0 | 966 | 0 | 1.404 | 0 | 1.404 | 100 | 0 | (0) |
| *Ship 8* | 22/9–27/11/01 | Auto | 237 | 0 | 237 | 100 | NC | 1 331.4 | NC | NC | 338 | 0 | NC | 0 | 338 | 0 | 0.254 | 0 | 0.254 | 100 | 0 | (0) |
| *Ship 8* | 16/5–17/6/02 | Auto | 112 | 0 | 112 | 100 | NC | 662.4 | NC | NC | 93 | 0 | NC | 0 | 93 | 0 | 0.140 | 0 | 0.140 | 100 | 0 | (0) |
| *Ship 9* | 2/10–17/11/01 | Sp | 46 | 0 | 46 | 100 | NC | 535.5 | NC | NC | 62 | 0 | NC | 0 | 62 | 0 | 0.116 | 0 | 0.116 | 100 | 0 | (0) |
| *Ship 9* | 24/3–22/4/02 | Sp | 41 | 0 | 41 | 100 | NC | 360.5 | NC | NC | 36 | 0 | NC | 0 | 36 | 0 | 0.100 | 0 | 0.100 | 100 | 0 | (0) |
| Total | | | | | | 100 | NC | 11 554.3 | NC | | 10 814 | 0 | NC | 0 | 10 814 | | 0.936 | 0 | 0.936 | | | |

* The number of observed hooks has not been collected and the rates given are from the total number of hooks set.

Table 7.6: Species composition of birds killed in longline fisheries in Subarea 58.6 and Division 58.5.1 during the 2001/02 season (September to August). PRO – white-chinned petrel; MXB – giant petrel; PCI – grey petrel; DAC – cape petrel; PTZ – unidentified petrel; DIC – grey-headed albatross; DIM – black-browed albatross; ALZ – unidentified albatross; EUC – macaroni penguin; EDJ – king penguin; PYP – gentoo penguin; UNK – unknown; () – % composition.

| Vessel | Dates of fishing | No. birds killed by group | | | | | | | | Species composition (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Petrels | | Albatrosses | | Penguins | | Total | | PRO | MXB | PCI | DAC | PTZ | DIC | DIM | ALZ | EUC | EDJ | PYP | UNK |
| | | N | D | N | D | N | D | N | D | | | | | | | | | | | | |
| **Subarea 58.6** | | | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 3/7–24/07/02 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | | | 2 (100) | | | | | | | | | |
| *Ship 2* | 15/4–14/05/02 | 59 | 0 | 18 | 0 | 0 | 0 | 77 | 0 | 33(42.9) | 20 (26.0) | 6 (7.8) | | | 17 (22.1) | | | | | | 1 (1.3) |
| *Ship 3* | 11/9–26/09/01 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 (100) | | | | | | | | | | | |
| *Ship 3* | 20/3–18/05/02 | 152 | 0 | 0 | 0 | 0 | 0 | 152 | 0 | 152 (100) | | | | | | | | | | | |
| *Ship 5* | 4/10–18/10/01 | 34 | 0 | 0 | 0 | 0 | 0 | 34 | 0 | 34 (100) | | | | | | | | | | | |
| *Ship 5* | 6/5–26/06/02 | 56 | 0 | 0 | 0 | 0 | 0 | 60 | 0 | | 38 (63.3) | 16 (26.7) | | 2 (3.3) | | | | | | | 4 (6.7) |
| *Ship 7* | 29/11–02/12/01 | 11 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 3(27.3) | 8 (72.7) | | | | | | | | | | |
| *Ship 7* | 11/3–27/03/02 | 388 | 0 | 0 | 0 | 0 | 0 | 388 | 0 | 388 (100) | | | | | | | | | | | |
| *Ship 7* | 21/6–14/07/02 | 6 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | | 1 (16.7) | 4 (66.7) | 1 (16.7) | | | | | | | | |
| *Ship 8* | 24/1–29/03/02 | 312 | 0 | 2 | 0 | 0 | 0 | 314 | 0 | 312(99.4) | | | | | | | 2 (0.6) | | | | |
| *Ship 9* | 25/9–30/09/01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| *Ship 9* | 7/12–25/12/01 | 11 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 11 (100) | | | | | | | | | | | |
| *Ship 9* | 22/2–19/03/02 | 179 | 0 | 5 | 0 | 2 | 0 | 186 | 0 | 179(96.2) | | | | | 4 (2.2) | 1 (0.5) | | | 1 (0.5) | 1 (0.5) | |
| *Ship 9* | 14/5–18/05/02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| *Ship 9* | 1/6–15/07/02 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | | | 1 (100) | | | | | | | | | |
| **Division 58.5.1** | | | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 18/3–26/05/02 | 1304 | 0 | 14 | 0 | 0 | 0 | 1318 | 0 | 1271(96.4) | | 33 (2.5) | | | 14 (1.1) | | | | | | |
| *Ship 2* | 17/5–08/06/02 | 106 | 0 | 0 | 0 | 0 | 0 | 106 | 0 | | 5 (4.7) | 101(95.3) | | | | | | | | | |
| *Ship 2* | 28/6–28/07/02 | 91 | 0 | 0 | 0 | 0 | 0 | 91 | 0 | | 12 (13.2) | 79 (86.8) | | | | | | | | | |
| *Ship 3* | 30/9–03/11/01 | 1213 | 0 | 0 | 0 | 0 | 0 | 1213 | 0 | 1212(99.9) | | 1 (0.1) | | | | | | | | | |
| *Ship 3* | 14/12/01–14/01/02 | 28 | 0 | 0 | 0 | 0 | 0 | 28 | 0 | 28 (100) | | | | | | | | | | | |
| *Ship 5* | 21/10–06/12/01 | 447 | 0 | 0 | 0 | 0 | 0 | 447 | 0 | 447 (100) | | | | | | | | | | | |
| *Ship 5* | 25/4/01–02/05/02 | 12 | 0 | 1 | 0 | 0 | 0 | 13 | 0 | | | 11 (84.6) | | 1 (7.7) | | | 1 (7.7) | | | | |
| *Ship 5* | 11/1–18/03/02 | 4797 | 0 | 14 | 0 | 0 | 0 | 4811 | 0 | 4790(99.6) | 1 (0.02) | 5 (0.1) | 1 (0.02) | | 1 (0.02) | 13 (0.3) | | | | | |
| *Ship 7* | 4/12/01–31/01/02 | 1286 | 0 | 4 | 0 | 1 | 0 | 1292 | 0 | 1286(99.5) | | | | | | 4 (0.3) | | 1 (0.1) | | | 1 (0.1) |
| *Ship 7* | 1/4–15/05/02 | 965 | 0 | 1 | 0 | 0 | 0 | 966 | 0 | 949(98.2) | 3 (0.3) | 13 (1.3) | | | | | 1 (0.1) | | | | |
| *Ship 8* | 22/9–27/11/01 | 338 | 0 | 0 | 0 | 0 | 0 | 338 | 0 | | | 338 (100) | | | | | | | | | |
| *Ship 8* | 16/5–17/06/02 | 92 | 0 | 0 | 0 | 0 | 0 | 93 | 0 | 8 (8.6) | | 84 (90.3) | | | | | | | | | 1 (1.1) |
| *Ship 9* | 2/10–17/11/01 | 62 | 0 | 0 | 0 | 0 | 0 | 62 | 0 | 62 (100) | | | | | | | | | | | |
| *Ship 9* | 24/3–22/04/02 | 36 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 36 (100) | | | | | | | | | | | |
| Total (%) | | 11989 | 0 | 59 | 0 | 3 | 0 | 12057 | 0 | 11202 (92.9) | 88 (0.7) | 694 (5.8) | 2 (0.02) | 3 (0.02) | 36 (0.3) | 18 (0.15) | 4 (0.3) | 1 (0.01) | 1 (0.01) | 1 (0.01) | 7 (0.06) |

Table 7.7: Reported and observed incidental mortality of seabirds in the longline fisheries for *Dissostichus* spp. in Subarea 58.6 and Division 58.5.1 during the 2002/03 season (September to August). Sp – Spanish method; Auto – autoliner; N – night-time setting; D – daytime setting (including dawn and dusk); NC – not collected.

| Vessel | Dates of fishing | Method | Sets deployed | | | | No. of hooks (thousands) | | | Hooks baited* (%) | No. of birds caught | | | | | | Observed † seabird mortality (birds/1 000 hooks) | | | Streamer line in use % | | Offal discharge during haul (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Dead | | Alive | | Total | | | | | | | |
| | | | N | D | Total | %N | Obs. | Set | % Observed | | N | D | N | D | N | D | N | D | Total | N | D | |
| **Subarea 58.6** | | | | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 25/9–10/12/02 | Auto | 145 | 0 | 145 | 100 | NC | 1553.4 | NC | - | 231 | 0 | NC | 0 | 231 | 0 | 0.149 | 0 | 0.149 | 100 | 0 | (0) |
| *Ship 2* | 9/9–3/10/02 | Auto | 82 | 0 | 82 | 100 | NC | 412.5 | NC | - | 36 | 0 | NC | 0 | 36 | 0 | 0.087 | 0 | 0.087 | 100 | 0 | (0) |
| *Ship 2* | 13/1–3/2/03 | Auto | 67 | 0 | 67 | 100 | NC | 424.1 | NC | - | 95 | 0 | NC | 0 | 95 | 0 | 0.224 | 0 | 0.224 | 100 | 0 | (0) |
| *Ship 2* | 26/2–10/3/03 | Auto | 45 | 0 | 45 | 100 | NC | 315.0 | NC | - | 158 | 0 | NC | 0 | 158 | 0 | 0.502 | 0 | 0.502 | 100 | 0 | (0) |
| *Ship 2* | 14/7–30/7/03 | Auto | 43 | 0 | 43 | 100 | NC | 323.8 | NC | 90.00 | 1 | 0 | NC | 0 | 1 | 0 | 0.003 | 0 | 0.003 | 100 | 0 | (0) |
| *Ship 3* | 5/12/02–10/2/03 | Auto | 127 | 0 | 127 | 100 | NC | 1454.8 | NC | - | 73 | 0 | NC | 0 | 73 | 0 | 0.050 | 0 | 0.050 | 100 | 0 | (0) |
| *Ship 5* | 13/4–30/5/03 | Auto | 103 | 0 | 103 | 100 | NC | 1027.8 | NC | - | 44 | 0 | NC | 0 | 44 | 0 | 0.043 | 0 | 0.043 | 100 | 0 | (0) |
| *Ship 6* | 13/12/02–3/1/03 | Auto | 50 | 0 | 50 | 100 | NC | 292.4 | NC | - | 53 | 0 | NC | 0 | 53 | 0 | 0.181 | 0 | 0.181 | 100 | 0 | (0) |
| *Ship 7* | 3/4–13/5/03 | Auto | 86 | 0 | 86 | 100 | NC | 789.3 | NC | 90.25 | 29 | 0 | NC | 0 | 29 | 0 | 0.037 | 0 | 0.037 | 100 | 0 | (0) |
| Total | | | | | | 100 | NC | 6593.0 | NC | | 720 | 0 | NC | 0 | 720 | 0 | 0.109 | 0 | 0.109 | | | |
| **Division 58.5.1** | | | | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 13/1–29/03/03 | Auto | 160 | 0 | 160 | 100 | NC | 2250.0 | NC | 85.01 | 2 028 | 0 | NC | 0 | 2 028 | 0 | 0.901 | 0 | 0.901 | 100 | 0 | (0) |
| *Ship 1* | 7/5–17/07/03 | Auto | 191 | 0 | 191 | 100 | NC | 1792.8 | NC | 86.20 | 274 | 0 | NC | 0 | 274 | 0 | 0.153 | 0 | 0.153 | 100 | 0 | (0) |
| *Ship 2* | 6/10–06/11/02 | Auto | 101 | 0 | 101 | 100 | NC | 730.8 | NC | - | 1 366 | 0 | NC | 0 | 1 366 | 0 | 1.869 | 0 | 1.869 | 100 | 0 | (0) |
| *Ship 2* | 25/11/02–09/01/03 | Auto | 126 | 0 | 126 | 100 | NC | 1077.4 | NC | - | 98 | 0 | NC | 0 | 98 | 0 | 0.091 | 0 | 0.091 | 100 | 0 | (0) |
| *Ship 2* | 13/3–06/05/03 | Auto | 153 | 0 | 153 | 100 | NC | 1300.5 | NC | - | 357 | 0 | NC | 0 | 357 | 0 | 0.275 | 0 | 0.275 | 100 | 0 | (0) |
| *Ship 2* | 28/5–11/07/03 | Auto | 120 | 0 | 120 | 100 | NC | 1073.8 | NC | 90.00 | 23 | 0 | NC | 0 | 23 | 0 | 0.021 | 0 | 0.021 | 100 | 0 | (0) |
| *Ship 3* | 1/9/02–30/10/03 | Auto | 129 | 0 | 129 | 100 | NC | 1356.6 | NC | - | 145 | 0 | NC | 0 | 145 | 0 | 0.107 | 0 | 0.107 | 100 | 0 | (0) |
| *Ship 3* | 19/3–18/06/03 | Auto | 200 | 0 | 200 | 100 | NC | 2090.5 | NC | - | 1 391 | 0 | NC | 0 | 1 391 | 0 | 0.665 | 0 | 0.665 | 100 | 0 | (0) |
| *Ship 4* | 19/10/02–11/01/03 | Sp | 123 | 0 | 123 | 100 | NC | 768.4 | NC | - | 107 | 0 | NC | 0 | 107 | 0 | 0.139 | 0 | 0.139 | 100 | 0 | (0) |
| *Ship 4* | 15/2–04/05/03 | Sp | 138 | 0 | 138 | 100 | NC | 999.1 | NC | - | 307 | 0 | NC | 0 | 307 | 0 | 0.307 | 0 | 0.307 | 100 | 0 | (0) |
| *Ship 4* | 4/6–30/08/03 | Sp | 202 | 0 | 202 | 100 | NC | 1101.1 | NC | - | 27 | 0 | NC | 0 | 27 | 0 | 0.025 | 0 | 0.025 | 100 | 0 | (0) |
| *Ship 5* | 10/9–13/11/02 | Auto | 141 | 0 | 141 | 100 | NC | 1386.0 | NC | - | 710 | 0 | NC | 0 | 710 | 0 | 0.512 | 0 | 0.512 | 100 | 0 | (0) |
| *Ship 5* | 19/12/02–04/03/03 | Auto | 167 | 0 | 167 | 100 | NC | 1854.0 | NC | - | 285 | 0 | NC | 0 | 285 | 0 | 0.154 | 0 | 0.154 | 100 | 0 | (0) |
| *Ship 5* | 1/6–07/07/03 | Auto | 75 | 0 | 75 | 100 | NC | 832.5 | NC | - | 131 | 0 | NC | 0 | 131 | 0 | 0.157 | 0 | 0.157 | 100 | 0 | (0) |
| *Ship 6* | 1/9–10/11/02 | Auto | 190 | 0 | 190 | 100 | NC | 1094.2 | NC | - | 1 469 | 0 | NC | 0 | 1 469 | 0 | 1.343 | 0 | 1.343 | 100 | 0 | (0) |
| *Ship 6* | 5/1–20/02/03 | Auto | 113 | 0 | 113 | 100 | NC | 818.2 | NC | - | 2 079 | 0 | NC | 0 | 2 079 | 0 | 2.541 | 0 | 2.541 | 100 | 0 | (0) |
| *Ship 6* | 2/4–14/06/03 | Auto | 214 | 0 | 214 | 100 | NC | 1453.1 | NC | - | 174 | 0 | NC | 0 | 174 | 0 | 0.120 | 0 | 0.120 | 100 | 0 | (0) |
| *Ship 6* | 26/7–30/08/03 | Auto | 77 | 0 | 77 | 100 | NC | 607.2 | NC | - | 120 | 0 | NC | 0 | 120 | 0 | 0.198 | 0 | 0.198 | 100 | 0 | (0) |
| *Ship 7* | 4/9–07/11/02 | Auto | 124 | 0 | 124 | 100 | NC | 1289.7 | NC | 91.60 | 859 | 0 | NC | 0 | 859 | 0 | 0.666 | 0 | 0.666 | 100 | 0 | (0) |
| *Ship 7* | 15/12/02–23/02/03 | Auto | 159 | 0 | 159 | 100 | NC | 1642.5 | NC | - | 1 909 | 0 | NC | 0 | 1 909 | 0 | 1.162 | 0 | 1.162 | 100 | 0 | (0) |
| *Ship 7* | 16/5–23/06/03 | Auto | 76 | 0 | 76 | 100 | NC | 854.1 | NC | 89.41 | 10 | 0 | NC | 0 | 10 | 0 | 0.012 | 0 | 0.012 | 100 | 0 | (0) |
| *Ship 7* | 9/8–02/09/03 | Auto | 55 | 0 | 55 | 100 | NC | 512.1 | NC | - | 57 | 0 | NC | 0 | 57 | 0 | 0.111 | 0 | 0.111 | 100 | 0 | (0) |
| Total | | | | | | 100 | NC | 26884.4 | NC | | 13 926 | 0 | NC | 0 | 13 926 | 0 | 0.518 | 0 | 0.518 | | | |

* Data from a sample of hooks.

† The number of observed hooks has not been collected and the rates given are from the total number of hooks set.

Table 7.8: Species composition of birds killed in longline fisheries in Subarea 58.6 and Division 58.5.1 during the 2002/03 season (September to August). PRO – white-chinned petrel; MXB – giant petrel; PCI – grey petrel; DAC – cape petrel; PTZ – unidentified petrel; DIC – grey-headed albatross; DIM – black-browed albatross; EUC – macaroni penguin; PVF – unidentified penguin; UNK – unknown; () – % composition.

| Vessel | Dates of fishing | No. of birds killed by group | | | | | | | | Species composition (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Albatrosses | | Petrels | | Penguins | | Total | | PRO | MXB | PCI | DAC | PTZ | DIC | DIM | EUC | PVF | UNK |
| | | N | D | N | D | N | D | N | D | | | | | | | | | | |
| **Subarea 58.6** | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 25/9–10/12/02 | 0 | 0 | 231 | 0 | 0 | 0 | 231 | 0 | 227 (98.3) | 4 (1.7) | | | | | | | | |
| *Ship 2* | 9/9–3/10/02 | 0 | 0 | 31 | 0 | 0 | 0 | 36 | 0 | 19 (52.8) | 3 (8.3) | 9 (25.0) | | | | | | | 5 (13.9) |
| *Ship 2* | 13/1–3/2/03 | 1 | 0 | 93 | 0 | 1 | 0 | 95 | 0 | 93 (97.9) | | | | | | 1 (1.1) | | 1 (1.1) | |
| *Ship 2* | 26/2–10/3/03 | 2 | 0 | 156 | 0 | 0 | 0 | 158 | 0 | 156 (98.7) | | | | | | 2 (1.3) | | | |
| *Ship 2* | 14/7–30/7/03 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | | | 1 (100) | | | | | | | |
| *Ship 3* | 5/12/02–10/2/03 | 0 | 0 | 71 | 0 | 1 | 0 | 73 | 0 | 70 (95.9) | 1 (1.4) | | | | | | 1 (1.4) | | 1 (1.4) |
| *Ship 5* | 13/4–30/5/03 | 0 | 0 | 44 | 0 | 0 | 0 | 44 | 0 | 25 (56.8) | 8 (18.2) | 11 (25.0) | | | | | | | |
| *Ship 6* | 13/12/02–3/1/03 | 9 | 0 | 44 | 0 | 0 | 0 | 53 | 0 | 19 (35.8) | 25 (47.2) | | | | | 9(17.0) | | | |
| *Ship 7* | 3/4–13/5/03 | 0 | 0 | 29 | 0 | 0 | 0 | 29 | 0 | 29 (100) | | | | | | | | | |
| **Division 58.5.1** | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 13/1–29/3/03 | 0 | 0 | 2028 | 0 | 0 | 0 | 2028 | 0 | 2028 (100) | | | | | | | | | |
| *Ship 1* | 7/5–17/7/03 | 0 | 0 | 274 | 0 | 0 | 0 | 274 | 0 | 1 (0.4) | | 273 (99.6) | | | | | | | |
| *Ship 2* | 6/10–6/11/02 | 3 | 0 | 1363 | 0 | 0 | 0 | 1366 | 0 | 1363 (99.8) | | | | | 1 (0.1) | 2 (0.1) | | | |
| *Ship 2* | 25/11/02–9/1/03 | 4 | 0 | 93 | 0 | 0 | 0 | 98 | 0 | 93 (94.9) | | | | | | 4 (4.1) | | | 1 (1.0) |
| *Ship 2* | 13/3–6/5/03 | 2 | 0 | 355 | 0 | 0 | 0 | 357 | 0 | 350 (98.0) | 1 (0.3) | 4 (1.1) | | | 1 (0.3) | 1 (0.3) | | | |
| *Ship 2* | 28/5–11/7/03 | 0 | 0 | 23 | 0 | 0 | 0 | 23 | 0 | 22 (95.7) | | | 1 (4.3) | | | | | | |
| *Ship 3* | 1/9/02–30/10/03 | 0 | 0 | 145 | 0 | 0 | 0 | 145 | 0 | 144 (99.3) | | 1 (0.7) | | | | | | | |
| *Ship 3* | 19/3–18/6/03 | 12 | 0 | 1379 | 0 | 0 | 0 | 1391 | 0 | 1176 (84.5) | 1 (0.1) | 200 (14.4) | 2 (0.1) | | 5 (0.4) | 7 (0.5) | | | |
| *Ship 4* | 19/10/02–11/1/03 | 0 | 0 | 107 | 0 | 0 | 0 | 107 | 0 | 107 (100) | | | | | | | | | |
| *Ship 4* | 15/2–4/5/03 | 0 | 0 | 307 | 0 | 0 | 0 | 307 | 0 | 299 (97.4) | | 8 (2.6) | | | | | | | |
| *Ship 4* | 4/6–30/8/03 | 0 | 0 | 27 | 0 | 0 | 0 | 27 | 0 | | | 27 (100) | | | | | | | |
| *Ship 5* | 10/9–13/11/02 | 0 | 0 | 710 | 0 | 0 | 0 | 710 | 0 | 704 (99.2) | | 6 (0.8) | | | | | | | |
| *Ship 5* | 19/12/02–4/3/03 | 0 | 0 | 284 | 0 | 0 | 0 | 285 | 0 | 284 (99.6) | | | | | | | | | 1 (0.4) |
| *Ship 5* | 1/6–7/7/03 | 0 | 0 | 131 | 0 | 0 | 0 | 131 | 0 | | | 130 (99.2) | | 1 (0.8) | | | | | |
| *Ship 6* | 1/9–10/11/02 | 16 | 0 | 1412 | 0 | 0 | 0 | 1469 | 0 | 1432 (97.5) | 13 (0.9) | | 4 (0.3) | | 1 (0.1) | 15 (1.0) | | | 4 (0.3) |
| *Ship 6* | 5/1–20/2/03 | 23 | 0 | 2056 | 0 | 0 | 0 | 2079 | 0 | 2055 (98.8) | 1 (0.04) | | | | 2 (0.1) | 21 (1.0) | | | |
| *Ship 6* | 2/4–14/6/03 | 0 | 0 | 174 | 0 | 0 | 0 | 174 | 0 | 172 (98.9) | 1 (0.6) | 1 (0.6) | | | | | | | |
| *Ship 6* | 26/7–30/8/03 | 2 | 0 | 119 | 0 | 0 | 0 | 120 | 0 | 4 (3.3) | 1 (0.8) | 113 (94.2) | 1 (0.8) | | 1 (0.8) | | | | |
| *Ship 7* | 4/9–7/11/02 | 0 | 0 | 856 | 0 | 0 | 0 | 859 | 0 | 857 (99.8) | | | 1 (0.1) | | | | | | 1 (0.1) |
| *Ship 7* | 15/12/02–23/2/03 | 1 | 0 | 1908 | 0 | 0 | 0 | 1909 | 0 | 1908 (99.9) | | | | | | 1 (0.1) | | | |
| *Ship 7* | 16/5–23/6/03 | 0 | 0 | 10 | 0 | 0 | 0 | 10 | 0 | | | 10 (100) | | | | | | | |
| *Ship 7* | 9/8–2/9/03 | 0 | 0 | 57 | 0 | 0 | 0 | 57 | 0 | 4 (7.0) | | 52 (91.2) | 1 (1.8) | | | | | | |
| Total (%) | | 75 | 0 | 14518 | 0 | 2 | 0 | 14646 | 0 | 13641 (93.10) | 59 (0.40) | 846 (5.78) | 10 (0.07) | 1 (0.01) | 11 (0.08) | 63 (0.43) | 1 (0.01) | 1 (0.01) | 13 (0.09) |

Table 7.9: Reported and observed incidental mortality of seabirds in the longline fisheries for *Dissostichus* spp. in Subarea 58.6 and Division 58.5.1 during the 2003/04 season (September to August). Sp – Spanish method; Auto – autoliner; N – night-time setting; D – daytime setting (including nautical dawn and dusk); NC – not collected.

| Vessel | Dates of fishing | Method | Sets deployed | | | | No. of hooks (thousands) | | | Hooks baited* (%) | No. of birds caught | | | | | | Observed seabird mortality (birds/1 000 hooks) | | | Streamer line in use % | | Offal discharge during haul (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Dead | | Alive# | | Total | | | | | | | |
| | | | N | D | Total | %N | Obs. | Set | % Observed | | N | D | N | D | N | D | N | D | Total | N | D | |
| **Subarea 58.6** | | | | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 14/1–25/2/04 | Auto | 69 | 0 | 69 | 100 | NC | 680.4 | NC | NC | 12† | 0 | 0 | 0 | 12 | 0 | 0.018 | 0 | 0.018 | 100 | 0 | (0) |
| *Ship 2* | 7/9–28/9/03 | Auto | 61 | 0 | 61 | 100 | NC | 466.9 | NC | NC | 11† | 0 | 4 | 0 | 15 | 0 | 0.024 | 0 | 0.024 | 100 | 0 | (0) |
| *Ship 2* | 2/2–9/2/04 | Auto | 25 | 0 | 25 | 100 | NC | 156.3 | NC | NC | 32† | 0 | 0 | 0 | 32 | 0 | 0.205 | 0 | 0.205 | 100 | 0 | (0) |
| *Ship 3* | 24/11–17/12/03 | Auto | 38 | 0 | 38 | 100 | NC | 467.3 | NC | 82.00 | 4† | 0 | 7 | 0 | 11 | 0 | 0.009 | 0 | 0.009 | 100 | 0 | (0) |
| *Ship 4* | 24/1–31/1/04 | Sp | 15 | 0 | 15 | 100 | NC | 84.4 | NC | 100.00 | 5† | 0 | 0 | 0 | 5 | 0 | 0.059 | 0 | 0.059 | 100 | 0 | (0) |
| *Ship 5* | 13/9–1/10/03 | Auto | 43 | 0 | 43 | 100 | NC | 410.4 | NC | NC | 3† | 0 | 0 | 0 | 3 | 0 | 0.007 | 0 | 0.007 | 100 | 0 | (0) |
| *Ship 5* | 3/2–26/2/04 | Auto | 52 | 0 | 52 | 100 | NC | 455.5 | NC | NC | 157† | 0 | 35 | 0 | 192 | 0 | 0.345 | 0 | 0.345 | 100 | 0 | (0) |
| *Ship 6* | 1/2–23/2/04 | Auto | 86 | 0 | 86 | 100 | NC | 418.5 | NC | NC | 9† | 0 | 1 | 0 | 10 | 0 | 0.022 | 0 | 0.022 | 100 | 0 | (0) |
| *Ship 7* | 25/11–7/12/03 | Auto | 18 | 0 | 18 | 100 | NC | 261.5 | NC | 94.00 | 9† | 0 | 3 | 0 | 12 | 0 | 0.034 | 0 | 0.034 | 100 | 0 | (0) |
| | | | | | | | NC | 3401.0 | NC | | 242 | 0 | 50 | 0 | 292 | 0 | 0.080 | | | | | |
| *Ship 1* | 15/7–25/7/04 | Auto | 24 | 0 | 24 | 100 | 45.2 | 221.9 | 20.4 | NC | 0 | 0 | 4 | 0 | 4 | 0 | 0.000 | 0 | 0.000 | 100 | 0 | (0) |
| *Ship 2* | 2/5–17/5/04 | Auto | 40 | 0 | 40 | 100 | 69.0 | 273.0 | 25.3 | 88.92 | 0 | 0 | 1 | 0 | 1 | 0 | 0.000 | 0 | 0.000 | 100 | 0 | (0) |
| *Ship 2* | 29/7–4/8/04 | Auto | 19 | 0 | 19 | 100 | 41.2 | 125.0 | 33.0 | 90.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0 | 0.000 | 100 | 0 | (0) |
| *Ship 3* | 17/6–16/7/04 | Auto | 62 | 0 | 62 | 100 | 191.7 | 588.0 | 32.6 | 88.41 | 2 | 0 | 0 | 0 | 2 | 0 | 0.010 | 0 | 0.010 | 100 | 0 | (0) |
| *Ship 4* | 13/8–31/8/04 | Sp | 37 | 0 | 37 | 100 | 62.4 | 260.6 | 23.9 | 100.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0 | 0.000 | 100 | 0 | (0) |
| *Ship 4* | 20/4–29/4/04 | Sp | 18 | 0 | 18 | 100 | 32.9 | 132.8 | 24.8 | 100.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0 | 0.000 | 100 | 0 | (0) |
| *Ship 5* | 17/7–20/7/04 | Auto | 9 | 0 | 9 | 100 | 22.5 | 64.5 | 34.9 | 89.22 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0 | 0.000 | 100 | 0 | (0) |
| *Ship 7* | 7/6–29/6/04 | Auto | 56 | 0 | 56 | 100 | 27.1 | 469.9 | 5.8 | 95.00 | 1 | 0 | 0 | 0 | 1 | 0 | 0.037 | 0 | 0.037 | 100 | 0 | (0) |
| *Ship 7* | 9/3–27/3/04 | Auto | 50 | 0 | 50 | 100 | 26.7 | 412.7 | 6.5 | 95.00 | 5 | 0 | 0 | 0 | 5 | 0 | 0.186 | 0 | 0.185 | 100 | 0 | (0) |
| | | | | | | | 518.7 | 2548.3 | 20.4 | | 8 | 0 | 5 | 0 | 13 | 0 | 0.026 | | | | | |
| **Division 58.5.1** | | | | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 24/9–14/12/03 | Auto | 200 | 0 | 200 | 100 | NC | 1927.8 | NC | NC | 700† | 0 | 0 | 0 | 700 | 0 | 0.363 | 0 | 0.363 | 100 | 0 | (0) |
| *Ship 1* | 1/3–7/4/04 | Auto | 83 | 0 | 83 | 100 | NC | 922.5 | NC | NC | 68† | 0 | 0 | 0 | 68 | 0 | 0.074 | 0 | 0.074 | 100 | 0 | (0) |
| *Ship 2* | 30/9–11/11/03 | Auto | 108 | 0 | 108 | 100 | NC | 1033.8 | NC | NC | 109† | 0 | 5 | 0 | 114 | 0 | 0.105 | 0 | 0.105 | 100 | 0 | (0) |
| *Ship 2* | 29/11/03–29/1/04 | Auto | 161 | 0 | 161 | 100 | NC | 1321.3 | NC | 90.00 | 61† | 0 | 0 | 0 | 61 | 0 | 0.046 | 0 | 0.046 | 100 | 0 | (0) |
| *Ship 3* | 4/9–21/10/03 | Auto | 89 | 0 | 89 | 100 | NC | 1099.4 | NC | 86.00 | 46† | 0 | 3 | 0 | 49 | 0 | 0.042 | 0 | 0.042 | 100 | 0 | (0) |
| *Ship 3* | 21/12/03–31/1/04 | Auto | 81 | 0 | 81 | 100 | NC | 1078.4 | NC | 84.00 | 37† | 0 | 1 | 0 | 38 | 0 | 0.034 | 0 | 0.034 | 100 | 0 | (0) |
| *Ship 4* | 19/10/03–19/1/04 | Sp | 170 | 0 | 170 | 100 | NC | 1313.2 | NC | 100.00 | 144† | 0 | 15 | 0 | 159 | 0 | 0.110 | 0 | 0.110 | 100 | 0 | (0) |
| *Ship 5* | 3/10–7/12/03 | Auto | 161 | 0 | 161 | 100 | NC | 1536.3 | NC | NC | 58† | 0 | 0 | 0 | 58 | 0 | 0.038 | 0 | 0.038 | 100 | 0 | (0) |
| *Ship 5* | 13/1–31/1/04 | Auto | 48 | 0 | 48 | 100 | NC | 408.1 | NC | NC | 86† | 0 | 27 | 0 | 113 | 0 | 0.211 | 0 | 0.211 | 100 | 0 | (0) |
| *Ship 5* | 1/3–28/3/04 | Auto | 72 | 0 | 72 | 100 | NC | 700.4 | NC | NC | 164† | 0 | 5 | 0 | 169 | 0 | 0.234 | 0 | 0.234 | 100 | 0 | (0) |
| *Ship 6* | 1/9–18/10/03 | Auto | 122 | 0 | 122 | 100 | NC | 1058.4 | NC | 79.00 | 349† | 0 | 0 | 0 | 349 | 0 | 0.330 | 0 | 0.330 | 100 | 0 | (0) |
| *Ship 6* | 3/12/03–29/1/04 | Auto | 138 | 0 | 138 | 100 | NC | 1211.4 | NC | NC | 31† | 0 | 0 | 0 | 31 | 0 | 0.026 | 0 | 0.026 | 100 | 0 | (0) |
| *Ship 7* | 1/9–27/10/03 | Auto | 102 | 0 | 102 | 100 | NC | 1314.6 | NC | 93.00 | 67† | 0 | 0 | 0 | 67 | 0 | 0.051 | 0 | 0.051 | 100 | 0 | (0) |
| *Ship 7* | 10/12/03–31/1/04 | Auto | 94 | 0 | 94 | 100 | NC | 1264.2 | NC | 91.00 | 149† | 0 | 2 | 0 | 151 | 0 | 0.118 | 0 | 0.118 | 100 | 0 | (0) |
| | | | | | | | NC | 16189.7 | NC | | 2069 | 0 | 58 | 0 | 2217 | 0 | 0.127 | | | | | |

(continued)

Table 7.9 (continued)

| Vessel | Dates of fishing | Method | Sets deployed | | | | No. of hooks (thousands) | | | Hooks baited* | No. of birds caught | | | | | | Observed seabird mortality (birds/1 000 hooks) | | | Streamer line in use % | | Offal discharge during haul (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Dead | | Alive# | | Total | | | | | | | |
| | | | N | D | Total | %N | Obs. | Set | % Observed | (%) | N | D | N | D | N | D | N | D | Total | N | D | |
| Division 58.5.1 (continued) | | | | | | | | | | | | | | | | | | | | | | |
| *Ship 1* | 14/5–11/7/04 | Auto | 114 | 0 | 114 | 100 | 298.6 | 1241.9 | 24.0 | NC | 14 | 0 | 4 | 0 | 18 | 0 | 0.047 | 0 | 0.047 | 100 | 0 | (0) |
| *Ship 2* | 4/3–28/4/04 | Auto | 146 | 0 | 146 | 100 | 288.3 | 1211.6 | 23.8 | 92.40 | 119 | 0 | 6 | 0 | 125 | 0 | 0.413 | 0 | 0.413 | 100 | 0 | (0) |
| *Ship 2* | 6/6–26/7/04 | Auto | 118 | 0 | 118 | 100 | 280.9 | 1029.6 | 27.3 | 89.40 | 31 | 0 | 33 | 0 | 64 | 0 | 0.110 | 0 | 0.110 | 101 | 0 | (0) |
| *Ship 3* | 11/3–15/5/04 | Auto | 122 | 0 | 122 | 100 | 398.3 | 1587.6 | 25.1 | 95.05 | 79 | 0 | 4 | 0 | 83 | 0 | 0.198 | 0 | 0.198 | 100 | 0 | (0) |
| *Ship 3* | 19/7–10/8/04 | Auto | 47 | 0 | 47 | 100 | 141.1 | 422.1 | 33.4 | 88.82 | 12 | 0 | 0 | 0 | 12 | 0 | 0.085 | 0 | 0.085 | 100 | 0 | (0) |
| *Ship 4* | 9/3–16/4/04 | Sp | 62 | 0 | 62 | 100 | 120.2 | 515.5 | 23.3 | 100.00 | 25 | 0 | 30 | 0 | 55 | 0 | 0.208 | 0 | 0.208 | 100 | 0 | (0) |
| *Ship 4* | 2/5–28/6/04 | Sp | 88 | 0 | 88 | 100 | 161.2 | 530.4 | 30.4 | 100.00 | 5 | 0 | 25 | 0 | 30 | 0 | 0.031 | 0 | 0.031 | 100 | 0 | (0) |
| *Ship 4* | 23/7–9/8/04 | Sp | 27 | 0 | 27 | 100 | 50.6 | 215.8 | 23.4 | 100.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0 | 0.000 | 100 | 0 | (0) |
| *Ship 5* | 7/5–14/7/04 | Auto | 152 | 0 | 152 | 100 | 454.5 | 1481.1 | 30.7 | 89.72 | 2 | 0 | 0 | 0 | 2 | 0 | 0.004 | 0 | 0.004 | 100 | 0 | (0) |
| *Ship 6* | 7/4–28/6/04 | Auto | 199 | 0 | 199 | 100 | 429.4 | 1730.7 | 24.8 | 79.45 | 27 | 0 | 12 | 0 | 39 | 0 | 0.063 | 0 | 0.063 | 100 | 0 | (0) |
| *Ship 7* | 30/3–4/6/04 | Auto | 140 | 0 | 140 | 100 | 92.5 | 1549.8 | 6.0 | 95.30 | 20 | 0 | 1 | 0 | 21 | 0 | 0.216 | 0 | 0.216 | 100 | 0 | (0) |
| | | | | | | | 2715.6 | 11516.1 | 23.6 | | 334 | 0 | 115 | 0 | 449 | 0 | 0.125 | | | | | |

* Data from a sample of hooks.
† The number of observed hooks has not been collected and the values given are from the total number of hooks set (birds reported).
# Seabirds caught during hauling (thus during the day) and released alive.

Table 7.10: Species composition of birds killed in longline fisheries in Subarea 58.6 and Division 58.5.1 during the 2003/04 season (September to August). N – night-time setting; D – daytime setting (including nautical dawn and dusk); PRO – white-chinned petrel; MAH – northern giant petrel; PCI – grey petrel; DAC – cape petrel; PND – petrel non-determined; () – % composition.

| Vessel | Dates of fishing | No. birds killed by group | | | | | | Species composition (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Albatrosses | | Petrels | | Total | | PRO | | MAH | | PCI | | DAC | | PND | |
| | | N | D | N | D | N | D | | | | | | | | | | |
| **Subarea 58.6** | | | | | | | | | | | | | | | | | |
| *Ship 1* | 14/1–25/2/04 | 0 | 0 | 12 | 0 | 12 | 0 | 12 | (100.0)* | | | | | | | | |
| *Ship 1* | 15/7–25/7/04 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | |
| *Ship 2* | 7/9–28/9/03 | 0 | 0 | 11 | 0 | 11 | 0 | 3 | (27.3)* | | | 7 | (63.6)* | | | 1 | (9.1)* |
| *Ship 2* | 2/2–9/2/04 | 0 | 0 | 32 | 0 | 32 | 0 | 32 | (100.0)* | | | | | | | | |
| *Ship 2* | 2/5–17/5/04 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | |
| *Ship 2* | 29/7–4/8/04 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | |
| *Ship 3* | 24/11–17/12/03 | 0 | 0 | 4 | 0 | 4 | 0 | 4 | (100.0)* | | | | | | | | |
| *Ship 3* | 17/6–16/7/04 | 0 | 0 | 2 | 0 | 2 | 0 | | | | | 2 | (100.0) | | | | |
| *Ship 4* | 24/1–31/1/04 | 0 | 0 | 5 | 0 | 5 | 0 | 5 | (100.0)* | | | | | | | | |
| *Ship 4* | 20/4–29/4/04 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | |
| *Ship 4* | 13/8–31/8/04 | 0 | 0 | 1 | 0 | 1 | 0 | | | | | 1 | (100.0) | | | | |
| *Ship 5* | 13/9–1/10/03 | 0 | 0 | 3 | 0 | 3 | 0 | 3 | (100.0)* | | | | | | | | |
| *Ship 5* | 3/2–26/2/04 | 0 | 0 | 157 | 0 | 157 | 0 | 157 | (100.0)* | | | | | | | | |
| *Ship 5* | 17/7–20/7/04 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | |
| *Ship 6* | 1/2–23/2/04 | 0 | 0 | 9 | 0 | 9 | 0 | 9 | (100.0)* | | | | | | | | |
| *Ship 7* | 25/11–7/12/03 | 0 | 0 | 9 | 0 | 9 | 0 | 9 | (100.0)* | | | | | | | | |
| *Ship 7* | 9/3–27/3/04 | 0 | 0 | 5 | 0 | 5 | 0 | 5 | (100.0) | | | | | | | | |
| **Division 58.5.1** | | | | | | | | | | | | | | | | | |
| *Ship 1* | 24/9–14/12/03 | 0 | 0 | 700 | 0 | 700 | 0 | 699 | (99.9)* | | | 1 | (0.1)* | | | | |
| *Ship 1* | 1/3–7/4/04 | 0 | 0 | 68 | 0 | 68 | 0 | 68 | (100.0)* | | | | | | | | |
| *Ship 1* | 14/5–11/7/04 | 0 | 0 | 14 | 0 | 14 | 0 | | | | | 14 | (100.0) | | | | |
| *Ship 2* | 30/9–11/11/03 | 0 | 0 | 109 | 0 | 109 | 0 | 106 | (97.2)* | 2 | (1.8)* | 1 | (0.9)* | | | | |
| *Ship 2* | 29/11/03–29/1/04 | 0 | 0 | 61 | 0 | 61 | 0 | 61 | (100.0)* | | | | | | | | |
| *Ship 2* | 4/3–28/4/04 | 0 | 0 | 119 | 0 | 119 | 0 | 117 | (98.3) | | | 2 | (1.7) | | | | |
| *Ship 2* | 6/6–26/7/04 | 0 | 0 | 31 | 0 | 31 | 0 | | | | | 31 | (100.0) | | | | |
| *Ship 3* | 4/9–21/10/03 | 0 | 0 | 46 | 0 | 46 | 0 | 39 | (84.8)* | | | 7 | (15.2)* | | | | |
| *Ship 3* | 21/12/03–31/1/04 | 0 | 0 | 37 | 0 | 37 | 0 | 37 | (100.0)* | | | | | | | | |
| *Ship 3* | 11/3–15/5/04 | 0 | 0 | 79 | 0 | 79 | 0 | 74 | (93.7) | | | 5 | (6.3) | | | | |
| *Ship 3* | 19/7–10/8/04 | 0 | 0 | 12 | 0 | 12 | 0 | | | | | 12 | (100.0) | | | | |
| *Ship 4* | 19/10/03–19/1/04 | 0 | 0 | 144 | 0 | 144 | 0 | 143 | (99.3)* | 1 | (0.7)* | | | | | | |
| *Ship 4* | 9/3–16/4/04 | 0 | 0 | 25 | 0 | 25 | 0 | 25 | (100.0) | | | | | | | | |
| *Ship 4* | 2/5–28/6/04 | 0 | 0 | 5 | 0 | 5 | 0 | | | | | 5 | (100.0) | | | | |
| *Ship 4* | 23/7–9/8/04 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | |
| *Ship 5* | 3/10–7/12/03 | 0 | 0 | 58 | 0 | 58 | 0 | 58 | (100.0)* | | | | | | | | |
| *Ship 5* | 13/1–31/1/04 | 0 | 0 | 86 | 0 | 86 | 0 | 86 | (100.0)* | | | | | | | | |
| *Ship 5* | 1/3–28/3/04 | 0 | 0 | 164 | 0 | 164 | 0 | 162 | (98.8)* | | | 2 | (1.2)* | | | | |
| *Ship 5* | 7/5–14/7/04 | 0 | 0 | 2 | 0 | 2 | 0 | | | | | 2 | (100.0) | | | | |
| *Ship 6* | 1/9–18/10/03 | 0 | 0 | 349 | 0 | 349 | 0 | 322 | (92.3)* | | | 21 | (6.0)* | 6 | (1.7)* | | |
| *Ship 6* | 3/12–29/12/03 | 0 | 0 | 31 | 0 | 31 | 0 | 31 | (100.0)* | | | | | | | | |
| *Ship 6* | 7/4–28/6/04 | 0 | 0 | 27 | 0 | 27 | 0 | 21 | (77.8) | | | 6 | (22.2) | | | | |
| *Ship 7* | 1/9–27/10/03 | 0 | 0 | 67 | 0 | 67 | 0 | 49 | (73.1)* | | | 18 | (26.9)* | | | | |
| *Ship 7* | 10/12/03–31/1/04 | 0 | 0 | 149 | 0 | 149 | 0 | 149 | (100.0)* | | | | | | | | |
| *Ship 7* | 30/3–4/6/04 | 0 | 0 | 20 | 0 | 20 | 0 | 18 | (90.0) | | | 2 | (10.0) | | | | |
| Total (%) | | 0 | 0 | 2654 | 0 | 2654 | 0 | 2504 | (94.3) | 3 | (0.1) | 140 | (5.3) | 6 | (0.2) | 1 | (0.0) |

* The number of observed hooks has not been collected and the values given are from the total number of hooks set.

Table 7.11: Annual reports of seabirds killed and the associated by-catch rates (number of birds killed per thousand hooks) in the longline fisheries for *Dissostichus* spp. in the French EEZs in Subarea 58.6 and Division 58.5.1. Data for the 1998/99 and 1999/2000 seasons are from WG-FSA-01/21, Appendix 1. In 2003/04, the number of birds estimated killed is based on the proportion of hooks observed (see paragraph 7.23). na – not applicable.

2003/04

| Area | Number of birds reported killed | Number of birds estimated killed | Hook effort | | | By-catch rate | | Total birds killed |
|---|---|---|---|---|---|---|---|---|
| | | | Reported cruises | Estimated cruises | | Birds reported/ thousand hooks | Birds estimated/ thousand hooks | |
| | | | | Total | Observed | | | |
| Subarea 58.6 | 242 | 100 | 3 401.0 | 2 548.3 | 518.7 | 0.080 | 0.026 | 342 |
| Division 58.5.1 | 2 069 | 1 597 | 16 189.7 | 11 516.1 | 2 715.6 | 0.127 | 0.125 | 3 666 |
| Total | **2 311** | 1 697 | 19 590.7 | 14 064.4 | 2 234.3 | 0.118 | 0.106 | **4 008** |

2002/03

| Area | Number of birds reported killed | Number of birds estimated killed | Total | Hook effort (thousands) | By-catch rate (birds reported/thousand hooks) |
|---|---|---|---|---|---|
| Subarea 58.6 | 720 | na | 720 | 6 593 | 0.109 |
| Division 58.5.1 | 13 926 | na | 13 926 | 26 884.4 | 0.518 |
| Total | 14 646 | na | **14 646** | **33 477.4** | 0.437 |

2001/02

| Area | Number of birds reported killed | Number of birds estimated killed | Total | Hook effort (thousands) | By-catch rate (birds reported/thousand hooks) |
|---|---|---|---|---|---|
| Subarea 58.6 | 1 243 | na | 1 243 | 7 432.8 | 0.167 |
| Division 58.5.1 | 10 814 | na | 10 814 | 11 554.3 | 0.936 |
| Total | 12 057 | na | **12 057** | **18 987.1** | 0.635 |

(continued)

Table 7.11 (continued)

1999/2000

| Area | Number of birds reported killed | Number of birds estimated killed | Total | Hook effort (thousands) | By-catch rate (birds reported/thousand hooks) |
|---|---|---|---|---|---|
| Subarea 58.6 | 360 | na | 360 | 1 931 | 0.186 |
| Division 58.5.1 | 1 897 | na | 1 897 | 6 167.4 | 0.308 |
| Total | 2 257 | na | **2 257** | **8 098.4** | 0.279 |

1998/99

| Area | Number of birds reported killed | Number of birds estimated killed | Total | Hook effort (thousands) | By-catch rate (birds reported/thousand hooks) |
|---|---|---|---|---|---|
| Subarea 58.6 | 1 326 | na | 1 326 | 1 789.0 | 0.741 |
| Division 58.5.1 | 4 967 | na | 4 967 | 1 682.5 | 2.95 |
| Total | 6 293 | na | **6 293** | **3 471.5** | 1.81 |

Table 7.12: Compliance, as reported by observers, of streamer lines with the minimum specifications set out in Conservation Measure 25-02 (2003) during the 2003/04 season. Y – yes; N – no; - – no information; A – autoliner; Sp – Spanish.

| Vessel name | Dates of fishing | Fishing method | Compliance with CCAMLR specifications | Compliance with details of streamer line specifications | | | | Length of streamers (m) | Streamer line in use % | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Attachment, height above water (m) | Total length (m) | No. streamers per line | Spacing of streamers per line (m) | | Night | Day |
| **Subarea 48.3** | | | | | | | | | | |
| *Globalpesca I* | 8/5–18/7/04 | Sp | N | N (5) | - | - | Y (3) | - | 100 | 100 |
| *Isla Camila* | 1/5–30/6/04 | Sp | N | Y (7) | Y (150) | 10 | Y (5) | N (1–6) | 75 | 100 |
| *Isla Santa Clara* | 1/5–23/7/04 | Sp | Y | Y (7) | Y (185) | 8 | Y (5) | Y (1–7.7) | 100 | 100 |
| *Isla Sofía* | 1/5–4/7/04 | Sp | Y | Y (7.4) | Y (150) | 9 | Y (5) | Y (1–6.5) | 100 | |
| *Polarpesca I* | 1/5–14/8/04 | Sp | Y | Y (7) | Y (151) | 7 | Y (5) | Y (1–7) | 99 | 100 |
| *Tierra del Fuego* | 3/5–14/8/04 | Sp | Y | Y (7) | Y (153) | 5 | Y (5) | Y (1–6.5) | 98 | |
| *Ibsa Quinto* | 2/5–25/6/04 | Sp | Y | Y (7) | Y (157) | 6 | Y (5) | Y (1–6.5) | 96 | |
| *Viking Bay* | 1/5–13/7/04 | Sp | N | N (6.3) | N (83) | 50 | Y (1.5) | N ( 0.8) | 100 | |
| *Argos Georgia* | 2/5–15/8/04 | Sp | N | Y (7) | Y (150) | 5 | Y (5) | N (1.5–5) | 100 | 98 |
| *Argos Helena* | 2/5–16/8/04 | A | Y | Y (7.7) | Y (160) | 7 | Y (5) | Y (1–7.5) | 100 | |
| *Burdwood* | 5/5–17/8/04 | Sp | Y | Y (7) | Y (150) | - | Y (5) | Y (1–6.5) | 100 | |
| *Jacqueline* | 3/5–7/7/04 | Sp | Y | Y (7.9) | Y (157) | 29 | Y (5) | Y (1–7.2) | 98 | |
| *No. 22 InSung* | 1/5–19/8/04 | Sp | Y | Y (7.1) | Y (200) | 9 | Y (5) | Y (1–6.5) | 100 | 100 |
| *Isla Alegranza* | 2/5–23/7/04 | Sp | Y | Y (7.7) | Y (167) | 7 | Y (5) | Y (1–6.5) | 98 | |
| *Paloma V* | 21/7–19/8/04 | Sp | Y | Y (7) | Y (150) | 11 | Y (5) | Y (1–6.5) | 100 | |
| *Koryo Maru No. 11* | 12/5–20/8/04 | Sp | N | Y (8) | Y (150) | 2 | Y (5) | N (5) | 100 | 100 |
| **Subarea 48.6** | | | | | | | | | | |
| *Shinsei Maru No. 3* | 7/3–21/3/04 | Sp | N | Y (7) | Y (158) | 5 | Y (5) | N (2–5) | 100 | 100 |
| **Subareas 58.6, 58.7** | | | | | | | | | | |
| *Koryo Maru No. 11* | 19/2–30/3/04 | Sp | N | N (5) | Y (177) | 6 | Y (5) | Y (1–6.5) | 100 | 100 |
| *South Princess* | 19/5–7/7/04 | A | Y | Y (7) | Y (150) | 14 | Y (5) | Y (1–6.5) | 100 | 100 |
| **Subareas 88.1, 88.2** | | | | | | | | | | |
| *Antarctic II* | 7/2–4/3/04 | A | Y | Y (7) | Y (200) | 6 | Y (5) | - | 18 | 93 |
| *Antarctic III* | 1/1–3/3/04 | A | N | N (6) | Y (150) | 5 | Y (5) | - | 100 | 100 |
| *Arnela* | 29/12/03–3/3/04 | Sp | N | N (6.5) | Y (180) | 12 | Y (5) | Y (1–6.6) | | 98 |

(continued)

Table 7.12 (continued)

| Vessel name | Dates of fishing | Fishing method | Compliance with CCAMLR specifications | Compliance with details of streamer line specifications | | | | Length of streamers (m) | Streamer line in use % | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Attachment, height above water (m) | Total length (m) | No. streamers per line | Spacing of streamers per line (m) | | Night | Day |
| *Argos Helena* | 21/2–7/3/04 | A | Y | Y (7) | Y (150) | 7 | Y (5) | Y (1–7.5) | | 100 |
| *No. 707 Bonanza* | 10/1–3/3/04 | Sp | N | Y (7.5) | Y (150) | 36 | Y (4) | N (1–4) | 50 | 98 |
| *No. 829 Yeon Seong* | 30/1–3/3/04 | Sp | N | Y (7) | Y (150) | 10 | Y (5) | N (1–4) | 100 | 100 |
| *Gudni Olafsson* | 27/12/03–10/2/04 | A | Y | Y (7) | Y (150) | 15 | Y (5) | Y (1.5–8) | | 100 |
| *San Aotea II* | 12/12/03–21/3/04 | A | Y | Y (7.6) | Y (150) | 11 | Y (5) | Y (1–7.5) | | 100 |
| *Volna* | 15/12/03–9/3/04 | Sp | N | N (5) | N (130) | 5 | Y (2) | N (1–3) | 100 | 100 |
| *Yantar* | 15/12/03–9/3/04 | Sp | Y | Y (7) | Y (150) | 6 | Y (5) | Y (1–6.5) | 100 | 100 |
| *Mellas* | 2/1–3/3/04 | Sp | N | Y (7) | N (125) | 12 | Y (5) | N (1–5) | 100 | 100 |
| *Simeiz* | 15/12/03–7/3/04 | Sp | N | N (5.2) | Y (150) | 9 | Y (4) | N (1–4) | 100 | 100 |
| *Sonrisa* | 10/2–4/3/04 | A | N | Y (7.4) | N (70) | 30 | Y 5) | N (1–3.5) | | 100 |
| *Piscis* | 12/1–7/3/04 | Sp | Y | Y (7) | Y (150) | 7 | Y (5) | - | 100 | 100 |
| *Punta Ballena* | 11/1–3/3/04 | Sp | Y | Y (11) | Y (150) | 28 | Y (5) | - | 67 | 94 |
| *America I* | 12/12/03–5/3/04 | Sp | Y | Y (7.3) | Y (155) | 6 | Y (5) | Y (2–6.5) | 100 | 94 |
| *American Warrior* | 8/1–3/3/04 | A | Y | Y (9) | Y (150) | 11 | Y (5) | Y (2–6.5) | | 100 |
| *South Princess* | 15/12/03–4/3/04 | A | N | Y (7) | Y (158) | 10 | Y (3) | N (2–5.2) | 100 | 99 |
| *Frøyanes* | 23/1–4/3/04 | A | Y | Y (7) | Y (150) | 11 | Y (5) | Y (1–7) | 100 | 100 |
| *Avro Chieftain* | 1/12/03–19/3/04 | A | Y | Y (7) | Y (150) | 40 | Y (2.5) | Y (1–7) | 100 | 100 |
| *Janas* | 12/12/03–24/2/04 | A | Y | Y (7.2) | Y (150) | 19 | Y (5) | Y (2–8) | | 100 |
| *San Liberatore* | 1/2–6/3/04 | A | Y | Y (10) | Y (150) | 14 | Y (4.5) | Y (1–8) | 100 | 100 |
| **Division 58.5.2** | | | | | | | | | | |
| *Janas* | 30/4–24/6/04 | A | Y | Y (7) | Y (150) | 19 | Y (4.5) | Y (1–6.5) | 100 | |
| *Janas* | 20/7–10/9/04 | A | Y | Y (7) | Y (150) | 15 | Y (5) | Y (1–7) | 100 | 100 |
| **Divisions 58.4.2, 58.4.3b** | | | | | | | | | | |
| *Eldfisk* | 30/11/03–24/1/04 | A | Y | Y (7) | Y (150) | 17 | Y (4.5) | Y (1–6.5) | | 100 |

Table 7.13: Summary of scientific observations relating to compliance with Conservation Measure 25-02 (2003), based on data from scientific observers from the 1996/97 to the 2003/04 season. Values in parentheses are % of observer records that were complete. na – not applicable.

| Subarea/time | Line weighting (Spanish system only) | | | Night setting (% Night) | Offal discharge (%) opposite haul | Streamer line compliance (%) | | | | | | | | | | Total catch rate (birds/thousand hooks) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Compliance % | | Median weight (kg) | Median spacing (m) | | | Overall | | Attached height | | Total length | | No. of streamers | | Distance apart | | Night | Day |
| **Subarea 48.3** | | | | | | | | | | | | | | | | | | |
| 1996/97 | 0 | (91) | 5.0 | 45 | 81 | 0 (91) | 6 | (94) | 47 | (83) | 24 | (94) | 76 | (94) | 100 | (78) | 0.18 | 0.93 |
| 1997/98 | 0 | (100) | 6.0 | 42.5 | 90 | 31 (100) | 13 | (100) | 64 | (93) | 33 | (100) | 100 | (93) | 100 | (93) | 0.03 | 0.04 |
| 1998/99 | 5 | (100) | 6.0 | 43.2 | 80[1] | 71 (100) | 0 | (95) | 84 | (90) | 26 | (90) | 76 | (81) | 94 | (86) | 0.01 | 0.08[1] |
| 1999/00 | 1 | (91) | 6.0 | 44 | 92 | 76 (100) | 31 | (94) | 100 | (65) | 25 | (71) | 100 | (65) | 85 | (76) | <0.01 | <0.01 |
| 2000/01 | 21 | (95) | 6.8 | 41 | 95 | 95 (95) | 50 | (85) | 88 | (90) | 53 | (94) | 94 | 94 | 82 | (94) | <0.01 | <0.01 |
| 2001/02 | 63 | (100) | 8.6 | 40 | 99 | 100 (100) | 87 | (100) | 94 | (100) | 93 | (100) | 100 | (100) | 100 | (100) | 0.002 | 0 |
| 2002/03 | 100 | (100) | 9.0 | 39 | 98 | 100 (100) | 87 | (100) | 91 | (100) | 96 | (100) | 100 | (100) | 100 | (100) | <0.001 | 0 |
| 2003/04 | 87 | (100) | 9.0 | 40 | 98 | 100 (100) | 69 | (94) | 88 | (100) | 93 | (94) | [7] | | 100 | (100) | 0.001 | 0 |
| **Subarea 48.6** | | | | | | | | | | | | | | | | | | |
| 2003/04 | 100 | (100) | 7.0 | 20 | 41[6] | No discharge | 0 | (100) | 100 | (100) | 100 | (100) | [7] | | 0 | (100) | 0 | 0 |
| **Divisions 58.4.2, 58.4.3b** | | | | | | | | | | | | | | | | | | |
| 2002/03 | Auto only | | na | na | 24[5] | No discharge | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 2003/04 | Auto only | | na | na | 0[5] | No discharge | 100 | (100) | 100 | (100) | 100 | (100) | [7] | | 100 | (100) | 0 | 0 |
| **Division 58.4.4** | | | | | | | | | | | | | | | | | | |
| 1999/00 | 0 | (100) | 5 | 45 | 50 | 0 (100) | 0 | (100) | 100 | (100) | 0 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| **Division 58.5.2** | | | | | | | | | | | | | | | | | | |
| 2002/03 | Auto only | | na | na | 100 | No discharge | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 2003/04 | Auto only | | na | na | 99 | No discharge | 100 | (100) | 100 | (100) | 100 | (100) | [7] | | 100 | (100) | 0 | 0 |
| **Subareas 58.6, 58.7** | | | | | | | | | | | | | | | | | | |
| 1996/97 | 0 | (60) | 6 | 35 | 52 | 69 (87) | 10 | (66) | 100 | (60) | 10 | (66) | 90 | (66) | 60 | (66) | 0.52 | 0.39 |
| 1997/98 | 0 | (100) | 6 | 55 | 93 | 87 (94) | 9 | (92) | 91 | (92) | 11 | (75) | 100 | (75) | 90 | (83) | 0.08 | 0.11 |
| 1998/99 | 0 | (100) | 8 | 50 | 84[2] | 100 (89) | 0 | (100) | 100 | (90) | 10 | (100) | 100 | (90) | 100 | (90) | 0.05 | 0 |
| 1999/00 | 0 | (83) | 6 | 88 | 72 | 100 (93) | 8 | (100) | 91 | (92) | 0 | (92) | 100 | (92) | 91 | (92) | 0.03 | 0.01 |
| 2000/01 | 18 | (100) | 5.8 | 40 | 78 | 100 (100) | 64 | (100) | 100 | (100) | 64 | (100) | 100 | (100) | 100 | (100) | 0.01 | 0.04 |
| 2001/02 | 66 | (100) | 6.6 | 40 | 99 | 100 (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 2002/03 | 0 | (100) | 6.0 | 41 | 98 | 50 (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | <0.01 | 0 |
| 2003/04 | 100 | (100) | 7.0 | 20 | 83 | 100 (100) | 50 | (100) | 50 | (100) | 100 | (100) | [7] | | 100 | (100) | 0.03 | 0.01 |

(continued)

Table 7.13 (continued)

| Subarea/time | Line weighting (Spanish system only) | | | Night setting (% Night) | Offal discharge (%) opposite haul | Streamer line compliance (%) | | | | | | | | | | Total catch rate (birds/thousand hooks) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Compliance % | Median weight (kg) | Median spacing (m) | | | Overall | | Attached height | | Total length | | No. of streamers | | Distance apart | | Night | Day |
| **Subareas 88.1, 88.2** | | | | | | | | | | | | | | | | | |
| 1996/97 | Auto only | na | na | 50 | 0 (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 1997/98 | Auto only | na | na | 71 | 0 (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 1998/99 | Auto only | na | na | 1[3] | 100 (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 1999/00 | Auto only | na | na | 6[4] | No discharge | 67 | (100) | 100 | (100) | 67 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 2000/01 | 1 (100) | 12 | 40 | 18[4] | No discharge | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 2001/02 | Auto only | na | na | 33[4] | No discharge | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 2002/03 | 100 (100) | 9.6 | 41 | 21[4] | 1 incidence of offal dumping | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 100 | (100) | 0 | 0 |
| 2003/04 | 89 (100) | 9 | 40 | 5[4] | 24% by 1 vessel | 59 | (100) | 82 | (100) | 86 | (100) | [7] | | 100 | (100) | 0 | <0.01 |

[1] Includes daytime setting – and associated seabird by-catch – as part of line-weighting experiments on *Argos Helena* (WG-FSA-99/5).
[2] Includes some daytime setting in conjunction with use of an underwater-setting funnel on *Eldfisk* (WG-FSA-99/42).
[3] Conservation Measure 169/XVII allowed New Zealand vessels to undertake daytime setting south of 65°S in Subarea 88.1 to conduct a line-weighting experiment.
[4] Conservation Measures 210/XIX, 216/XX and 41-09 (2002, 2003) permit daytime setting south of 65°S in Subarea 88.1 if they could demonstrate a sink rate of 0.3 m/s.
[5] Conservation Measure 41-05 (2002, 2003) permits daytime setting in Division 58.4.2 if the vessel can demonstrate a sink rate of 0.3 m/s.
[6] Conservation Measure 41-04 (2003) permits daytime setting in Subarea 48.6 if the vessel can demonstrate a sink rate of 0.3 m/s.
[7] Conservation Measure 25-02 (2003) was updated and the requirement for a minimum of five streamers per line was removed.

Table 7.14: Offal discharge observed during net shooting and hauling operations in finfish trawl fisheries in the CCAMLR Convention Area during the 2003/04 season.

| Vessel name | Cruise dates | Offal discharged during (%) | |
|---|---|---|---|
| | | Net shooting | Net hauling |
| **Subarea 48.3** | | | |
| *Betanzos* | 26/12/03–22/2/04 | 8 (9) | 8 (9) |
| *Argos Vigo* | 12/1–29/1/04 | 0 | 0 |
| *Robin M Lee* | 14/4–1/5/04 | 1 (12) | 0 |
| *Sil* | 25/1–29/2/04 | 0 | 0 |
| *Dongsan Ho* | 6/1–30/1/04 | 0 | 3 (9) |
| *Insung Ho* | 28/12/03–27/1/04 | 1 (3) | 0 |
| **Division 58.5.2** | | | |
| *Austral Leader* | 13/10–19/12/03 | 0 | 0 |
| *Austral Leader* | 14/3–12/5/04 | 0 | 0 |
| *Austral Leader* | 25/7–23/9/04 | 0 | 0 |
| *Southern Champion* | 22/1–23/3/04 | 0 | 0 |
| *Southern Champion* | 18/4–30/6/04 | 0 | 0 |

Table 7.15: Estimated total potential seabird by-catch in the IUU *Dissostichus* spp. fishery in the Convention Area from 1996 to 2004. Lower and upper refer to 95% confidence limit.

| Subarea/ Division | Year | Estimated total potential seabird by-catch | | |
|---|---|---|---|---|
| | | Lower | Median | Upper |
| 48.3 | 2004 | 0 | 0 | 0 |
| | 1996–2003 | 1 811 | 3 441 | 56 031 |
| 58.5.1 | 2004 | 895 | 1 092 | 2 915 |
| | 1996–2003 | 46 988 | 57 332 | 153 081 |
| 58.5.2 | 2004 | 596 | 727 | 1 941 |
| | 1996–2003 | 31 857 | 38 870 | 103 787 |
| 58.4.3 | 2004 | 522 | 636 | 1 699 |
| 58.4.4 | 2004 | 0 | 0 | 0 |
| | 1996–2003 | 2 866 | 3 497 | 9 338 |
| 58.6 | 2004 | 1 611 | 1 966 | 5 249 |
| | 1996–2003 | 43 277 | 52 803 | 140 989 |
| 58.7 | 2004 | 369 | 450 | 1 202 |
| | 1996–2003 | 12 106 | 14 770 | 39 439 |
| 88.1 | 2004 | 360 | 440 | 1 160 |
| | 1996–2003 | 32 | 39 | 104 |
| Totals | 2004 | 4 352 | 5 311 | 14 166 |
| | 1996–2003 | 138 937 | 170 752 | 502 768 |
| Total | | 143 289 | 176 063 | 516 934 |

Table 7.16: Summary of IMAF risk assessment in relation to proposed new and exploratory longline fisheries in 2004/05 (five-point risk scale as defined in SC-CAMLR-XXIII/BG/21).

| Area | Risk scale | Mitigation requirements | Proposal assessment |
|---|---|---|---|
| 48.6 north of ca. 55°S | 2 – average to low | • Strict compliance with standard seabird by-catch conservation measure.<br>• No need for restriction of longline fishing season.<br>• Daytime setting permitted subject to line sink rate requirements and seabird by-catch limits.<br>• No offal dumping at any time. | Proposals from Japan (WG-FSA-04/18 and CCAMLR-XXIII/18), Republic of Korea (CCAMLR-XXIII/20) and New Zealand (CCAMLR-XXIII/25) do not conflict with the IMAF assessment. |
| 48.6 south of ca. 55°S | 1 – low | • Strict compliance with standard seabird by-catch conservation measure.<br>• No need for restriction of longline fishing season.<br>• Daytime setting permitted subject to line sink rate requirement.<br>• No offal dumping at any time. | Proposals from Japan (CCAMLR-XXIII/18), Republic of Korea (CCAMLR-XXIII/20) and New Zealand (CCAMLR-XXIII/25) do not conflict with the IMAF assessment. |
| 58.4.1 | 2 – average to low | • Strict compliance with standard seabird by-catch conservation measure.<br>• No need for restriction of longline fishing season.<br>• Daytime setting permitted subject to line sink rate requirements and seabird by-catch limits.<br>• No offal dumping at any time. | Proposals from Chile (CCAMLR-XXIII/12), Republic of Korea (CCAMLR-XXIII/21), Spain (CCAMLR-XXIII/15), New Zealand (CCAMLR-XXIII/26) and Ukraine (CCAMLR-XXIII/30) do not conflict with the IMAF assessment. |
| 58.4.2 | 3 – average | • Strict compliance with standard seabird by-catch conservation measure.<br>• Restrict longline fishing to April to September (outside the October to March giant petrel breeding season) unless line sink rate requirements are met at all times.<br>• Daytime setting permitted subject to strict line sink rate requirements and seabird by-catch limits.<br>• No offal dumping at any time. | Proposals from Chile (CCAMLR-XXIII/13), Republic of Korea (CCAMLR-XXIII/22), Spain (CCAMLR-XXIII/15), New Zealand (CCAMLR-XXIII/26) and Ukraine (CCAMLR-XXIII/31) do not conflict with the IMAF assessment. |
| 58.4.3a | 3 – average | • Strict compliance with standard seabird by-catch conservation measure.<br>• Restrict longline fishing to May through August (outside the September to April albatross, giant petrel and white-chinned petrel breeding season) unless line sink rate requirements are met at all times.<br>• Daytime setting permitted subject to strict line sink rate requirements and seabird by-catch limits.<br>• No offal dumping at any time. | Proposals from Australia (CCAMLR-XXIII/9), Spain (CCAMLR-XXIII/15) and the Republic of Korea (CCAMLR-XXIII/23) do not conflict with the IMAF assessment. |

(continued)

Table 7.16 (continued)

| Area | Risk scale | Mitigation requirements | Proposal assessment |
|---|---|---|---|
| 58.4.3b | 3 – average | • Strict compliance with standard seabird by-catch conservation measure.<br>• Restrict longline fishing to May to August (outside the September to April albatross, giant petrel and white-chinned petrel breeding season) unless line sink rate requirements are met at all times.<br>• Daytime setting permitted subject to strict line sink rate requirements and seabird by-catch limits.<br>• No offal dumping at any time. | Proposals from Australia (CCAMLR-XXIII/10), Chile (CCAMLR-XXIII/14), Japan (CCAMLR-XXIII/19), Spain (CCAMLR-XXIII/15) and the Republic of Korea (CCAMLR-XXIII/24) do not conflict with the IMAF assessment. |
| 88.1 north of 65°S | 3 – average | • Strict compliance with standard seabird by-catch conservation measure.<br>• No need for restriction of longline fishing season, but line sink rate requirements to be met at all times.<br>• Daytime setting permitted subject to strict line sink rate requirements and seabird by-catch limits.<br>• No offal dumping at any time. | Proposals from Argentina (CCAMLR-XXIII/8), Australia (CCAMLR-XXIII/11), Norway (CCAMLR-XXIII/6), Spain (CCAMLR-XXIII/15), New Zealand (CCAMLR-XXIII/27), Russia (CCAMLR-XXIII/28), South Africa (CCAMLR-XXIII/34), Ukraine (CCAMLR-XXIII/29) and Uruguay (CCAMLR-XXIII/32) do not conflict with the IMAF assessment.<br>The UK (CCAMLR-XXIII/17) confirmed intention to conform with IMAF assessment in all respects. |
| 88.1 south of 65°S | 2 – average to low | • Strict compliance with standard seabird by-catch conservation measure.<br>• No need for restriction of longline fishing season.<br>• Daytime setting permitted subject to line sink rate requirements and seabird by-catch limits.<br>• No offal dumping at any time. | Proposals from Argentina (CCAMLR-XXIII/8), Australia (CCAMLR-XXIII/11), Norway (CCAMLR-XXIII/6), Spain (CCAMLR-XXIII/15), New Zealand (CCAMLR-XXIII/27), Russia (CCAMLR-XXIII/28), South Africa (CCAMLR-XXIII/34), Ukraine (CCAMLR-XXIII/29) and Uruguay (CCAMLR-XXIII/32) do not conflict with the IMAF assessment.<br>The UK (CCAMLR-XXIII/17) confirmed intention to conform with the IMAF assessment in all respects (see paragraph 7.195). |
| 88.2 | 1 – low | • Strict compliance with standard seabird by-catch conservation measure.<br>• No need for restriction of longline fishing season.<br>• Daytime setting permitted.<br>• No offal dumping at any time. | Proposals from Norway (CCAMLR-XXIII/6), Argentina (CCAMLR-XXIII/8), New Zealand (CCAMLR-XXIII/27) and Russia (CCAMLR-XXIII/28) do not conflict with the IMAF assessment. |

Table 7.17: Summary of IMAF assessment of risk to seabirds posed by new and exploratory longline fisheries in the Convention Area (see also Figure 7.3).

| Risk level | Mitigation requirements | Observer coverage |
|---|---|---|
| 1 – low | • Strict compliance with standard seabird by-catch conservation measure.[1]<br>• No need for restriction of longline fishing season.<br>• Daytime setting permitted subject to line sink rate requirements.[2]<br>• No offal dumping. | 20% of hooks hauled<br>50% of hooks set |
| 2 – average to low | • Strict compliance with standard seabird by-catch conservation measure.[1]<br>• No need for restriction of longline fishing season.<br>• Daytime setting permitted subject to line sink rate requirements and seabird by-catch limits.[3]<br>• No offal dumping. | 25% of hooks hauled<br>75% of hooks set |
| 3 – average | • Strict compliance with standard seabird by-catch conservation measure.[1]<br>• Restrict longline fishing to period outside at-risk species breeding season where known/relevant, unless line sink rate requirements are met at all times.<br>• Daytime setting permitted subject to strict line sink rate requirements and seabird by-catch limits.[3]<br>• No offal dumping. | 40% of hooks hauled[4]<br>95% of hooks set |
| 4 – average to high | • Strict compliance with standard seabird by-catch conservation measure.[1]<br>• Restrict longline fishing to the period outside any at-risk species breeding season.<br>• Strict line sink rate requirements at all times.<br>• No daytime setting permitted.<br>• No offal dumping. | 45% of hooks hauled[4]<br>95% of hooks set |
| 5 – high risk | • Strict compliance with standard seabird by-catch conservation measure.[1]<br>• Restrict longline fishing to period outside at-risk species breeding season.<br>• Closed areas as identified.<br>• Strict line sink rate requirements at all times.<br>• No daytime setting permitted.<br>• Strict seabird by-catch limits in place.<br>• No offal dumping. | 50% of hooks hauled[4]<br>100% of hooks set |

[1] Conservation Measure 25-02 with the possibility of exemption to paragraph 4 as provided by Conservation Measure 24-02.
[2] Changes required to Conservation Measure 25-02 (2003), paragraph 4.
[3] Requires text similar to Conservation Measure 41-09 (2003), paragraphs 6 and 7.
[4] This is likely to require the presence of two observers.

Table 7.18: Seabird mortality totals and rates (BPT: birds/trawl) and species composition of by-catch, recorded by observers in the CCAMLR Convention Area trawl fisheries over the last four seasons. DIC – grey-headed albatross; DIM – black-browed albatross; PRO – white-chinned petrel; PWD – Antarctic prion; DAC – cape petrel; MAI – southern giant petrel.

| Season | Area | Vessel | Cruise dates | Trawls observed | BPT | Dead | | | | | | Total dead | Alive (combined) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | DIC | DIM | PRO | PWD | DAC | MAI | | |
| 2001 | 48.3 | *Argos Vigo* | 1/2–10/2/01 | 58 | 0.64 | 1 | 25 | 11 | | | | 37 | 22 |
| | | *Betanzos* | 26/11/00–26/2/01 | 157 | 0.34 | 2 | 21 | 30 | | | | 53 | 16 |
| | | *Saint Denis* | 6/12/00–18/1/01 | 100 | 0.02 | 2 | | | | | | 2 | 2 |
| | | Total | | 315 | 0.29 | 5 | 46 | 41 | | | | 92 | 40 |
| 2002 | 48.3 | *Argos Vigo* | 15/12/01–30/1/02 | 35 | 0.49 | | 6 | 11 | | | | 17 | 8 |
| | | *Robin M Lee* | 15/12/01–15/2/02 | 74 | 0.26 | | 4 | 15 | | | | 19 | 25 |
| | | *Insung Ho* | 31/12/01–18/2/02 | 81 | 0.26 | | 3 | 17 | 1 | | | 21 | 18 |
| | | *Bonito* | 15/12/01–9/2/02 | 67 | 0.06 | | 2 | 2 | | | | 4 | 1 |
| | | *Zakhar Sorokin* | 20/12/01–5/2/02 | 174 | 0.04 | | 3 | 4 | | | | 7 | 0 |
| | | Total | | 431 | 0.16 | | 18 | 49 | 1 | | | 68 | 52 |
| | 58.5.2 | *Austral Leader* | 28/3–8/5/02 | 34 | 0 | | | | | | | 0 | 1 |
| | | Total | | 34 | 0 | | | | | | | 0 | 1 |
| 2003 | 48.3 | *Betanzos* | 7/12/02–5/3/03 | 107 | 0.14 | 1 | 1 | 13 | | | | 15 | 11 |
| | | *Sil* | 16/12/02–18/1/03 | 48 | 0.35 | | 3 | 14 | | | | 17 | 1 |
| | | *Insung Ho* | 31/12/02–18/1/03 | 27 | 0.15 | | 3 | 1 | | | | 4 | 3 |
| | | Total | | 182 | 0.20 | 1 | 7 | 28 | | | | 36 | 15 |
| | 58.5.2 | *Austral Leader* | 10/4–10/5/03 | 117 | 0.03 | | 1 | 1 | | 2 | | 4 | 0 |
| | | *Southern Champion* | 24/1–20/3/03 | 44 | 0.02 | | | 1 | | | | 1 | 7 |
| | | *Southern Champion* | 24/4–18/5/03 | 277 | 0.004 | | 1 | | | | | 1 | 0 |
| | | *Southern Champion* | 4/6–15/7/03 | 301 | 0 | | | | | | | 0 | 4 |
| | | Total | | 739 | 0.008 | | 2 | 2 | | 2 | | 6 | 11 |
| 2004 | 48.3 | *Argos Vigo* | 12/1–29/1/04 | 17 | 1.06 | | 2 | 16 | | | | 18 | 4 |
| | | *Betanzos* | 26/12/03–22/2/04 | 87 | 0.22 | | 1 | 18 | | | | 19 | 76 |
| | | *Robin M Lee* | 14/4–1/5/04 | 8 | 0.38 | | | 3 | | | | 3 | 0 |
| | | *Sil* | 25/1–29/2/04 | 69 | 0.25 | 1 | 3 | 13 | | | | 17 | 22 |
| | | *Dongsan Ho* | 6/1–30/1/04 | 28 | 0.46 | | 8 | 4 | | | 1 | 13 | 4 |
| | | *Insung Ho* | 28/12/03–27/1/04 | 29 | 0.59 | | 12 | 5 | | | | 17 | 30 |
| | | Total | | 221 | 0.37 | 1 | 26 | 59 | | | 1 | 87 | 132 |
| | 58.5.2 | *Austral Leader* | 14/3–12/5/04 | 366 | 0 | | | | | | | 0 | 1 |
| | | *Southern Champion* | 22/1–23/3/04 | 55 | 0 | | | | | | | 0 | 6 |
| | | Total | | 421 | 0 | | | | | | | 0 | 7 |

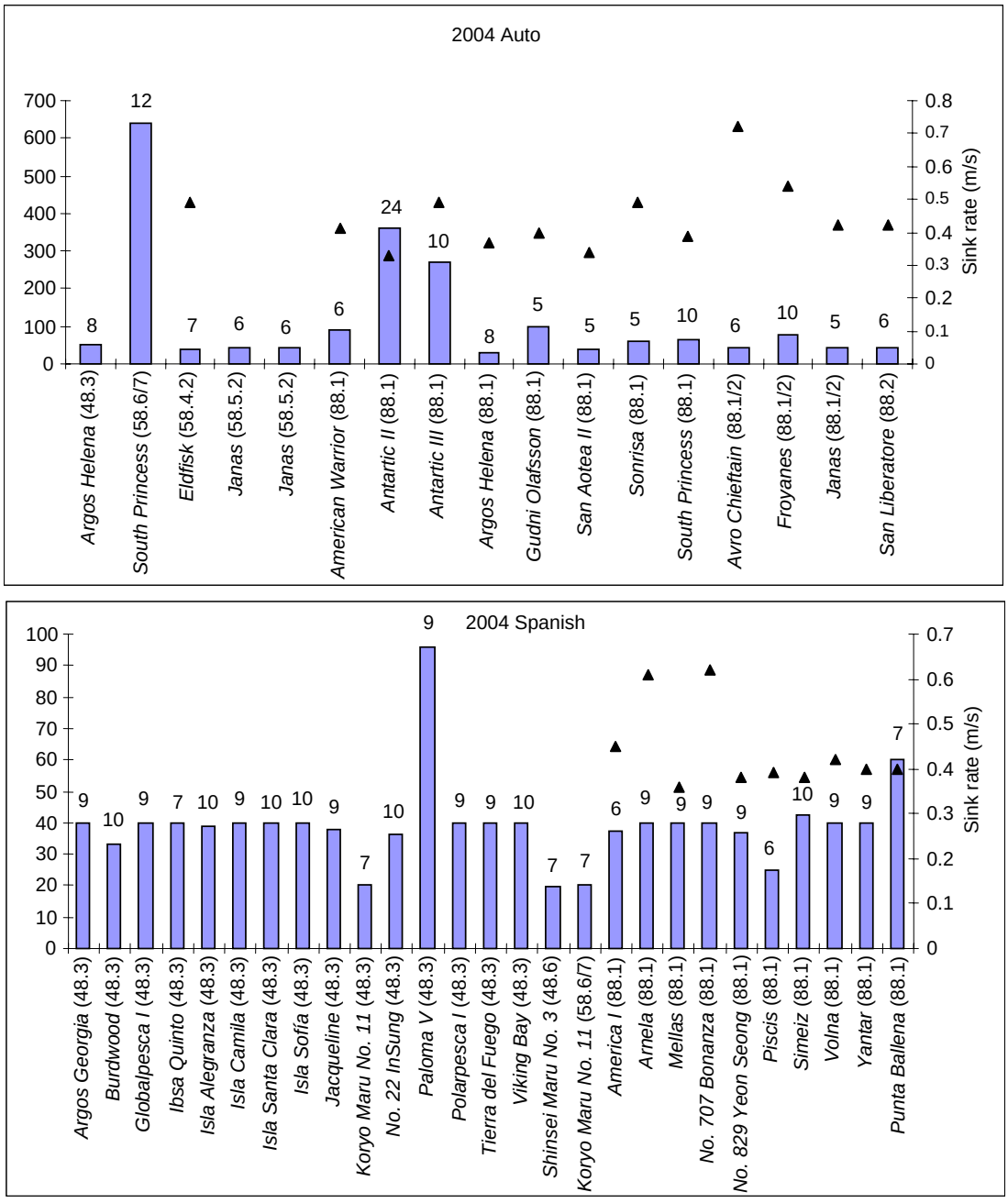


Figure 7.1: Longline weight spacing (y-axis in metres) and weights used (kilograms) by Spanish and autoline systems during the 2003/04 season. ▲ – sink rate (m/s).

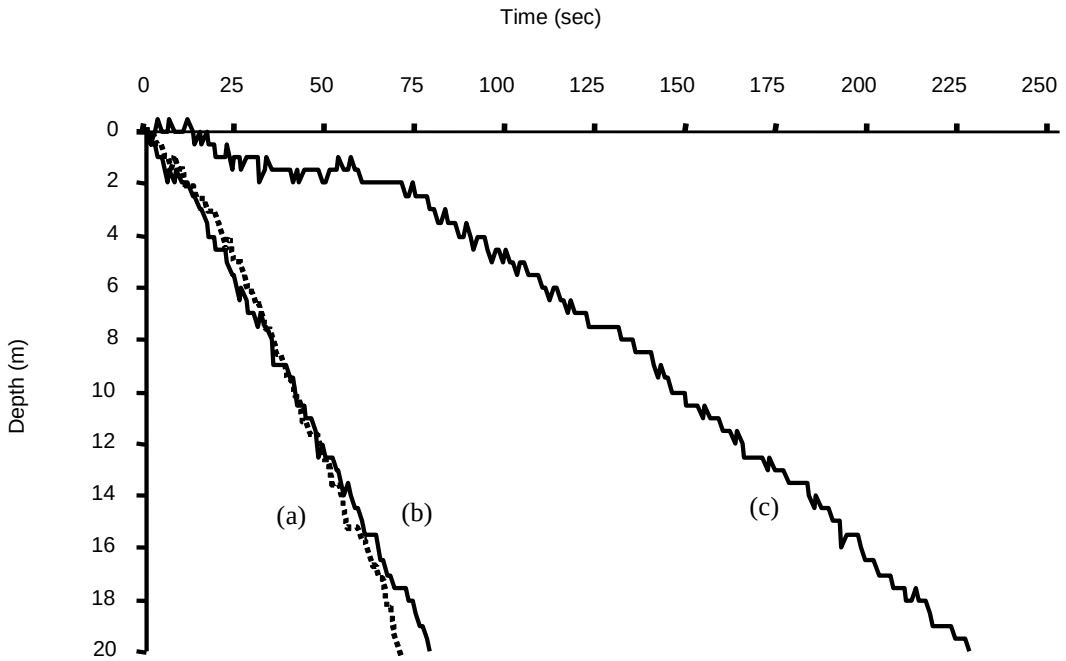


Figure 7.2: Examples of typical sink profiles to 20 m depth of: (a) 11.5 mm diameter UWLs with external weights attached (6 kg/42 m) and set in accordance with the requirements of Conservation Measure 24-02; (b) 9 mm diameter IWL; and (c) 9 mm diameter UWL. Lines were set from the FV *Janas* and sink profiles were determined with time-depth recorders. Sink rate to 20 m depth of UWLs + external weights was 0.29 m/s, slightly less than the 0.3m/s required by Conservation Measure 24-02. Sink rates of IWLs and UWLs shown were 0.25 m/s and 0.1 m/s respectively.

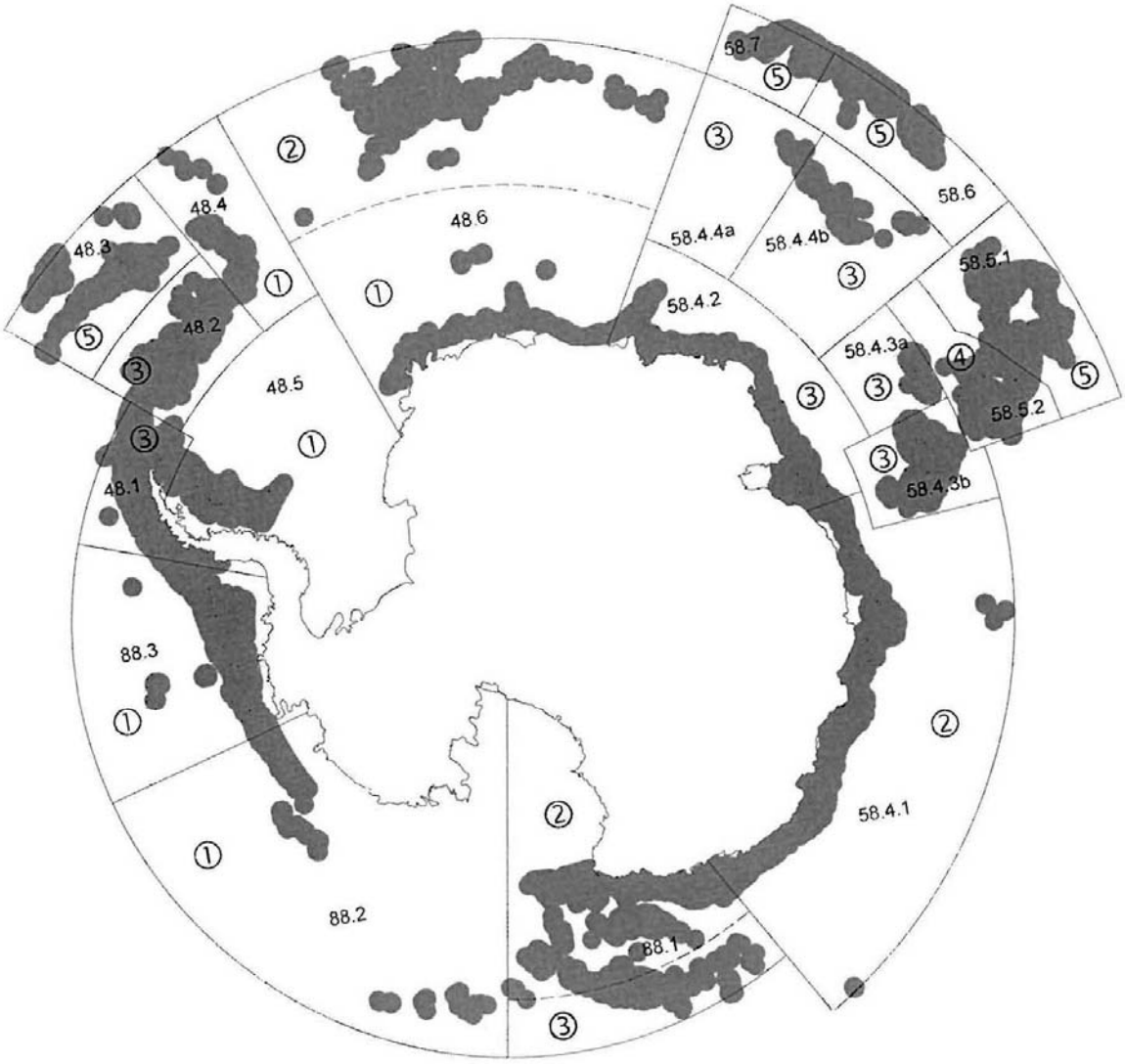


Figure 7.3: Assessment of the potential risk of interaction between seabirds, especially albatrosses, and longline fisheries within the Convention Area. 1: low, 2: average to low, 3: average, 4: average to high, 5: high. Shaded patches represent seabed areas between 500 and 1 800 m.