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**INCIDENTAL MORTALITY OF SEABIRDS DURING
UNREGULATED LONGLINE FISHING IN THE CONVENTION AREA**

Ad Hoc Working Group on Incidental Mortality Arising from Fishing (WG-IMAF)

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INCIDENTAL MORTALITY OF SEABIRDS DURING UNREGULATED LONGLINE FISHING IN THE CONVENTION AREA

INTRODUCTION

Each year ad hoc WG-IMALF is asked to prepare estimates of the level of incidental mortality of seabirds during IUU longline fishing in the Convention Area. As no information is available on seabird by-catch rates from the unregulated fishery, estimating this figure presents a number of difficulties, requiring that various assumptions.

2. As no information is available on seabird by-catch rates from the unregulated fishery, estimates have been made using both the average catch rate for all cruises from the appropriate period of the regulated fishery 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 set at night, to use streamer lines or to use any other mitigation measure. Therefore catch rates, on average, are likely to be considerably higher than in the regulated fishery. For example, in Subarea 48.3 the worst-case catch rate was nearly four times the average value and applies only to a single cruise in the regulated fishery. Using this catch rate to estimate the seabird catch rate of the whole unregulated fishery may produce a considerable overestimate.

3. In view of the fact that:

- (i) seabird by-catch rates in the regulated fishery have been reduced substantially since 1997, due to much better compliance with CCAMLR conservation measures, including those relating to closed seasons; and
- (ii) it is unreasonable to assume that the unregulated fishery made comparable improvements to the timing and practice of its operations;

the Working Group decided that it should continue to use the seabird by-catch rates from 1997, as was done in this assessment last year. The assessment this year, therefore, followed the identical procedure to that used last year (SC-CAMLR-XX, Annex 5, paragraphs 7.106 to 7.108), except that the calculation was prepared on a fishing season basis, in place of the split-season used in the past.

UNREGULATED EFFORT AND POTENTIAL BIRD BY-CATCH

4. To estimate the number of hooks deployed by the unregulated fishery, it is assumed that the fish catch rate in the regulated and unregulated fisheries is the same. Estimates of fish catch rate from the regulated fishery and estimated total catch from the unregulated fishery can then be used to obtain an estimate for the total number of hooks using the following formula:

$$\text{Effort(U)} = \text{Catch(U)}/\text{CPUE(R)},$$

where U = unregulated and R = regulated.

CPUE data for the regulated fishery in Division 58.5.1 were not available for 2000 to 2002, and we have used the catch rate from the last season for which these data are available (1999).

CPUE data for the regulated fishery in Division 58.4.4 legal fishery were not available for 2002, and we have used the catch rate from the last season for which these data are available (2001).

Division 58.5.2 has never had a legal longline fishery, and we have used the CPUE data from the adjacent Division 58.5.1 for all seasons.

Catch rates for Subarea 88.1 were assumed to be identical to those for summer fishing in Division 58.5.1, which has the lowest recorded by-catch rate for any area in which a regulated fishery has operated.

5. The fishing year was divided into two seasons, a summer season (S: September to April) and a winter season (W: May to August), corresponding to periods with substantially different bird by-catch rates. There is no empirical basis on which to split the unregulated catch into summer and winter components. Three alternative splits (80:20, 70:30 and 60:40) were used. For Subarea 88.1, it was assumed that all fishing occurred in summer, because of operational difficulties in longlining in much of this area during winter.

6. The seabird by-catch rates used were:

Subarea 48.3 –

summer: mean 2.608 birds/thousand hooks; maximum 9.31 birds/thousand hooks;

winter: mean 0.07 birds/thousand hooks; maximum 0.51 birds/thousand hooks.

Subareas 58.6, 58.7, Divisions 58.5.1 and 58.5.2 –

summer: mean 1.049 birds/thousand hooks; maximum 1.88 birds/thousand hooks;

winter: mean 0.017 birds/thousand hooks; maximum 0.07 birds/thousand hooks.

Division 58.4.4 –

summer: mean 0.629 birds/thousand hooks; maximum 1.128 birds/thousand hooks;

winter: mean 0.010 birds/thousand hooks; maximum 0.042 birds/thousand hooks.

Subarea 88.1 –

summer: mean 0.629 birds/thousand hooks; maximum 1.128 birds/thousand hooks;

winter: no fishing.

7. The composition of the potential seabird by-catch has been determined by that observed to occur in the regulated fishery during the 1996/97 split-year season (SC-CAMLR-XVI, Annex 5, Tables 42 and 44). These are:

Subarea 48.3 –

43% albatrosses, 2% giant petrels, 48% white-chinned petrels (7% unidentified petrels);

Subarea 58.7 –

22% albatrosses, 4% giant petrels, 63% white-chinned petrels (10% unidentified petrels).

As data for all other subareas and divisions are not available for regulated fisheries in the 1996/97 split-year season, the composition of seabird by-catch has been assumed to be identical to that in Subarea 58.7.

RESULTS

8. The results of these estimations are shown in Tables 1 and 2.

9. The overall estimated totals for the whole Convention Area (Tables 1 and 2) indicate a potential seabird by-catch in the unregulated fishery of 39 000–52 000 (lower level) to 70 000–93 000 birds (higher level) in 2002.

10. The composition of the estimated potential seabird by-catch is set out in Table 3. This indicates a potential by-catch in 2002 of 9 906–17 943 albatrosses, 1 800–3 259 giant petrels and 28 357–51 336 white-chinned petrels in the unregulated fishery in the Convention Area in 2002.

11. Table 3 also compares the estimates for 2002 with similar estimates for the years 1996 to 2001.

12. As in previous years, it is emphasised that the values in Tables 1 to 3 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.

Table 1: Estimate of seabird by-catch in the IUU *Dissostichus* spp. fishery in Subareas 48.3, 58.6, 58.7 and 88.1, and Divisions 58.4.4, 58.5.1 and 58.5.2 in fishing season 2002. S – summer, W – winter.

Subarea / Division	Total Unregulated Catch (tonnes)	Split S:W		Unregulated Catch (tonnes)		<i>Dissostichus</i> spp. Regulated Catch Rate (kg/hooks)	Unregulated Effort (1000 hooks)		Seabird By-catch Rate (birds/1000 hooks)				Estimated Total Unregulated Seabird By-catch			
		S	W	S	W		S	W	Mean		Max		Mean		Max	
									S	W	S	W	S	W	S	W
48.3	3	80	20	2.4	0.6	0.326	7	2	2.608	0.07	9.31	0.51	19	0	69	1
	3	70	30	2.1	0.9	0.326	6	3	2.608	0.07	9.31	0.51	17	0	60	1
	3	60	40	1.8	1.2	0.326	6	4	2.608	0.07	9.31	0.51	14	0	51	2
58.6	720	80	20	576	144	0.085	6 800	1 700	1.049	0.017	1.88	0.07	7 133	29	12 784	119
	720	70	30	504	216	0.085	5 950	2 550	1.049	0.017	1.88	0.07	6 242	43	11 186	179
	720	60	40	432	288	0.085	5 100	3 400	1.049	0.017	1.88	0.07	5 350	58	9 588	238
58.7	78	80	20	62.4	15.6	0.082	763	191	1.049	0.017	1.88	0.07	801	3	1 435	13
	78	70	30	54.6	23.4	0.082	668	286	1.049	0.017	1.88	0.07	701	5	1 256	20
	78	60	40	46.8	31.2	0.082	573	382	1.049	0.017	1.88	0.07	601	6	1 076	27
58.4.4	880	80	20	704	176	0.041	17 099	4 275	0.629	0.01	1.128	0.042	10 755	43	19 287	180
	880	70	30	616	264	0.041	14 961	6 412	0.629	0.01	1.128	0.042	9 411	64	16 876	269
	880	60	40	528	352	0.041	12 824	8 549	0.629	0.01	1.128	0.042	8 066	85	14 465	359
58.5.1	6300	80	20	5040	1260	0.229	22 052	5 513	1.049	0.017	1.88	0.07	23 133	94	41 458	386
	6300	70	30	4410	1890	0.229	19 296	8 270	1.049	0.017	1.88	0.07	20 241	141	36 276	579
	6300	60	40	3780	2520	0.229	16 539	11 026	1.049	0.017	1.88	0.07	17 350	187	31 094	772
58.5.2	2500	80	20	2000	500	0.229	8 751	2 188	1.049	0.017	1.88	0.07	9 180	37	16 452	153
	2500	70	30	1750	750	0.229	7 657	3 282	1.049	0.017	1.88	0.07	8 032	56	14 395	230
	2500	60	40	1500	1000	0.229	6 563	4 375	1.049	0.017	1.88	0.07	6 885	74	12 339	306
88.1	92	100	0	92	0	0.550	167	0	0.629		1.128		105		189	
	92	100	0	92	0	0.550	167	0	0.629		1.128		105		189	
	92	100	0	92	0	0.550	167	0	0.629		1.128		105		189	

Note: No CPUE data are available for longline fishing in Divisions 58.5.1, 58.5.2 and 58.4.4 in 2001/02. The figures used for CPUE are derived from the last season for which these data are available (58.5.1 – 1999; 58.4.4 – 2001). For Division 58.5.2, the catch rate from the adjacent Division 58.5.1 is used.

Table 2: Estimates of potential seabird by-catch in IUU longline fishing in the Convention Area in 2002.

Subarea/ Division	Potential By-catch Level	Summer	Winter	Total ¹
48.3	Lower (mean)	10–20	0–0	10–20
	Higher (max)	50–70	1–2	50–70
58.6	Lower (mean)	5 300–7 100	30–60	5 300–7 200
	Higher (max)	9 600–12 800	120–240	9 700–13 000
58.7	Lower (mean)	600–800	0–10	600–800
	Higher (max)	1 100–1 400	10–30	1 100–1 400
58.4.4	Lower (mean)	8 100–10 800	40–80	8 100–10 900
	Higher (max)	14 500–19 300	180–360	14 700–19 700
58.5.1	Lower (mean)	17 300–23 100	90–190	17 400–23 300
	Higher (max)	31 100–41 500	390–770	31 500–42 300
58.5.2	Lower (mean)	6 900–9 200	40–70	6 900–9 300
	Higher (max)	12 300–16 500	150–310	12 400–16 800
88.1	Lower (mean)	105	0	100
	Higher (max)	190	0	200
Total	Lower (mean)	38 300–51 100 ¹	200–400 ¹	39 000–52 000 ²
	Higher (max)	68 800–91 800 ¹	900–1 700 ¹	70 000–93 000 ²

¹ Rounded to nearest hundred birds

² Rounded to nearest thousand birds

Table 3: Composition of estimated potential by-catch in IUU longline fisheries in the Convention Area from 1996 to 2002.

Area	Year	Estimated Total Potential Seabird By-catch (lower level above, higher level below)		Composition of Potential Seabird By-catch ²		
				Albatrosses	Giant Petrels	White-chinned Petrels
Subarea 48.3 ³	1996	-	-	-	-	-
		-	-	-	-	-
	1997	-	-	-	-	-
		-	-	-	-	-
	1998	800	1 100	409	19	456
		3 000	4 100	1 527	71	1 704
	1999	3 400	4 500	1 699	79	1 896
		12 100	16 300	6 106	284	6 816
	2000	5 000	6 700	2 516	117	2 808
		18 000	24 300	9 095	423	10 152
2001	1 300	1 700	645	30	720	
	4 500	6 100	2 279	106	2 544	
2002	0	0	0	0	0	
	0	100	22	1	24	
Division 58.5.1 ⁴	1996	5 700	7 700	1 474	268	4 221
		10 300	13 900	2 662	484	7 623
	1997	10 700	14 300	2 750	500	7 875
		19 300	25 900	4 972	904	14 238
	1998	14 700	19 700	3 784	688	10 836
		26 600	35 700	6 853	1 246	19 625
	1999	3 400	4 600	880	160	2 520
		6 200	8 300	1 595	290	4 568
	2000	7 200	9 600	1 848	336	5 292
		13 000	17 400	3 344	608	9 576
	2001	12 600	16 800	3 234	588	9 261
		22 700	30 500	5 852	1 064	16 758
	2002	17 400	23 300	4 477	814	12 821
		31 500	42 200	8 107	1 474	23 216
Division 58.5.2 ⁴	1996	20 600	27 600	5 302	964	15 183
		37 300	50 000	9 603	1 746	27 500
	1997	12 500	16 700	3 212	584	9 198
		22 500	30 200	5 797	1 054	16 601
	1998	8 600	11 400	2 200	400	6 300
		15 400	20 700	3 971	722	11 372
	1999	1 200	1 600	308	56	882
		2 100	2 900	550	100	1 575
	2000	3 200	4 300	825	150	2 363
		5 800	7 700	1 485	270	4 253
	2001	5 500	7 400	1 419	258	4 064
		10 000	13 400	2 574	468	7 371
	2002	6 900	9 300	1 782	324	5 103
		12 500	16 800	3 223	586	9 230

continued

Table 3 continued

Area	Year	Estimated Total Potential Seabird By-catch (lower level above, higher level below)		Composition of Potential Seabird By-catch ²		
				Albatrosses	Giant Petrels	White-chinned Petrels
Division 58.4.4 ⁴	1996	-	-	-	-	-
		-	-	-	-	-
	1997	400	500	99	18	284
		700	1 000	187	34	536
	1998	1 600	2 100	407	74	1 166
		2 900	3 900	748	136	2 142
	1999	2 500	3 400	649	118	1 859
		4 600	6 100	1 177	214	3 371
	2000	7 100	9 500	1 826	332	5 229
		12 900	17 300	3 322	604	9 513
2001	11 500	15 400	2 959	538	8 474	
	20 800	27 800	5 346	972	15 309	
2002	8 100	10 800	2 079	378	5 954	
	14 600	19 600	3 762	684	10 773	
Subarea 58.6 ⁴	1996	6 800	9 100	1 749	318	5 009
		12 300	16 500	3 168	576	9 072
	1997	24 600	32 900	6 325	1 150	18 113
		44 400	59 600	11 440	2 080	32 760
	1998	5 000	6 700	1 287	234	3 686
		9 100	12 200	2 343	426	6 710
	1999	19 100	25 600	4 917	894	14 081
		34 500	46 300	8 888	1 616	25 452
	2000	11 200	14 900	2 871	522	8 222
		20 200	27 100	5 203	946	14 900
	2001	11 300	15 100	2 904	528	8 316
		20 400	27 300	5 247	954	15 026
	2002	5 400	7 200	1 386	252	3 969
		9 700	13 000	2 497	454	7 151
Subarea 58.7 ⁴	1996	4 000	5 300	1 023	186	2 930
		7 200	9 600	1 848	336	5 292
	1997	11 500	15 400	2 959	538	8 474
		20 800	27 900	5 357	974	15 341
	1998	2 000	2 700	517	94	1 481
		3 700	5 000	957	174	2 741
	1999	2 800	3 700	715	130	2 048
		5 000	6 700	1 287	234	3 686
	2000	900	1 200	231	42	662
		1 600	2 200	418	76	1 197
	2001	1 200	1 600	308	56	882
		2 100	2 900	550	100	1 575
	2002	600	800	154	28	441
		1 100	1 500	286	52	819
Subarea 88.1 ⁴	2002	100	100	22	4	63
		200	200	44	8	126

continued

Table 3 continued

Area	Year	Estimated Total Potential Seabird By-catch (lower level above, higher level below)		Composition of Potential Seabird By-catch ²		
				Albatrosses	Giant Petrels	White-chinned Petrels
Total	1996	37 100	49 700	9 548	1 736	27 342
		67 100	90 000	17 281	3 142	49 487
	1997	59 700	79 800	15 345	2 790	43 943
		107 700	144 600	27 753	5 046	79 475
	1998	32 700	43 700	8 604	1 509	23 924
		60 700	81 600	16 399	2 775	44 292
	1999	32 400	43 400	9 168	1 437	23 285
		64 500	86 600	19 603	2 738	45 467
	2000	34 600	46 200	10 117	1 499	24 575
		71 500	96 000	22 867	2 927	49 590
	2001	43 400	58 000	11 469	1 998	31 716
		80 500	108 000	21 848	3 664	58 583
	2002	38 500	51 500	9 906	1 800	28 357
		69 600	93 400	17 943	3 259	51 336
Overall Total		278 400	372 300	74 156	12 769	203 140
		521 600	700 200	143 693	23 551	378 228

¹ Rounded to nearest thousand birds.

² Based on averages for lower (above) and higher (below) level values.

³ Based on 43% albatrosses, 2% giant petrels, 48% white-chinned petrels (7% unidentified petrels) (see SC-CAMLR-XVI, Annex 5, Table 44).

⁴ Based on 22% albatrosses, 4% giant petrels, 63% white-chinned petrels (10% unidentified petrels) (see SC-CAMLR-XVI, Annex 5, Table 42).