CCAMLR-XXV/BG xx
October 2006
Original: English
Agenda Item 4, 7 & 10

IMPROVING MONITORING AND CONTROL OF THE KRILL FISHERY

THE ANTARCTIC AND SOUTHERN OCEAN COALITION
(ASOC)

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I. Introduction – CCAMLR and krill

Ecosystem management of Antarctic krill (*Euphausia superba)* is a central task for CCAMLR. The Scientific Committee, through its Working Group on Ecosystem Monitoring and Management (WG-EMM), is developing management procedures on krill aimed at ensuring that ecological relationships between harvested, dependent and related populations are maintained, according to Article II 3 (b) of the Convention. In addition, CCAMLR's Ecosystem Monitoring Program (CEMP) provides information on the status of the different components of the ecosystem to be incorporated into these management procedures.

Regrettably, the quality and magnitude of CCAMLR's scientific work on krill is rarely matched by action at the Commission level to provide the necessary tools to allow adequate monitoring and control of the fishery. A review of the reports of the Scientific Committee and the Commission from the past thirteen years has been recently conducted in order to assess the profile of krill-related discussions in their respective agendas. Discussions of krill and toothfish (*Dissostichus* spp.), currently the highest profile species under CCAMLR management, were compared. The results of this research are shown in Appendix 1 of this paper.[1] It reveals that while the Scientific Committee has devoted similar consideration to krill and toothfish-related issues (table 1), the Commission has drawn considerably more attention to toothfish than it has done to krill. In the early 1990s the treatment of both species was fairly balanced in the Commission agenda. Since 1996, however, toothfish-related issues began to dominate the discussions – a trend that peaked in 2002, where only 25 of the paragraphs in the Commission's report dealt with krill, and 155 with toothfish (table 2). This reflects the pressure on the Commission to address high levels of illegal, unreported and unregulated (IUU) fishing for toothfish in the Convention Area. Krill-focused management decisions have suffered as a result.

In recent years, the Antarctic and Southern Ocean Coalition (ASOC) has drawn CCAMLR's attention to the imminent expansion of krill fishing in the Convention Area, its potential consequences for the Antarctic ecosystem, and the need to ensure that an effectively controlled, ecosystem-based management of Antarctic krill is in place before this expansion occurs.[2] ASOC papers on these issues have been noted by the Scientific Committee.[3] The Commission needs now to address these issues as a matter of priority. It is paradoxical that while CCAMLR's scientific work on krill is regarded as a model at the regional level, this fishery is still exempt from basic control requirements that apply to other CCAMLR fisheries. This deficit on Monitoring, Control and Surveillance (MCS) has two important consequences:

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[1] Preliminary and unpublished results of research conducted by Virginia Gascón (Antarctic Krill Conservation Project) are presented here to contribute to CCAMLR discussions. Special thanks are given to Cynthia Fernández and Soledad Lindner for their invaluable help in this work, and to Rodolfo Werner for his very useful advice.

[2] ASOC, *Management of the Antarctic Krill: Ensuring the Conservation of the Antarctic Marine Ecosystem.* SC-CCAMLR-XXIII/BG/25; ASOC, *Ecosystem Management of the Antarctic Krill Fishery*. SC-CCAMLR-XXIV/BG/21.

[3] SC-CCAMLR, *Report of the Twenty-Third Meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources* (CCAMLR, 2004), para. 4.13; SC-CCAMLR, *Report of the Twenty-Fourth Meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources* (CCAMLR, 2005), para. 9.10 and 9.11.

1) It considerably hinders the ability of the Scientific Committee to provide adequate management advice to the Commission;

2) It will be virtually impossible to ensure that fishing operations comply with the requirements of an ecosystem management regime if these measures are not in place.

II. MCS Conservation Measures on krill

This paper highlights the urgent need for CCAMLR to approve Conservation Measures that extend to krill fisheries the MCS measures applied to other CCAMLR fisheries. Proposed regulations relate to scientific observers, Vessel Monitoring System, and improved information on catches and fishing plans.

A. Scientific Observers

CCAMLR achievements in developing innovative approaches to fisheries management in other fisheries have been made possible in considerable part by the collection of data through CCAMLR's scientific observer program. Valuable information gathered by observers on aspects such as bycatch and operational fishing practices have enabled the development of key measures to minimize impacts on the Southern Ocean ecosystem as a result of fishing (Croxall & Trathan, 2004).

CCAMLR's *Scheme of International Scientific Observation* was adopted in 1992 to gather and validate fishery-related scientific information. This data is needed to assess the status of the populations of Antarctic marine living resources and the impact of fishing on such populations, as well as on those of related and dependent species (Sabourenkov and Appleyard, 2005).

In order to achieve these objectives, the Scientific Committee has developed lists of scientific research priorities to be followed by observers on board commercial vessels. These priorities are included in CCAMLR's Scientific Observer Manual. Currently, this manual includes research priorities for Mackerel icefish *(Champsocephalus gunnari), Patagonian toothfish (Dissostichus eleginoides),* lantern fish *(Electrona carlsbergi),* stone crabs *(Paralomis* spp.), and krill.

Research priorities for krill include: observations of fishing operations; collection of haul-by-haul catch and effort data; representative length frequency distributions; representative sex and maturity stage distributions; observations on feeding intensity; observations of the by-catch of juvenile fish; and observations of incidental mortality of predators (birds and seals).

During the 2004/05 season, nine vessels fished for krill in the CCAMLR Area. Six out of these vessels had scientific observers on board for limited periods of time. These vessels were flagged to USA (national observer), Japan, Korea, Vanuatu (international observers) and Ukraine (national and international).[4] The WG-EMM has noted that these scientific observers mainly operated during summer and autumn, providing insufficient coverage of the fishery, as the krill fishing season currently extends from summer to winter. Similarly, most of the observer reports were related to fishing operations in Subarea 48.3, and no observer information was available from Subareas 48.1

[4] CCAMLR Secretariat, *Summary of Scientific Observation Programmes undertaken during the 2004/05 Season*, SC-CCAMLR- XXIV/BG/7. During the previous season, only one observation was conducted on board a US krill vessel operating in Area 48. CCAMLR Secretariat, *Summary of Scientific Observation Programmes undertaken during the 2003/04 season*, SC-CCAMLR- XXIII/BG/6.

and 48.2.[5] The WG-EMM emphasized the need for more comprehensive and representative observer coverage in space and time to further improve the understanding of the krill fishery. [6] The only way to ensure that this coverage is achieved is by requiring krill fishing vessels to fully comply with CCAMLR's Scheme of International Scientific Observation.

There is agreement at the WG-EMM that there is an urgent need for international observer coverage on all vessels fishing for krill in the CCAMLR Area, especially in light of recent changes in the fishing/processing technology being used for krill. [7] Details of the fishing operations of the different vessel technologies and their potential ecosystem impacts need to be carefully evaluated through scientific observer information.

In addition, as the Scientific Committee has pointed out, observer data during this transition period will also be crucial in the future in order to understand changes in the fishery.[8] As an example, lack of scientific observer data from the toothfish fishery in Subarea 48.3 during the developmental phase of the fishery (late 1980s, early 1990s) has negatively affected CCAMLR's recent endeavours to assess toothfish stocks in this Subarea.[9]

At its meeting in 2005,[10] Scientific Committee Members agreed that observers onboard krill vessels were needed to provide essential data on: a) biology and distribution of krill; b) technological developments in the fishery; c) by-catch of fish (e.g., larval *C. gunnari*); d) incidental catches of seals and seabirds; e) mitigation measures, particularly the use and efficacy of seal-exclusion devices.[11] In spite of this agreement on the scientific rationale in favour of full international observer coverage on krill vessels, the Scientific Committee remains unable to reach consensus to give advice to the Commission on this issue. However, as some Scientific Committee Members have acknowledged, the factors that are impeding CCAMLR from adopting a mandatory observer program for krill are not of a scientific nature, and thus would better be dealt with by the Commission. [12]

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[5] During the 2003/04 season, 13,882 tonnes of krill were caught in Subarea 48.1; 46,456 tonnes in Subarea 48.2; and 57,829 tonnes in Subarea 48.3.

[6] At its 2005 meeting, the WG-EMM noted that the CCAMLR database held scientific observer data from 20 trips/deployments in the krill fishery between 1999/2000 and 2003/04 in Subareas 48.1, 48.2 and 48.3. *See* SC- CCAMLR WG-EMM, *Report of the Meeting of the Working Group on Ecosystem Monitoring and Management.* SC-CCAMLR-XXIV/3, para. 3.31-3.33.

[7] *Id.,* para. 3.44

[8] Graphic 1 in the Appendix to this paper portrays a summary of the coverage of the issue of scientific observers by the Scientific Committee and the Commission from 1992 to 2005.

[9] SC-CCAMLR, *Report of the Twenty-Fourth Meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources* (CCAMLR, 2005), para. 11.7.

[10] *Id.*, para. 11.6

[11] The Scientific Committee has recommended that exclusion devices should be employed by all vessels engaged in the krill fishery in order to minimize the incidental catch of fur seals and that observers should be deployed on all vessels to assess the effectiveness of the these devices SC-CCAMLR, *Report of the Twenty-Third Meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources* (CCAMLR, 2004), para 5.37. It has also noted that, under the current observer coverage, an assessment of the total Antarctic full seal mortality in the krill fishery is not possible. SC-CCAMLR, *Report of the Twenty-Fourth Meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources* (CCAMLR, 2005), para. 5.39.

[12] SC-CCAMLR, *Report of the Twenty-Fourth Meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources* (CCAMLR, 2005), para. 2.12.

B. Vessel Monitoring System

Vessel Monitoring System (VMS) is a basic regulatory tool that allows States to verify that fishing operations comply with the conditions of the fishing licence and that fishing in non-authorised areas does not occur. CCAMLR introduced the system in 1998, requiring flag States to monitor the position of its fishing vessels licensed to fish in the Convention Area through an automated satellite-linked VMS.[13] Since its adoption, krill has been exempt from this measure, which applies to all other CCAMLR fisheries.

CCAMLR's VMS has been strengthened in recent years to include more complete information to be reported to the flag State, which now includes not only general fishing vessel identification and position, but also specific data on the geographical position of the vessel, date and time of said positions, and speed and course of the vessel. This data must be reported at minimum every four hours. The VMS measure has also been revised to include specific requirements that make the system less amenable to tampering. Most importantly, at its 2004 meeting, CCAMLR established a centralised VMS, by which flag states are required to transmit the position of the vessels to the CCAMLR Secretariat, which allows for independent verification of vessel positioning data.

The Commission has discussed the need to require VMS on board krill vessels on several occasions. While most CCAMLR Members have been in favour of VMS, opponents have argued that the total krill catch is currently well below the catch limit and VMS is therefore unnecessary. Nevertheless, under the new fishing technologies being used, there is potential for reaching the 620,000 tones trigger level in a very short period of time.[14] CCAMLR needs to establish this measure before the trigger level has been reached. When catch limits at the SSMU level are in place, it will be impossible to ensure compliance without VMS monitoring of all krill vessels, and introducing this regulation in advance will avoid possible implementation delays. Also, previous experiences at CCAMLR have shown that it is more difficult to reach consensus on these types of regulatory adjustments when the need for them has already become imperative (Constable *et al*., 2000).

In addition, at present there is no way to ensure vessel compliance for vessels licenced to fish in a given subarea of the South Atlantic. CCAMLR flag States must be required to monitor the positioning of these vessels to make sure that the conditions of the licence are met. Without VMS, the krill fishery is poorly regulated and difficult to monitor.

III. Reporting and submission of fishing plans

For the development of adequate management procedures, CCAMLR krill fishing nations need to provide complete information to CCAMLR about the fishery, both as it relates to fishing operations taking place during the season and as related to catch projections for the forthcoming season.

In relation to catch projections, CCAMLR currently requires the notification of intent to fish in Southern Ocean fisheries, except krill. In 2003, the Commission approved a pro forma to be completed by CCAMLR Members that intend to fish for krill. This form asks for minimal information and is voluntary. This pro forma includes: number of vessels; months and areas for planned fisheries;

[13] *See* Conservation Measure 10-04 (2005).

[14] Recent application of modern fishing technologies to the Antarctic krill fishery, including the catching and simultaneous on-board processing of krill, enables operators to increase catch projections up to 120,000 tonnes per year per vessel (Engoe, 2006).

expected catch levels; and product information. Since 2003, Members are generally following these guidelines and submitting information that it is very valuable for the Scientific Committee to identify trends in the fishery. [15]

The Scientific Committee has also noted that this information is most useful when viewed in a time series. Consequently, it is important that complete fishing plan information is consistently reported to CCAMLR over the years. This becomes particularly significant in view of the changes currently affecting the fishery in catching and processing methods, catch levels, and resulting products. The only way for CCAMLR to ensure that complete information is consistently submitted is by making submission of krill fishing plans mandatory.

Prior to 2002 the krill fishery was the only CCAMLR fishery that did not require mandatory submission of detailed catch and effort data. Until then, submission of CPUE and associated data was only voluntary.[16] In 2002, the Commission responded to calls from the Scientific Committee that more detailed data on krill fishing was needed and, therefore, the reporting requirements for the krill fishery were revised. Consequently, Conservation Measure 23-06 was adopted, establishing a data reporting system for krill. According to this system, krill catches are to be reported to the Commission on a monthly basis. The measure was revised in 2004 and 2005, responding to the need to obtain fine-scale, haul-by-haul data on krill fishing operations at the end of the fishing season, in order to be able to develop management advice.[17]

In 2005, the Scientific Committee noted that with the new technology being used to catch krill, the duration of a haul can extend for several days, and therefore, a single haul can occur in several different SSMUs. Conservation Measure 23-06 was adapted accordingly, and it now requires catches to be reported "according to the statistical areas, subareas, divisions, or any other area or unit specified with catch limits in Conservation Measures 51-01, 51-02 and 51-03".[18] This means that, when catch limits are allocated among the SSMUs in Area 48, catches will have to be reported at the SSMU level on a monthly basis, in addition to providing haul-by-haul, fine-scale data at the end of the fishing season. At the moment, vessels report fine-scale data with different levels of detail depending on the fishing method. CCAMLR should take this into consideration and adapt the fine-scale and effort data form (trawl fisheries form C1) so as to allow cross-fleet comparison between different fishing methods. This comparison is necessary to understand trends in the krill fishery.

IV. Conclusions

CCAMLR must strengthen monitoring, control and surveillance measures in order to establish precautionary, ecosystem-based management of the Antarctic krill fishery. The krill fishery should be subject to the same controls applicable to other CCAMLR fisheries.

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[15] In previous years, CCAMLR's Scientific Committee and WG-EMM had noted that the absence of complete and reliable information on krill fishing plans was precluding CCAMLR bodies from predicting trends in the krill fishery, which would be key for management decisions. *See* SC-CCAMLR, *Report of the Twenty-Second Meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources* (CCAMLR, 2003), para. 4.6.

[16] CCAMLR, *Report of the Twenty-First Meeting of the Commission for the Conservation of Antarctic Marine Living Resources* (CCAMLR, 2002), para. 4.27.

[17] CM 23-06 (2005), app. 3.

[18] CM 23-06 (2005), app. 2.

Specifically:

- The Commission should ensure that all krill vessels fishing in the CCAMLR Area have scientific observers on board, in accordance with CCAMLR's *Scheme of International Scientific Observation.* There is no doubt about the compelling scientific reasons for full observer coverage in the krill fishery, in order to gather information that is indispensable for krill management.
- The Commission needs to make sure that VMS is required for all vessels fishing for krill in the Convention Area. VMS should be considered as a minimum regulatory standard and it should apply to all CCAMLR fisheries with no exception.
- The Commission should ensure that consistent information on krill catches, fishing operations and catch projections is reported to CCAMLR in sufficient detail for the Scientific Committee to develop management advice. Particularly, submission of krill fishing plans should be mandatory, following the current pro forma developed by CCAMLR. In addition, reporting of fine-scale and effort data on krill catches should be adapted so as to allow cross-fleet comparison between different fishing methods.

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APPENDIX

Table 1. Number of paragraphs dealing with krill and toothfish in Scientific Committee Reports 1992-2004.

Year	Total para.	Krill	Toothfish
1992	464	185	16
1993	446	138	48
1994	506	99	40
1995	371	58	58
1996	432	53	81
1997	589	42	128
1998	489	38	132
1999	402	49	78
2000	465	58	75
2001	441	56	58
2002	421	77	66
2003	534	72	129
2004	546	64	113
Total*	5560	925	909

* Total paragraphs 1992-2004: 5,560

925 were specifically related to krill
909 dealt with issues that are specifically related to toothfish
3,726 dealt with other issues

Table 2. Number of paragraphs in dealing with krill and toothfish Commission Reports 1992-2004

Year	Total para.	Krill	Toothfish
1992	187	16	23
1993	233	22	15
1994	285	27	28
1995	273	23	22
1996	393	13	59
1997	391	12	80
1998	421	25	88
1999	343	20	77
2000	423	30	73
2001	349	30	70
2002	552	25	155
2003	532	29	126
2004	417	33	89
Total*	4799	305	905

* Total paragraphs 1992-2004: 4,799 305 were specifically related to krill
905 dealt with issues that are specifically related to toothfish
3,589 dealt with other issues

Table 3. Number of Paragraphs dealing with krill in Scientific Committee (SC) v. Commission (Comm.) Reports 1992-2004

Year	**SC**	**Comm.**
1992	185	16
1993	138	22
1994	99	27
1995	58	23
1996	53	13
1997	42	12
1998	38	25
1999	49	20
2000	58	30
2001	56	30
2002	77	25
2003	72	29
2004	64	33
Total	925	305

Table 4. Number of Paragraphs dealing with toothfish in Scientific Committee (SC) v. Commission (Comm.) Reports 1992-2004

Year	SC	Comm.
1992	16	23
1993	48	15
1994	40	28
1995	58	22
1996	81	59
1997	128	80
1998	132	88
1999	78	77
2000	75	73
2001	58	70
2002	66	155
2003	129	126
2004	113	89
Total	909	905

Graphic 1. Detail of paragraphs dealing with observer coverage on board krill vessels in Scientific Committee and Commission Reports 1992-2005.