OTHER RESOURCES

SQUID

4.1 No Members reported fishing for squid within the Convention Area during the past year. In addition, no field program on cephalopod biology was reported by Members.

4.2 The UK reported research on the diet of *Martialia hyadesi* that was conducted during this last year (SC-CAMLR-XI/BG/10 and 11). Samples of deep frozen squid, collected aboard two Japanese squid jigging vessels carrying out commercial fishing trials at the Antarctic Polar Frontal Zone, north Scotia Sea in February 1989 were examined. The prevalence of copepod-feeding myctophids in the diet of squid, which is itself a major prey item of some higher predators in the Scotia Sea, suggests that they fed in two food chains, the copepod-myctophid food chain and the *E. superba* food chain.

4.3 An international symposium on Southern Ocean Cephalopods: Life Cycles and Population, on behalf of the Cephalopod International Advisory Council and sponsored by the British Antarctic Survey and the Malacological Society of London will be held at King's College, Cambridge from the 4 to 10 July, 1993.

CRABS

4.4 It was noted that the Scientific Committee at the last meeting had initially assigned the task of assessing the status of crab stocks to WG-FSA. It was agreed that this was the appropriate venue for this work and that future assessment of crab stocks should be completed by WG-FSA.

4.5 The Scientific Committee commended the US for the way it had conducted the early developmental stages of the new crab fishery and that this should serve as a guide for the development of other new fisheries.

4.6 Beginning in early July 1992 and continuing until the present, the US vessel FV *Pro Surveyor* has been conducting fishing operations for Antarctic crabs in waters around South Georgia and Shag Rocks (Subarea 48.3). Two species are being caught: *Paralomis spinosissima* and *P. formosa*. Using data collected during the first 22-day trip of the vessel, "commercial" crabs to be retained as catch were defined as males of *P. spinosissima* that exceed 102 mm in carapace width. Only about 500 male *P. formosa*, which exceeded 90 mm, were retained and all other crabs were returned to the sea (Annex 5 and WG-FSA-92/29).

4.7 During the first trip, approximately 7 280 pots were lifted (fished), and on average, each pot contained approximately seven crabs which averaged about 1.1 kg each.

4.8 Mr P. Duffy, owner of the US crab fishing vessel conducting operations in Antarctic waters, was invited by the Scientific Committee to provide details of the fishing operation. He provided answers to several questions concerning the specific operation of the fishery, his future plans to fish in Antarctic waters, survival of released crabs, incidence of parasites in the crabs, etc.

4.9 The Scientific Committe noted WG-FSA's view that growth rates of Antarctic crabs are unknown and apparently high initial catches may reflect an accumulated biomass and lead to an overestimate of sustainable yield. In addition, the Scientific Committee agreed that reliable estimates of sustainable yield of Antarctic crabs could not be calculated from the limited data available (Annex 5, paragraphs 6.8 and 6.9).

4.10 WG-FSA investigated two methods which might provide guidance in setting conservative levels of catch to be applied in the early stages of the fishery while the data necessary for more precise estimates are being acquired and analytical methods are being developed.

4.11 The first method, described in Annex 5, paragraph 6.10, is based on the fact that catch rates and the depths at which crabs are taken in Antarctic waters are similar to those in the Aleutian Islands (Bering Sea) fishery for golden king crab (*Lithodes aequispinum*). This method indicated that Subarea 48.3 might have an annual potential yield of 2 210 tonnes between 200 and 1 000 m (strata fished during the first trip).

4.12 In the second method (Annex 5, paragraph 6.11), a rough calculation of the standing stock of commercially sized male *P. spinosissima* was made by determining the vessel's average catch per n mile^2 and multiplying this value by the total fishable area (200 to 1 000 m) in Subarea 48.3. This method indicated that the standing stock might be roughly 155 000 tonnes.

4.13 However, the Scientific Committee agreed with the view of WG-FSA that this method contained a number of potential biases (Annex 5, paragraphs 6.16 and 6.17). Therefore, a conservative approach was to reduce the standing stock calculation by 50% and by 70%. This reduced the calculated stock estimate to 78 000 and 48 000 tonnes, respectively.

4.14 A catch of 2 210 tonnes, based on calculations of the potential yield from the Aleutian Island fishery, would correspond to less than 5% of exploitable standing stock estimates in the second method.

Management Advice

4.15 The Scientific Committee agreed that given the large uncertainties associated with estimating standing stock, a conservative management strategy should be followed. This would include WG-FSA's suggestion that immediate application of precautionary measures and the simultaneous commencement of work on the development of a longterm management plan for the fishery should be adopted.

4.16 The Scientific Committee recognised that the first stage in the development of a longterm management plan is the convening of a workshop during the intersessional period to specify the data needed and the actions required to acquire the data from the exploratory crab fishery that will allow the development of assessment methods and the estimation of appropriate harvest levels. The Workshop should be held in late April or early May, 1993.

4.17 The terms of reference for the Workshop are:

(i) to design an approach to management of this fishery that will enable WG-FSA to measure;

  (a) the productivity and abundance of the stock; and
  (b) the effect of different harvest strategies;

(ii) to establish the types and scale of data necessary to implement the above approach to management; and

(iii) to establish reporting requirements for the fishery.

4.18 Pending the development of a longterm management plan for the crab fishery in Statistical Area 48 by the Workshop and its subsequent review by WG-FSA and the Scientific Committee and its endorsement by the Commission, the following measures should be applied:

(i) the fishery should be closed until the end of the Workshop (planned for April or May, 1993);
(ii) the exploratory crab fishery should be limited to a few vessels (i.e., one to three vessels); however, if more than three vessels register with the Secretariat to fish for Antarctic crabs, a catch limit (see paragraphs 4.19 and 4.20) should be applied for the period from the start of the fishery until the next meeting of the Commission;

(iii) a condition to enter this fishery should be that each Member participating, or intending to participate, in the exploratory crab fishery register with the Secretariat (at least three months in advance of starting fishing annually) the name, type, size, registration number, and radio call sign and fishing plan of each vessel that the Member has authorised to participate in the exploratory crab fishery;

(iv) the following data should be reported to CCAMLR by 30 September 1993 for crabs caught prior to 30 July 1993;

(a) the location, date, depth, fishing effort (number and spacing of pots) and catch (numbers and weight) of commercially sized crabs (reported on as fine a scale as possible, but no coarser than 1° longitude by 0.5° latitude) for each 10-day period;

(b) the species, size, and sex of a representative subsample of crabs caught in traps;

(c) other relevant data, as possible, according to the logbook formats already being used in the exploratory crab fishery (Annex 5, Appendix F);

(v) data identified by the Workshop that are required to determine the appropriate harvest levels should be collected during the 1993 season by all vessels fishing for Antarctic crabs. These data should be reported to CCAMLR in the form specified by the Workshop;

(vi) crab fishing gear should be limited to the use of crab pots (traps). The use of all other methods of catching crabs (e.g., bottom trawls) should be prohibited;

(vii) the crab fishery should be limited to sexually mature male crabs that have had, on average, at least one opportunity to breed - all female and undersized male crabs caught should be released unharmed. In the case of *P. spinosissima* and *P. formos*a, males with a minimum carapace width of 102 mm and 90 mm, respectively, may be retained in the catch; and

(viii) crab processed at sea should be frozen as crab sections (minimum size of crabs can be determined using crab sections).

4.19 Some Members believed that if more than three vessels register to enter the fishery for Antarctic crabs (see paragraph 4.18 above) a reasonable catch limit would be 2 200 tonnes.

4.20 Other Members believed that if more than three vessels register to participate in the crab fishery a reasonable catch limit would be 1 000 tonnes.

4.21 The Scientific Committee welcomed the offer of the US to host the CCAMLR Crab Workshop at the Southwest Fisheries Science Center, La Jolla, California.