

**CHAIRMAN'S COMMENTS ON THE RESULTS  
OF THE FISH STOCK ASSESSMENT  
WORKING GROUP MEETING**

# REPORT OF THE AD HOC WORKING GROUP ON FISH STOCK ASSESSMENT

## CHAIRMAN'S SUMMARY

### ASSESSMENTS

1. The new length and age data which was made available for the group by several countries permitted an improved assessment of the effects of fishing on *N. rossii* and *C. gunnari* stocks at South Georgia. An assessment of *N. rossii* and *N. squamifrons* at Kerguelen was presented by France. Data were not available to assess any stocks in the South Atlantic peninsula subarea.

#### South Georgia

##### *N. rossii*

2. The previous, 1984, report concluded that 'this stock is very severely affected by fishing'. All the further information discussed during the present meeting confirmed that conclusion. Not only was the stock depleted by the very large catches between 1969 and 1971, but the relatively small catches taken since then have been sufficient to cause further decline. Though the strengths of the year-classes currently in the fishery are not precisely known, they are certainly small, and small catches will be sufficient to prevent a recovery. The information on yield-per-recruit and current year-class strength, as well as on the effects of recent catches suggest that the current replacement yield is less than a thousand tons. In contrast, if the spawning stock could be rebuilt to provide recruitment of say 10 million fish (i.e. rather less than the recruitment in the 1960s), and the fishing mortality and age at first capture adjusted to provide a yield of around 1000 gm per recruit, this would correspond to a sustainable annual yield of around 10,000 tons.

##### *C. gunnari*

3. While it appears that this stock is heavily fished, there is no indication that recruitment has, up to the present, been affected. Though the information on year-class strength is not as

good as for Kerguelen, it does suggest that, as in the case at Kerguelen, recruitment is variable. This variability is in part the cause of the high variability in annual catches, and this effect is increased by the degree to which recent catches are dominated by a single year-class. This, as noted last year, makes the fishery vulnerable to years of low recruitment, a possibility which has to be recognised if the high level of mortality continues.

4. For both species, the yield per recruit calculations indicated that increases would be obtained by increasing the age at first capture or reducing fishing mortality. Substantial reductions in fishing mortality, even to less than about 20% of current levels, would not much decrease yield-per-recruit and would increase spawning stock.

#### *N. gibberifrons*

5. There has been a clear upward trend in total mortality from about 0.1 in 1975/76, to 0.3 or more after 1981. This seems almost certainly due to the increased catches; catches were negligible before 1975. The data suggest the current values of F and M are around 0.2 and 0.1 respectively. It does seem probable that fishing mortality (as an average over the last years) is well in excess of natural mortality. This high rate of fishing may be detrimental to the stock in the long run. It was noted that this species is taken primarily as a by-catch.

6. The data are too sparse to show any clear trends for *C. aceratus* and *P. georgianus*, for which, reported catches were low except in 1977/78 when 13,000 tons of georgianus were reported. Some of the actual catch for these species may be part of the large reported catches of unidentified species.

#### Kerguelen

7. The detailed fisheries log-book data which have been collected since 1979 have permitted a detailed description of the fishery and trends in population size.

#### *N. rossii*

8. The decline of this stock has continued and there is some evidence that recruitment has been adversely affected. The annual average catches of around 5000 tons since 1980 have been greater than the recruitment rate.

*C. gunnari*

9. Length and age analysis of this relatively short-lived species show that there are large variations in year-class strength. A good cohort was born in 1979, and supported good catches in the 1981/82 and 1982/83 seasons, but has now become scarce. Information from the 1984/85 season suggests that the 1982 cohort is also good. The relatively high total mortality suggests that fishing mortality is significant, but there is no evidence that this is affecting recruitment.

*N. squamifrons*

10. Recent catches have been considerably smaller than the peak catches of 26,500 and 51,000 tons taken in the 1970/71 and 1971/72 seasons. However, there is no evidence to determine whether there has been a decline in stock size, or whether the decrease in catch is due more to a decrease in fishing effort on a species which is less attractive commercially than *N. rossii*.

## MANAGEMENT ADVICE

### Mesh Regulations

11. There were no direct observations on selectivity for Antarctic fish available at the meeting.

12. In the Convention area, comparisons of catches by research vessels using small meshes with those of the commercial fleets have shown, that for *C. gunnari* the larger size meshes in commercial nets do release the smallest size-class of fish (ca. 15 cm). For the other species including *N. rossii* a comparison of the data sets shows no such difference, with very small fish being absent even from the small mesh catches. This suggests that the small fish are absent from the commercial fishing grounds and that all sizes of fish offshore can be retained in the mesh sizes now in use.

13. The earlier analyses did suggest, on the basis of yield-per-recruit analyses, that if the age (and size) at first capture of at least *N. rossii* and *C. gunnari* was increased, then the yield-per-recruit and stock would improve. Because the selective action of a trawl is not exact, and selection occurs over a range of sizes, and because data was lacking there could

not be determined a unique match of mesh size to size of first capture. However, it is usual to choose the mesh size whose 50% selection point (i.e. the length at which 50% of the fish will pass through meshes) is equal to the desired length at first capture.

14. The group noted that it is important, when introducing mesh regulations, to have a clear understanding of what is meant by a mesh of a given size; e.g. how the mesh is to be measured. This question has been the subject of lengthy discussions in other Commissions, especially in the north Atlantic, and the experience of those bodies should be drawn upon in establishing CCAMLR rules if mesh regulations are to be introduced.

## CLOSED AREAS

15. There was no new information provided on the distribution in time and space for fish around South Georgia. For *N. rossii* juveniles apparently occupy coastal areas until about 4 or 5 years of age. *C. gunnari* spawns inshore in April and May following offshore aggregation and migration inshore.

16. Experience at Kerguelen has indicated that closed areas for all or part of the fishing season can provide protection for juveniles and spawners.

## MANAGEMENT NEEDS

### South Georgia

#### *N. rossii*

17. This stock is severely depleted, and the only hope for significant catches in the future is to rebuild the spawning stock. There should certainly be no directed fishery, but since any incidental catches would cause further declines in the stock, measures should also be taken to keep incidental catches to a minimum.

*C. gunnari*

18. The stock appears to be heavily fished, even though there is no indication that recruitment has been affected as yet. Gains in terms of yield-per-recruit would be expected from any measures that increased the age of recruitment (e.g. mesh size), or reduced the fishing mortality (e.g. limits on annual catches, or on the number of vessels operating). Measures of the latter type by increasing the number of year-classes contributing effectively to the fishery, would reduce the year-to-year variability, and the vulnerability of the fishery to declines in recruitment.

*N. gibberifrons*

19. The present fishing mortality, though due only to by-catch, appears to be high. It would seem desirable to keep the amount of by-catch to as low a level as practicable.

Kerguelen

20. Since 1979 a number of controls have been progressively established by the French authorities. These are set out in the report of the 1984 meeting of the Scientific Committee (paragraph 7.22). However, the present controls seem to have been applied too late to prevent further decline in the stock of *N. rossii* in recent years, and consideration should be given to some strengthening. It might also be useful to analyse age and length data for *C. gunnari* to show whether, to improve the yield-per-recruit, it might be desirable to reduce the amount of fishing, or increase the size of first capture.

INFORMATION NEEDS

21. Although there was new data provided this year, the available information is still insufficient for firm assessments. The reporting of commercial catch and effort was in all cases falling short of the requirements stated last year. Only Poland provided catches giving a geographical breakdown smaller than subareas. Statlant 8B forms were available at the time of the working group only for 1982/83 from all countries, and only from Poland and France for other years.

22. The group did estimate split year catches of *N. rossii* for USSR for 1969/70 to 1971/72; and subareas of area 48 for *C. gunnari*. The group recommended that the Commission's tabulations be modified accordingly.
23. The group also urged that countries make every effort to classify the significant quantities of fish reported as unidentified.
24. The group recommended reporting of length frequencies by one centimeter groupings, measurements being carried out according to BIOMASS standards.
25. More detailed reports of biological information giving the basis of the analysis and results are required and should be provided to the Commission at future meetings.
26. Information on time and fine scale area of both fish and fishing distributions around South Georgia is required.
27. Information on mesh selectivity is required for all species, and countries are urged to conduct such experiments during the next year if possible.
28. Surveys of juvenile fish are needed to provide indices of recruitment. Any past data would be particularly valuable.
29. Differences in ageing between countries were noted for *N. rossii* and *C. gunnari*. It is important that they should be resolved, and the group recommend direct interchanges of materials, and also a workshop to be held in some conveniently located institute. Those actively engaged in age reading should be involved.
30. The group noted that much of the time during its meeting had been taken up with work of data compilation, and running routine analyses such as VPA. With the benefit of experience, it is clear that the duration of the meeting could be shortened, and more time spent in discussions of matters of substance arising from the analyses, if most of this work could be done in advance of the meeting. The group therefore suggested to the Scientific Committee that, when similar meetings are convened in the future, clear guidance should be given to the Secretariat, so that they can carry out the preliminary analyses. Consideration should also be given to possible modifications of the latest dates of submission of data to the Commission.