

Report of the Scientific Committee

The Committee met at 9.00 am on 27 June 1981 and following days at New Hall, Cambridge, under the Chairmanship of J. L. Bannister.

A list of participants is given in Annex A.

1. CHAIRMAN'S WELCOME AND OPENING REMARKS

The Chairman welcomed the Committee members and invited participants; observers from several organisations were present. The Committee stood in silence in memory of Dr Y. Fukuda, who had been a member of the Committee from 1970 to 1978 and whose death had occurred in February, 1981.

2. APPOINTMENT OF RAPORTEURS

Donovan was appointed rapporteur with the assistance of various members as appropriate. Chairmen of sub-committees appointed rapporteurs for their meetings.

3. ADOPTION OF AGENDA

The Agenda adopted is shown in Annex B.

4. ARRANGEMENTS FOR MEETING

4.1 Meeting procedure, establishment of sub-committees, and time schedule

The Committee agreed to a work schedule proposed by the Chairman. In accordance with Rule C1 in the Rules of Procedure, four sub-committees (minke, sperm, other baleen whales and protected species and aboriginal/subsistence whaling) had been appointed at last year's meeting; a fifth (small cetaceans) remained as a standing sub-committee (and see Item 10.4). An additional sub-committee (management) was established, particularly to discuss Items 8.1, 8.2, 8.4 and 13.1. Reports arising are dealt with under the relevant Agenda Items and as Annexes:

- Annex D Report of the sub-committee on sperm whales
- Annex E Report of the sub-committee on minke whales
- Annex F Report of the sub-committee on other baleen whales
- Annex G Report of the sub-committee on protected species and aboriginal/subsistence whaling
- Annex H Report of the sub-committee on small cetaceans

The Committee gave consideration to the Commission's charge (*Rep. int. Whal. Commn 32: 28*) that it should consider ways of reducing its workload. The recommendations are given in Annex I.

4.2 Computer arrangements

As in previous years, the University of Cambridge generously granted the IWC a high priority of access to the

University IBM 370/165 computer. For the 1981 meeting, in addition, the computer laboratory set up a network node at New Hall, which permitted several terminals to use one line simultaneously. Altogether five terminals and a graph plotter were made available. Despite the improved facilities, the use of the network led to a reduced cost compared with the 1980 meeting.

Access to remote computers was possible over the public switched telephone network, but almost all work was in fact run in Cambridge.

5. REVIEW OF AVAILABLE DOCUMENTS AND REPORTS

5.1 and 5.2 Documents submitted and progress reports on research

Lists of documents, progress and other reports available are appended as Annex C.

5.3 Reports of Special Meetings and Workshops

5.3.1 Sightings Workshop

The report of this Workshop is given in SC/33/Rep 1.

5.3.2 Special Meeting on Southern Hemisphere Minke Whales

The report of this meeting is given in SC/33/Rep 3.

5.3.3 Killer Whale Workshop

The report of this workshop is given in SC/33/Rep 4.

5.3.4 Management Procedures

The report of this meeting (IWC/33/13) is discussed under Item 8.1.

The attention of sub-committee chairmen was drawn to recommendations 1(a-e) on page R6 of that report, which the Committee agreed should be acted upon at this meeting.

5.3.5 Workshop on Humane Killing Techniques

The report of this Workshop (IWC/33/15) is discussed under Item 13.2.

5.3.6 US Workshop on Humpback Whales of the Western North Atlantic

The report of the IWC observer, Tillman, is given in SC/33/PS9. It was discussed by the sub-committee on protected species and aboriginal whaling (Annex G).

5.4 Scientific Permits

5.4.1 1980-81 Reports

No scientific permits were issued for 1980-81.

5.4.2. 1981-82 Advance Review (also see Annex F, p. 91)

- (a) Danish application to take up to nine fin whales off the Faroes.

The Committee reviewed the research proposal outlined in SC/33/RP3. It was not thought that biological samples obtained from nine whales per year would add greatly to present knowledge. However, it supports other elements of the total research proposal with some qualification regarding the tagging (Annex F, p.91).

The Committee does not endorse the proposal for a special permit.

(b) Chilean application to take at least 100 sei whales.

The Committee reviewed the proposal outlined in SC/33/Ba10. It recommends that other kinds of work, including the compilation and analysis of earlier data, and further development of national expertise should precede any research catches. Any future proposal should be more detailed and carefully justified.

The Committee does not endorse the proposal.

5.5 Previous season's catches and other statistical material

Statistical material prepared at the Bureau of International Whaling Statistics under the direction of E. Vangstein was presented to the meeting. The Committee noted that several countries had not provided the Bureau with information in time for it to be included in these statistics, although some of the missing data were available in national Progress Reports. The Committee recommends that member nations be reminded of the need for prompt provision of catch information to the Bureau, if the Committee is to carry out its stock assessment work satisfactorily.

5.6 Marking

5.6.1 Progress of the International Scheme including the Commission's contribution to costs

Brown presented a report (Annex J) which summarised whale marking during 1980 and 1981 and reviewed the current position regarding stocks of marks and funding for the International Marking Scheme. The Committee endorsed the report.

The Secretary reported that it was the Commission's policy to only supply marks for those projects which could be expected to provide recoveries. This was supported by the Committee.

It was also agreed that during the coming year a small working group of Free (Convenor), Brown and Ivashin, should examine the possibility of storing all the marking data from the Soviet and International schemes in the IWC computer system.

5.6.2 Reports of special cruises—minke whales

The report of the Southern Hemisphere minke whale cruise undertaken in Area V under the IDCR programme is given in SC/33/MiS19 (and see Item 7.1.4).

5.7 Sightings programme—data reports from commercial operations 1980–81

The Secretary reported that no information had been received.

5.8 Indexed List of Scientific Committee Publications

Donovan reported that the 'List of Scientific Documents' had been updated to include papers from last year's Scientific Committee meeting. The Commission's publications are included in the ASFIS (Aquatic Sciences and Fisheries Information System) data bank and the Secretariat has access to ASFIS publications via the Library of the British Antarctic Survey.

6. CO-OPERATION WITH OTHER ORGANISATIONS

6.1 FAO

Gulland reported that the remaining volumes arising from the FAO/ACMRR Meeting in Bergen in 1976 should be published by the end of the year. The biological data requested by the Commission last year has now been sent to the IWC Secretariat. FAO has worked in co-operation with UNEP on the draft Global Plan of Action (see 6.2 below). Attention was drawn to the report of the FAO Working Party on the Management of Fisheries which referred to all aspects of management not simply scientific matters. Of particular interest are sections on multi-species fisheries and on fisheries for krill and other species which are directly relevant to the ecology of whales. The annual FAO review of Fisheries resources includes a special section on marine mammals this year (Gulland: Review of the State of World Fishery Resources, COFI, 81/mf5). He also reported that the UN Conference on the Law of the Sea is coming to a close and it is hoped that the Treaty, which includes specific paragraphs on marine mammals, will be signed in 1982.

The IWC Observer's report on the FAO Committee on Fisheries discussion of the draft Global Action Plan for the Conservation, Management and Utilisation of Marine Mammals is given in IWC/33/11E.

6.2 UNEP

In the absence of a representative from UNEP, Holt informally reported on the activities of UNEP during the past year. A UNEP representative will be present at the Commission Meeting. The revised Global Plan of Action has been completed and considered by the UNEP Governing Council in May 1981. The proposed action had been generally supported by member states and delegations had urged that the first phase of the Plan be implemented during 1981–83. UNEP is anxious to see the Commission involved in this wherever appropriate, and the Committee noted that an approach would be made by UNEP to the Commission.

6.3 IUCN

Beddington reported that the report of the workshop on the interactions between fisheries and marine mammals would be ready in August. IUCN is co-sponsoring the meeting on research programmes for the Indian Ocean Sanctuary being held in Amsterdam later this year (see Item 8.3.1).

6.4 IATTC

Hammond reported to the sub-committee on small cetaceans on the activities of IATTC with respect to cetaceans (Annex H).

Perrin reported on the IATTC meeting that was held in Washington, D.C., 28–29 October 1980 (IWC/33/11C) at which he represented the Commission as an observer. In particular he noted:

- (a) although negotiations continue, at present there is no management regime in place for yellow fin tuna in the eastern tropical Pacific. Mexico, with the second largest landings from the area, has withdrawn from the IATTC;
- (b) analysis of sightings shows a sharp decline over the period 1977–79 in density and size of schools of the eastern spinner dolphin, *Stenella longirostris*, although the finding is tentative;

- (c) member nations did not agree to adopt a series of measures for minimizing dolphin deaths but did agree to take them under advisement; and
- (d) although the CPUE of tuna has declined in recent years, and the fishing effort is greater than the level that would yield MSY, there is no concern about possible collapse of the fishery, because of the very weak relationship thought to exist between stock size and recruitment at present population level.

The next annual meeting of the IATTC will be in Paris, France in October, 1981. The IWC has been invited to observe the meeting. The Committee recommends that the Secretary should review the agenda for the meeting and attend if appropriate.

A meeting of IATTC scientific staff and invited experts was held in Managua, Nicaragua, 6-10 April 1981 to review existing information on the dolphin-tuna association and discuss possible research approaches to further understanding the mechanisms, ecology and management implications of the association. Perrin again represented the Commission and his report is given in IWC/33/11C.

6.5 CITES

Rudge thanked those members of the Scientific Committee who had helped in the revision of the 'World Review of Cetacea' which was presented to the CITES meeting in New Delhi. He reported that the UK National Conservancy Council which had funded the original work was unable to provide additional funds for its updating. The Committee believed that an annual review would be useful and agreed that this should be carried out by the Secretariat in conjunction with sub-committee convenors and Klinowska. Updated pages would be circulated to the Committee after each Annual Meeting.

Last year the Committee recommended that the Commission responds to special requests for information from CITES by referring to the views of the Committee as expressed in its report. The Secretariat forwarded the relevant parts of the report of CITES in response to a request for information regarding certain proposals to place cetaceans on the CITES appendices. The report of the IWC observer at the New Delhi CITES meeting is given in IWC/33/11D. The CITES meeting placed sperm, sei and fin whales on Appendix I.

Berney reported that the CITES Secretariat was involved in a review of all species not under the jurisdiction of any state, and that the Commission would be asked to participate in a committee to examine this. The Scientific Committee recommends that the Secretary should represent the Committee at this meeting.

6.6 BIOMASS

Allen reported on the 2nd meeting of the BIOMASS Technical Group on Data Statistics and Resource Evaluation (SC/33/Rep 1). The group had hoped to obtain sightings data during FIBEX (First International BIOMASS Expedition) which would be of value in examining the relation between the distribution of whales and that of krill. This would be valuable in the understanding of the functional relationship between these animals in the Antarctic ecosystem. Advice on cetacean sightings techniques was given to FIBEX by the IWC Working Group on Sightings Techniques (SC/33/Rep 2). A meeting is being held in Hamburg in September 1981 to

examine data obtained from FIBEX and consider how it can best be stored and retrieved. The Committee noted that although nine of the eleven nations participating in FIBEX were IWC member nations only the Japanese vessel contained experienced whalers. Ohsumi reported that because of the lack of a detailed format for sightings data, Japan had been unable to send the resultant data to the BIOMASS centre. It was agreed that he would consult with Free in order to determine a suitable format to present at the Hamburg meeting.

The Committee recommends:

- (a) that the IWC continues to give as much support as possible to the BIOMASS programme;
- (b) that the IWC gives all possible support to the establishment of a BIOMASS Data Centre and to the establishment of links to assist scientists working in either IWC or BIOMASS programmes to have access to data stored in both systems;
- (c) that the IWC should continue to co-operate with BIOMASS at the scientific level by sending representatives to appropriate meetings. In particular the Committee recommends that Free should attend the Hamburg meeting on its behalf and that Allen should attend the 3rd BIOMASS Technical Group Meeting if he is available.
- (d) that the IWC should seek for the Committee to be represented at any planning meetings for SIBEX in order to help co-ordinate any cetacean research.

6.7 CCAMLR

The Secretary reported that he had been unable to obtain support for the workshop recommended by the Technical Committee Working Group on the Implications for Whales of Management Regimes for Other Marine Resources (*Rep. int. Whal. Commn* 31: 29).

The Commission has been asked to send an observer to a CCAMLR meeting in Hobart, Australia in September. The Committee recommends that Allen attends the relevant parts of that meeting.

7. INTERNATIONAL DECADE OF CETACEAN RESEARCH (IDCR)

The Committee discussed the history and origins of IDCRC. The Scientific Committee had originally proposed, in 1972, in response to the call for a moratorium by the 1972 UN conference in Stockholm, that 'instead of a moratorium, support should be sought for a decade of intensified research on cetaceans, particularly as regards problems relevant to their conservation' (*Rep. int. Whal. Commn* 23: 38). The Commission adopted the proposal at its 1972 meeting (*Rep. int. Whal. Commn* 24: 26) when it was moved that an *ad hoc* Committee should be established 'to determine ways in which such a programme can be implemented and that this Committee be instructed to contact all other appropriate national and international groups and organisations and in particular FAO to determine their interest in sponsoring such an international programme'. The first detailed proposals for IDCRC were reported in December 1974 (*Rep. int. Whal. Commn* 26: 116-79). In view of this background the Committee agreed that IDCRC should be considered to have started in 1975.

The Committee agreed that future research should be organised on two levels:

- (a) Continuation of the IDCRC programme in which priority would be given to projects relevant to

management, although all cetacean research would be considered. IDCR programmes would be those which fulfil at least one of the following criteria:

- (i) requiring co-operation between national groups;
 - (ii) requiring funding from more than one national group;
 - (iii) providing information valuable in studies on stocks other than the one to which they are primarily directed.
- (b) As part of a general international programme of cetacean research in co-operation with non-IWC nations and international organisations. In particular, the UNEP Global Plan of Action, (see 6.2) has produced a series of research recommendations and the Committee urges the Commission to endeavour to ensure its participation in their formulation and implementation. Any IWC research programmes should eventually be integrated into the Global Plan.

Holt reported that a special session of UNEP would take place in 1982, to review the status of the recommendations made at the Stockholm Conference in 1972. As IDCR was originally set up in response to this Conference, the Committee recommends that during the year the Secretariat should prepare a review of the programme and its achievements to date in consultation with the Committee Chairman, the Vice-Chairman, Holt and Ohsumi, for transmission to that session.

7.1 Review of results 1980—81

7.1.1 Icelandic Whale Research Facility

Jónsson reported that the facility had now been established and that advice was being sought on the nature of the equipment which should be provided. In the event of a large number of requests for space at the station, the Icelandic Government would seek advice from the Commission regarding the priority of projects, as had been requested by the Committee last year (*Rep. int. Whal. Commn* 31: 54). Brodie reported on the excellence of the facility and the co-operation extended to researchers by whaling personnel.

7.1.2 Azores Sperm Whale Project

Funds have been provided by the Commission for this project and the Committee looks forward to receiving a report of the research to be carried out this summer.

7.1.3 Sperm Whales of the Southeast Pacific

Last year the Commission, on the recommendation of the Scientific Committee, agreed to finance completion of a further section of the work by Clarke and co-workers on Division 9 sperm whales. Half the funds allocated were transferred to Clarke but, due to problems unrelated to the project encountered by workers in Mexico, completion of the analyses and writing up the results has been delayed.

7.1.4 Southern Hemisphere minke whale assessment cruise, Area V

A report of this cruise is given in SC/Jn81/MiS19, and discussed in SC/33/Rep 3. Financial support for the project was provided principally by the Japanese and Soviet governments who provided scouting vessels (estimated in the case of the two Japanese vessels to represent an expenditure of \$1,200,000). Further support was provided by South Africa (R24,000) and Australia (A\$6,000). The Committee wishes to express its appreciation of this

support and to stress the value of such co-operative ventures.

7.2 Proposals 1981–82

7.2.1 Southern Hemisphere minke whale assessment cruise

Best reported that plans were being made for the 1981/82 cruise to cover Area II. Three to four vessels would be available and the costs would be borne by Japan and the USSR. In addition it was hoped that one of the vessels would spend four to six weeks on the Brazilian minke whaling grounds before proceeding to the Antarctic. A working group met during the course of the Brighton meetings to plan the co-ordination of objectives and procedures. Funds may be sought for the travel and subsistence of participating scientists.

7.2.2 North Atlantic cruise

An *ad hoc* group was formed under the joint-chairmanship of Tillman and Harwood to plan a programme for 1982. The group also met during the course of the Brighton meetings. Its report is given in Annex K. Funds will be required.

7.2.3 Age determination and interspecies comparison of baleen whales using the aspartic acid racemisation method (SC/33/RP2)

The Committee agreed that this project should be considered under the procedure set up at last year's meeting (*Rep. int. Whal. Commn* 32: 55, Item 7.3).

7.2.4 Examination of logbooks from Antarctic fin whaling

The Committee examined the proposal for a study of logbooks from Antarctic fin whaling given in Annex F (page 91). It recommends that the Secretary contact people and institutions which may be able to assist such work. If necessary money designated for contingencies (Item 7.4.4) should be used.

7.2.5 Humane killing study in Iceland

This is discussed under Item 13.2. Travel funds are sought.

7.2.6 Killer whales in the northeast Atlantic

The Government of the Netherlands has contributed Dfl.10,000 (about £2,100) to the IWC Research Fund with the suggestion that it be spent 'on such activities as may be recommended by the Scientific Committee with regard to the conservation of small cetaceans'.

The Committee agreed following a recommendation by the small cetacean sub-committee (Annex H) that the Secretary should contact relevant countries seeking submission of research proposals for field studies to identify killer whale stocks in the northeast Atlantic. It noted that photographic and passive acoustic surveys appear to be the most promising methods for this work.

7.2.7 Biochemical analysis of Southern Hemisphere minke whale samples

The Committee supported a proposal to provide financial support to Wada to assist in the electrophoretic analysis of samples from Southern Hemisphere minke whales, in order to determine as soon as possible the usefulness of the technique for stock identification of cetaceans.

7.3 Funds available

The Secretary reported that the Research Fund had stood at between £50,000 and £90,000 during the year, most of

which had been designated for specific projects by the contributors. Of the undesignated funds £6,279 had been used to provide support for research projects according to the procedure adopted last year (*Rep. int. Whal. Commn* 32: 55).

7.4 Funding procedures

The Committee reviewed the system instigated last year to assess and recommend funding for research projects submitted to the Commission. It agreed that last year's system of circulating applications to sub-committee members for review between meetings was unsatisfactory and recommends that the following procedures be adopted:

- (1) all requests for funding should reach the Commission at least two months prior to the Annual Meeting. Projects would then be examined by the relevant sub-committee and the full Committee;
- (2) in the event of a large number of proposals the policy should be to provide partial funding for a number rather than near total funding for a few;
- (3) if there are no funds available for a project which is considered worthwhile by the Committee, then the Secretary will write a letter of endorsement on behalf of the Committee to the originator(s) of the proposal;
- (4) A sum of money, not exceeding 10% of the research allocation in any one year, should be added to it and designated for contingencies, to be available throughout the year, particularly to support projects arising out of Special Meetings or Workshops at a maximum level per project of £500. Allocation of this money would be the responsibility of the Secretary in consultation with a small sub-committee to be appointed by the Committee annually for the purpose;
- (5) the following two main priority listings should each be taken into account equally, but in order of priority under each section as indicated:
 - (a) Nature of project
 - (i) multinational projects;
 - (ii) projects which contribute generally to the management of particular species of cetaceans or cetaceans as a whole;
 - (iii) projects carried out by one country in the territory or on the animals of another to provide general information;
 - (iv) projects involving information to manage species exploited by another country.
 - (b) Species
 - (i) most exploited stocks;
 - (ii) environmentally threatened stocks;
 - (iii) other stocks.

8. MANAGEMENT PROCEDURES

8.1 Reports of Technical Committee Working Group Meetings on Revised Management Procedures, February/March 1981 and May 1981

As a preface to deliberations concerning the four proposals for revised management procedures put forward by IWC/33/13, the Committee discussed the conceptual approach to management presented in paper SC/33/Mg2. This document examined a series of possible trajectories of whale population abundance resulting from different management policies. It pointed out that, while one might possibly define a band of trajectories which met the

proposed objectives for management (page T17 in IWC/33/13), one would not be able to distinguish, on scientific grounds, any one policy within that acceptable band as being better than another.

Consequently the document concluded that the Committee could not recommend any one policy from among a series of acceptable policies as being correct; the Committee could only advise which policies resulted in trajectories which were inconsistent with the proposed objectives.

In subsequent discussions, several participants pointed out that the document brought out a fundamental question about the nature of the decision-making process within the Commission, i.e. where are decisions to be made? Some members felt that the current management procedure tended to give too much of the responsibility for decision-making to the Scientific Committee. Other members noted that this apparent tendency was the result of the Commission's earlier desire to increase its reliance upon the advice of the Scientific Committee.

The Committee noted that the specific scientific advice on currently exploited stocks requested by IWC/33/13 (p. R6) comprised the information exactly needed to determine the trajectories discussed in SC/33/Mg3. While it was agreed that the requested information would be provided to the extent possible, the Committee noted that an inadequate data base for several stocks would prevent full compliance. Moreover, it was agreed that, in providing advice on the optional trajectories requested, the Committee must also spell out the implications of these options, particularly emphasising the long term risks involved, if any.

In accordance with IWC/33/13 (p. R6), three governments had forwarded to the Chairman of the Scientific Committee specific comments or questions regarding the scientific content and implications of the four management proposals being put forward. These are given in Appendix 1.

The Canadian request concerning small cetaceans was forwarded to the small cetacean sub-committee for action. The report of that group (Annex H) contains the advice requested.

In taking up the questions from the USA on the proposed management procedures, the Committee agreed that only four of the five questions contained sufficient scientific content to warrant an answer. At issue was question 'B' concerning the provision of incentives for undertaking needed research. The Committee agreed that, while it was desirable to improve the scientific basis for management and, hence, to reduce uncertainties in assessments, the establishment of incentive programmes was not a scientific matter, but rather fell within the purview of the Technical Committee. Therefore the Committee decided not to contrast the four proposals with respect to incentives for undertaking research, and only the remaining four questions were used as appropriate criteria.

With respect to the Japanese comments and questions, the Committee agreed that question (3) concerning management based on fixed rates of exploitation was also not an appropriate basis for contrasting the four proposals. Indeed it was believed that this concept constituted a fundamental basis for developing another possible management regime. The Committee decided that further review and comment was needed of this concept as put forward by Ohsumi's paper presented at the Rome session, entitled 'Fixed exploitation rate and its practicality for

management procedure of whale stocks'. However, the press of other issues did not allow time for this review.

The remaining two Japanese questions were added to the list of those used in contrasting the four proposals. It was agreed to modify the resulting six questions by removing non-operational terms which could only be defined subjectively. The agreed questions were as follows:

- (1) Does the proposal provide safeguards which account for uncertainties in assessment models and for the quantity and quality of information used by those assessments?
- (2) Does the proposal delay the implementation of revisions of catch limits or stock classifications resulting from new assessments?
- (3) Does the proposal provide specific, operational guidance for classifying stocks and for determining catch limits?
- (4) Does the proposal provide procedures for smoothing changes in catch limits resulting from new assessments?
- (5) Does the proposal make allowance for the flat-topped nature of yield curves when setting reference/target levels?
- (6) Does the proposal take account of cumulative losses in catch, as against future gains in replacement yield, resulting from the speed with which the stock is moved toward a reference/target level?

A review of the four proposals for revised management procedures using these six criteria, is given with comments in Table 1.

Noting that Annex O to the Scientific Committee's report of two years ago (*Rep. int. Whal. Commn* 29: 99–101) summarised a number of problems arising under the current management procedure, it was suggested that this might also be used as another basis for discussing the merits of the four proposals. However, a lack of time prevented this discussion from taking place.

8.2 Moratorium proposals

8.2.1 Conditional ban/moratorium on commercial whaling
Under this Agenda Item the Committee discussed the proposals put forward by the UK and the USA, having been informed that the proposal for a world-wide ban on all whaling did not contain material requiring review by the Scientific Committee.

The Committee noted that it had previously reviewed similar proposals and that the best summaries of differing views were given in *Rep. int. Whal. Commn* 30: 46–8 and in *Rep. int. Whal. Commn* 31: 57–8.

The Committee further noted that one aspect of the balance of advantages and disadvantages to these proposals depended very largely on the research effort which would be made during a conditional ban or moratorium. In reviewing the experience of countries in which whaling had ceased, the Committee noted that the level of cetacean research had both increased and decreased. In circumstances where research had increased, some members expressed the belief that such programmes had been spurred by increased public interest in whales, by problems arising from increased human use of nearshore marine ecosystems, or by increased recognition of the non-consumptive values of whales. In circumstances where research had decreased, some members believed that this resulted from a lowering of research priorities when no

industry existed. The Committee was still unable to agree whether a moratorium or conditional ban would have the effect of increasing or decreasing the build up of scientific information and understanding which will aid in improving the management of the whale stocks.

8.2.2 Moratorium proposals

The Committee considered the several moratorium proposals which are on the Commission's Agenda. It agreed that, apart from in the French document, IWC/33/21, there was little new scientific content in the documents supporting these proposals. In the time available the Committee therefore briefly examined IWC/33/21 in which a moratorium on the commercial exploitation of sperm and minke whales was proposed. Some members pointed out that the document, and particularly its Appendix A, identified some of the important problems faced in assessing and setting catch limits although most of the problems had at one time or another been considered at least implicitly by the Committee. Some members felt that these problems should be studied in greater depth. Other members felt that there were statements in the document which were incorrect or required substantiation. Yet others considered that there was little in the documentation to provide a scientific basis for a moratorium on sperm or minke whaling.

Although the Committee had agreed that it would only discuss the new scientific aspects of the documentation of the moratorium proposals and therefore only discussed IWC/33/21, some members believed that there are substantial scientific reasons to support the several moratorium proposals (North Atlantic, sperm, minke). Other members believe there are no scientific grounds for any blanket moratoria, either by region or by species.

8.3 Whale sanctuaries

8.3.1 Indian Ocean—scientific research proposals

The proposed international meeting of scientists to plan a programme of monitoring and research for marine mammals in the Indian Ocean (*Rep. int. Whal. Commn* 31: 59) will be held in Amsterdam in September 1981. The Committee adopted the report (Annex L) produced by the sub-committee set up last year to develop research proposals and as agreed it will be presented at the meeting by the Committee chairman or his representative. Invitations to participate will be sent by the Netherlands and the Seychelles who are co-sponsoring the meeting.

8.3.2 Other areas—including scientific aspects of their establishment

Anderson presented IWC/33/25 which had been prepared by Australia for the Technical Committee. There will be a meeting (see 8.3.1) in Autumn which is likely to cover research aspects of sanctuaries. It was agreed that individual members of the Committee would pass on their comments directly to Anderson.

8.4 Previously unexploited or little known stocks

For the past two meetings the Committee has attempted to develop a simple protocol giving guidelines useful to those planning or authorising any take under special permit, particularly where damage to a sensitive stock might occur through the sampling process itself. On reviewing one proposal for such a protocol (Annex K, *Rep. int. Whal.*

Table 1

Comparison of four proposals for revised management procedures
(PL = present level, RL = reference or target level, IL = initial level,
RY = replacement yield, MSYL = MSY level, CL = catch limit)

Criterion	Tokyo Appendix 6 (Japan) IWC/33/13: T20-T25	Rome Annex 6 (USA) IWC/33/13: R17-R19	Rome Annex 7 (Iceland) IWC/33/13: R20	Rome Annex 8 (Seychelles) IWC/33/13: R21-R22
Safeguards for assessment uncertainties and for quantity and quality of information.	see footnote 1	Basic CLs are reduced by fixed percentages depending on number of available estimates of PL and RY.	Scientific Committee is to take account of quality of data when assessing likelihood of stock abundance changing appreciably or in a direction reducing RY.	MSY or RY reduced to 90% as an allowance for uncertainties.
Delays in implementing revisions of catch limits or stock classifications ²	Classification subject to review once every five years. CLs remain unchanged for 5 years in absence of scientific evidence to contrary and will be reviewed once in every 5 years thereafter. Changes in CLs may not exceed 10% of present CL.	Transitional CL calculated as average of the CLs for current year and previous year, but is not to be used if cessation of whaling required.	Changes in CLs to be kept small with a general guideline of not more than 10% per year unless stock will become reduced to protection status (as currently defined) in 5 years, in which case a scheme of catches will be adopted to avoid that reduction.	Permitted catches from unclassified stocks shall be based on such advice as is available from the Scientific and Technical Committees but in any case increase in catches above current levels of catch limit shall not be permitted. May not change CLs by more than 20% each year, unless Scientific Committee advises a greater change is required to prevent stock passing into protected category.
Specific operational guidance for classifying stocks and determining catch limits.	(1) Five categories defined according to state of knowledge of PL, RY, MSYL or IL. Presently protected stocks included in first category. Accounts for expanding stocks. (2) RY or fixed exploitation rate used as basis for setting CLs. MSYL or IL not essential for determining CLs. Regime takes account of relative position of PL to RL (MSYL or 70% IL), where RL known, in determining adjustments to RY or size of fixed exploitation rates. If PL > RL, sets CL > RY to reduce population to MSYL in 10 years. Protection level at 40% RL for currently utilized stocks and at RL for presently protected stocks.	(1) Uses RL = 70% IL for baleen whales and 95% IL and 50% IL respectively for male and female sperm whales as basis for classification. Five categories defined on basis of knowledge regarding RY, PL, RL. Specific protection category is defined, and whaling cannot be initiated until acceptable estimate of PL. Accounts for expanding stocks. (2) RY used as basis for setting CLs. If PL > RL sets CL > RY to bring stock to RL in 10 years. If PL < RL, sets CL < RY to return stock to RL in 5 years. If cannot bring back in 5 years then classify as protected. ³	(1) No specific categories are defined. Protection status remains as currently defined. No RL is established. (2) CLs kept at present levels unless Scientific Committee advises it is likely that stock abundance will change appreciably or in direction which will reduce RY. The words 'likely' and 'appreciably' are undefined. ⁴	(1) Uses MSYL or RL = 70% IL as basis for classifying. Similar to current management procedure in definitions of 5 categories, using position of PL relative to RL as basis. A specific protection category is defined. Accounts for expanding stocks. Acceptable estimate of PL required before whaling begins. (2) Uses modified form of current management procedures to set CLs with MSY or RY as basis. ⁵ If PL < RL, sets CL < RY to bring stock back to RL in 5 years. If initial management stock, sets CL > RY to bring stock to RL in 10 years.
Procedures for smoothing changes in catch limits resulting from new assessments.	Specifies that yearly changes may not exceed 10% of present CL.	Transitional CL calculated as average of the CLs for current year and previous year, but is not to be used if cessation of whaling required.	Changes in CLs to be kept small with a general guideline of no more than 10% per year.	May not change CLs by more than 20% each year, unless Scientific Committee advises a greater change is required to prevent stock passing into protected category.

(continued overleaf)

Table 1 (continued)

Criterion	Tokyo Appendix 6 (Japan) IWC/33/13: T20–T25	Rome Annex 6 (USA) IWC/33/13: R17–R19	Rome Annex 7 (Iceland) IWC/33/13: R20	Rome Annex 8 (Seychelles) IWC/33/13: R21–R22
Allows for flat-topped nature of yield curves in setting target levels. ⁶				
Accounts for cumulative losses relative to future gains in replacements.	When $PL < RL$ and the stock is moved towards RL , the length of time to reach RL is not regarded as important. This results in lower changes in catches at the cost of deferring the time at which maximum yield can be taken. ⁷	When $PL < RL$, the stock is moved to reach RL within 5 years. This results in faster recovery of the stock at the cost of greater changes in catches. ⁷	see footnote 8	When $PL < RL$, the stock is moved to reach RL within 5 years. This results in faster recovery of the stock at the cost of greater changes in catches. ⁷

¹ Some members asserted that the Japanese proposal (Tokyo Appendix 6) was not responsive to the safeguards criterion since the catch limit would depend only on the best estimate of stock status and would not be affected by assessment uncertainties and by quantity and quality of information.

Other members pointed out that the problems of uncertainties in assessment models and of the quantity and quality of information should be resolved in the process of each stock assessment on a stock-by-stock and case-by-case basis, but not in the management procedures.

² Some members noted that errors in assessments may or may not result in delays.

Other members pointed out that the uniform safeguard schemes of Rome Annex 6 (USA) and of Rome Annex 8 (Seychelles) would introduce delays in implementing the revision of catch limits or stock classifications resulting from new assessments.

³ Some members pointed out that there is ambiguity in setting CLs for Exploitable Expanding Stocks because of the undefined term 'precise' which is the keyword in CL determination (see Rome Annex 6, 10 (a) (2) and 11 (b) (1) and (3)).

Other members responded that the term 'precise' refers to present target level (for stocks in an expanding or expanded environment) but the classification is based on initial target level and hence the procedure is fully specified.

⁴ The Committee pointed out that it would be necessary to define the words 'likely' and 'appreciably' to achieve an operational scheme (see Rome Annex 7, (1) and (1) (b)).

⁵ The Committee found that no method is provided to set CLs where $PL > RL$ and no estimate of MSY is available (see Rome Annex 8, 10 (i) (a)).

⁶ Some members of the Committee were unable to find any characteristics of the proposals with respect to the setting of target levels which related to the allegedly flat-topped nature of yield curves.

Other members pointed out that the Japanese proposal (Tokyo Appendix 6) takes full account of the flat-topped nature of the yield curve for whales which gives the yield close to MSY for a wide range (60–80% IL) of stock levels. Thus they believed the Japanese proposal does not regard the RL as an absolute goal to be achieved within a fixed period of time at all costs, nor does it require the cessation of exploitation even when $PL < RL$, through a range of stock levels much wider than the other proposals.

⁷ The relative effects of the two proposals (Tokyo Appendix 6 versus Rome Annexes 7/8) on the value of the long term catch will depend upon both biological and economic factors and may be different in different cases.

⁸ Most members believed that this proposal (Rome Annex 7) was not responsive to this criterion. Some other members believed that the proposal was responsive and that the following annotation should be made: 'Changes in catch limits should be kept small (see Rome Annex 7, (2)).'

Comm 30: 130), the Committee noted that there were two cases with which a protocol must be concerned: currently unexploited stocks with no information available, previously exploited stocks with little recent information available. The Committee agreed that to take into account these two cases any statement on this matter should be entitled: 'insufficiently known stocks that are not now exploited and may or may not have been exploited in the past'. It was noted that the determination of sufficiency of information would be made by the Commission on the advice of the Scientific Committee. Several views were expressed concerning the nature of a simple protocol or procedure. However, after extensive discussion, the Committee was unable to reach any firm conclusions on the nature or content of such a protocol or procedure at this time.

8.5 Role of the Scientific Committee

As last year, the Chairmen of sub-committees were reminded of the Commission's charge that major changes from previous recommendations should be adequately

documented and explained in the Committee's Report. The matter is discussed further under Item 4.1 and in Annex I.

9. WHALE STOCKS, STATUS AND REGULATORY MEASURES

9.1 Minke whales (also see Annex E and SC/33/Rep 3)

9.1.1 Southern Hemisphere

This is a summary of the results and recommendations presented in SC/33/Rep 3. Various sub-divisions of the Southern Hemisphere were considered but ultimately results were presented for the present six management Areas. Direct sightings estimates were available for Areas III, IV and V from the IDCR cruises and for Areas I and VI from Japanese surveys. Mark-recapture results were available for Areas III and IV. Results from fitting observed and expected catches were obtained for Areas III–VI; the runs for Area III and one of the runs for Area VI gave no fit to the observed catch data. Using coastal sightings as indices of abundance, fits were obtained for

Areas II and III but these were considered poor and were discarded.

(a) Areas I, III–VI

Taking into account the average proportion of females in the catch by Area, over the past three years, most of the Committee recommends that the catch limits for Areas I and III–VI should be given as either the replacement yield by sex or as a total figure based on the average proportion of females in the catch. The two sets of values are given below:

Recommended catch limits			
Area	Catch by sex		Total catch limits to help ensure that the female RY is not exceeded
	Male RY	Female RY	
I	601	578	1,179 ¹
III	1,519	1,782	2,784
IV	720	836	1,548
V	918	1,008	1,504
VI	840	829	1,669 ¹

¹ The proportion of females in the catch is less than 0.5 and so the total is given as the sum of the two replacement yields.

However, some members of the Committee shared the concerns expressed in Annex M, regarding the problem faced for several years in assessing Southern Hemisphere minke whale stocks, in particular inconsistencies of stock estimates between methods and years and uncertainties in estimating RY. In view of this those members believe that the Commission should adopt caution in setting catch limits for these stocks and in particular not set catch limits greater than those adopted last year.

(b) Area II

No agreed stock size was found for Area II. Some members believed that as the large value (127,000—1982 exploitable stock size calculated by the programme BALEEN) was disregarded an extrapolation procedure provided a reasonable estimate for the population (56,358). They noted the lack of trend in the CPUE series. Estimates of Replacement Yield by sex and by total allowing for unbalanced catches by sex are:

Male RY: 856; Female RY: 1,092; Total limits: 1,583

These values for Area II are slightly different from those calculated in SC/33/Rep 3 for the reasons documented in Annex N.

Some other members noted the inconsistent results obtained from last year's and this year's attempts to estimate abundance by extrapolating estimates from one Area to another and concluded that the use of relative abundance indices was an inappropriate procedure for estimating the stock size of Area II. They believed that in

the absence of a proper assessment it was not possible to provide scientific advice as to catch limits for Area II.

The Committee noted that a proposed IDCR cruise to Area II in 1981/82 was likely to provide a better basis for assessments next year.

(c) Allowance system

The Committee was unable to agree on a recommendation regarding the allowance system.

(d) Comparison with last year's results

The Committee draws the Commission's attention to the following reasons for the differences between the estimates given above and those obtained last year. Comparisons can only be made for Areas II, IV and VI for which advice was provided last year (see Table at foot of page).

For Area IV the lower stock size is particularly due to an estimate from the programme BALEEN relatively lower than the sightings and marking estimates and which has a much narrower confidence interval than last year. The increase in stock size in Area VI is due to the adoption of the results from the programme BALEEN and the rejection, in comparison, of the previous point estimate based on sightings. The general increase in the percentage that RY is of the total stock is due largely to the adoption of a lower value for M, but the specific pattern of the catches is also important (see Area IV).

(e) Other recommendations

The Committee makes the following recommendations with respect to obtaining improved data for the Brazilian minke whaling operations:

- (i) the catcher log books should be examined from 1966 onwards to determine the number of days and hours worked in each month. The number of hours worked each month could be ascertained as the time that the catcher left port until it returned;
- (ii) the identity of the vessels which operated during the early period of minke whaling and their characteristics should be clarified;
- (iii) the locations of the catches for each month for at least some of the years should be determined. This could be in the form of catch per 5° square;
- (iv) it can be seen from the time budget data that the time spent travelling to the whaling ground varies from month to month and between the 1979 and 1980 seasons. Whether this navigation time includes an element of searching should be clarified, i.e. is it the time taken from leaving port to start chasing the first whale? If this is so then it would be more appropriate to record searching time as beginning at the time when the vessel reaches the 100 fathom line since this is reported to be the edge of the whaling ground;
- (v) there are some discrepancies between the BIWS length statistics and the statistics presented in

Area	Exploitable population		Total replacement yield		RY as a percent of total stock		
	1981 calculated in 1980 ¹	1982 calculated in 1981	1980	1981	1980	1981	1980 with M = 0.0687
III	74,837	88,218	1,534	3,301	2.05	3.74	3.86
IV	80,579	44,376	2,869	1,556	3.56	3.51	2.85
VI	26,892	54,142	590	1,669	2.19	3.08	2.99

¹ Rep. int. Whal. Commn 31: 120–121, tables 1–3.

SC/33/ProgRep Brazil and these should be reconciled if possible (especially the years 1968, 1977 and 1980). (The 1966, 1967, 1969 and 1970 length distributions are not published in the BIWS);

- (vi) chasing times for sperm whales during the seasons 1979 and 1980 should be determined;
- (vii) basic data such as sea state, visibility and wind force throughout the last few seasons should be compiled to determine whether any corrections for these factors may be required.

The Committee also recommends that (a) further work on the effect of the random movement of whales on sightings estimates be carried out before the next meeting; and (b) further work regarding the implementation of new assessment (particularly Area α) and management Areas be carried out before the next meeting.

9.1.2 North Pacific

It was agreed to retain the present three stock areas and the Committee recommends that effort be continued to obtain samples for comparative biochemical studies.

(i) Sea of Japan-Yellow Sea-East China Sea

In 1979 the Commission, on the advice of the Scientific Committee, established a block quota of 3,634 whales for the period of 1980/84 with a maximum of 940 in any one year. The Committee agreed that it had no significant new information on which to give any additional advice to that which was provided last year.

The Committee recommends that past RoK log-book data be analysed to obtain an index of boat-days. It also recommends that age and reproductive material be collected from this stock.

(ii) Okhotsk Sea-West Pacific stock

As last year the Committee recommends, on the basis of the continuing stability of the CPUE, that the block quota of 1,678 for the period 1980–84 be retained with a maximum catch of 421 in any one year, and that the stock continue to be classified as a SMS.

It also recommends that an attempt be made to refine the long series of CPUE data.

There is no undue imbalance between the sexes in the catches from either of these stocks.

(iii) Remainder of the North Pacific

Given the lack of data for assessments the Committee recommends that the stock remain classified as an IMS with zero catch limit.

It was noted that the precise boundaries of the North Pacific stocks are not defined and it was agreed that the definitions should be provided at the next meeting.

9.1.3 North Atlantic

Further mark returns supported the present definition of the Northeastern stock. There is no further information on the other stocks and it was agreed to retain the same four stock Areas as last year.

(i) Northeastern stock

Results from marking and recaptures give an estimate of total stock size of 121,000 and an available stock size of 60,532. Noting this figure, simulation studies and the lack of trend in CPUE data, the Committee recommends that this stock should remain classified as a SMS with a catch limit of 1,790. It also recommends that an attempt be made

to find a CPUE series that could incorporate the more refined data of recent years and that these data should then be used in the assessment studies.

The percentage of females in the catch of 1980 was 56.3%. Restrictions on operations, by time and location, have been in force for two years and it is expected that this will reduce the previous high percentage of females in the catch.

(ii) Central stock

New biological and catch per effort data are available from Icelandic catches and Norwegian catches but refined indices of abundance have only been available for recent years. In response to recommendations made last year a marking programme was started but bad weather prevented any whales being marked. The programme will continue in 1981.

Noting the lack of trend in the series of CPUE data the Committee recommends, as last year, that the stock be provisionally classified as a SMS with a catch limit of 320. There is no undue imbalance between the sexes in the catch from this stock.

(iii) West Greenland stock

New biological and catch per effort data are available for this stock. Marking was attempted in 1980 but only one minke whale was marked. Given the lack of trend in the CPUE series the Committee recommends, as last year, that the stock remain classified as a SMS with a block quota of 1,778 over the period 1981–85 with a maximum of 444 in any one year. It also recommends that an attempt be made to reconcile the two sets of CPUE given in *Rep. int. Whal. Commn* 31: 108.

No data are available on the proportion of females in the 1980 catch by the Greenlanders, but *Rep. int. Whal. Commn* 30: 195 gives an average figure of about 0.68 since 1950. The proportion in the Norwegian catch was 0.81 in 1980. Catch data by month and region over the period 1976–80 were investigated and it is the Committee's view that there is no simple operational way of reducing this high percentage.

(iv) Canadian east coast stock

There is no new information on this stock and the Committee recommends, as last year, that the stock remains unclassified with a zero catch limit pending satisfactory estimates of stock size.

9.1.4 North Indian Ocean stocks

There is no information on which to designate or to set catch limits. The Committee recommends that minke whales in this region be classified as IMS with zero catch limits pending satisfactory estimates of stock size.

9.1.5 General

It is noted that next year, the Committee will pay specific attention to classifying the Northern Hemisphere minke whale stocks in a coherent and consistent way.

9.2 Sperm whales

The Committee was informed that when the techniques of *Rep. int. Whal. Commn* 31:747–60 were applied to North Pacific pelagic sperm whale catch data at the 1980 Annual Meeting, a data handling error affecting the calculation of relative catchabilities (selectivities) had been made, as outlined in Annex D. When this error was corrected, it was

found that a better fit to the data had been obtained with the incorrectly calculated selectivities. This implied that the technique was failing to find the best fit to the data.

Two new techniques have been developed since the last meeting, in which selectivities are assumed to be purely length specific (SC/33/Sp3) or age specific (SC/33/Sp5). The sub-committee agreed that, prior to the use of either technique for assessments during this meeting, both should be subject to close examination. The report of a subgroup set up to examine these techniques is given in Annex D, Appendix 2; further comment is to be found in Annex D, Section 5.

As the suitability for use of either method depends on the catch and associated biological data available for each stock, the sub-committee agreed that their use should be examined on a stock by stock basis. The sub-committee also agreed that the results of the sensitivity tests recommended in Annex D, Appendix 2 should be examined for each stock for which either method is used.

The Committee agreed that a working group should correspond during the following year on further development of these techniques, as proposed in Annex D, Section 5.

9.2.1 Southern Hemisphere, Division 1-8

Because of lack of time, it was not possible to undertake assessments of these stocks.

9.2.2 Southern Hemisphere, Division 9

Because of lack of time, it was not possible to undertake assessments of this stock.

9.2.3 North Pacific

Although there were no biological reasons to change the existing stock boundary shown in *Rep. int. Whal. Commn* (Special Issue 2): 67 Fig. 1, due to geographical imprecision in the recording of catch length frequencies the Committee agreed that a stock assessment for the Western North Pacific stock of sperm whales should be attempted using a boundary at 160°W. Population estimates for a Western Stock with this boundary are likely to be slightly higher than those obtained using the old boundary.

For population estimation purposes, the biological parameters shown in Table 1, Annex D were adopted.

The Committee agreed that estimates of population size for the Western Stock could not be calculated using catch and effort data, due to still unresolved difficulties in their interpretation and pooling (see *Rep. int. Whal. Commn* 31: 81).

An *ad hoc* working group was set up to examine the estimates obtained using the two estimation techniques described in Annex D. Their report is given in Annex O. The Committee noted that after a lengthy and detailed discussion, two alternative views were expressed in the *ad hoc* group:

some of the members felt that, even though strict comparison was not possible, a better fit had been obtained using the CB technique than had been obtained using the ST technique, as indicated by comparing the sum of the three entries in the SS (sum of squares) column of Table 1, Appendix 1 with the approximate minimum sum of squares indicated in Figs 1 and 2 of Appendix 2. Believing that the estimates obtained using the CB technique satisfied each of the three agreed criteria (in Annex D) and that the ST technique had satisfied none of these criteria, they felt that the initial

and 1981 population estimates obtained using this technique should be adopted;

others believed that it was not possible to compare the results any further or to determine the appropriateness of either model from sums of squares because no direct comparisons of results on the same data series were available. They believed that a further analysis of the two models should involve:

- (i) execution of the two programs employing the same data series, so that results were strictly comparable;
- (ii) careful study of the available data sets and further refinement if possible; and
- (iii) a check of the behaviour of each model relevant to the availability and validity of the data sets.

Last year the Committee had agreed that in the model validation process, comparisons of observed and expected pregnancy rates should be made for Divisions 3, 5 and 9. Comparisons using the revised CB method have been made between predicted and observed pregnancy rates in the Western North Pacific and in Division 5. The Committee agreed that similar comparisons should be made for the CB method for Divisions 3 and 9, and for the Western North Pacific and Divisions 3, 5 and 9 for the ST technique.

Best and Clark thought neither method could be judged on the basis of predicted pregnancy rates, as these were determined entirely by the sperm whale model and the starting population estimate. While theoretical and predicted pregnancy rates might therefore be taken to choose one population estimate over another, they believed there was so much noise in the data and so much uncertainty concerning the model that this was not practical.

In these circumstances the Committee, being unable to resolve the differences between these views, agreed that it was unable to provide unequivocal advice to the Commission on stock size, classification and catch limits for the Western North Pacific stock.

Some members believed that rather than making hasty recommendations based on incomplete conclusions as was the case last year, efforts should be made to resolve the differences between the alternative views as soon as possible.

Other members believed that applying the CB technique leads to results from which it can be concluded on the basis of the same arguments that the recommendations made in 1980 by the Committee (with Japanese scientists dissenting) should again be submitted to the Commission, namely 'that males be classified as a Protected Stock with a zero catch limit, and that a zero catch limit be set for females'.

While accepting that the CB estimates of 1910 and 1981 population size should be adopted, yet others believed that it was inappropriate at this stage to proceed to stock classification and catch limits in view of the current uncertainty in the sperm whale model and its parameters with regard to predictions of pregnancy rates.

9.2.4 North Atlantic

In the absence of new data, the Committee agreed to treat North Atlantic sperm whales as one stock for assessment purposes. As last year, in the absence of direct data, the parameters for the Southern Hemisphere shown in Table 2, Annex D, were adopted.

Population estimation was attempted using Icelandic catch length data and new CPUE data from Spain and the Azores using the POPDYN procedure with results as

shown in Table 3 of Annex D. However, due to uncertainties in the assumption in the methods used and the biological parameters adopted, the Committee considered that none of the population estimates were reliable.

The Committee agreed that the new catch and effort data available at this meeting support the conclusions reached last year that the stocks of both males and females have declined. However, it was unable to agree on the extent of that decline. Some members believed that there had been a serious decline in stock sizes, while others believed such a conclusion was unwarranted, and that the stocks may be near optimal levels.

The Committee agreed that the data and population estimates did suggest a greater decline in male than in female stocks. It recommends caution in the setting of catch limits for this stock, and that they should not exceed those set by the Commission last year.

However, several members expressed the view that the CPUE data for the Azores and Spain taken together showed that both males and females had been reduced to well below protection level and should be thus classified; evidence for this is presented in Annex P, paragraphs 8 and 9.

9.3 Other baleen whales (also see Annex F)

9.3.1 *Fin whales, Southern Hemisphere, Areas I-V*

The Committee agreed that for the time being there is no reason to change last year's projections (*Rep. int. Whal. Commn* 31: 129). It therefore recommends that all stocks should remain protected.

9.3.2 *Fin whales, Southern Hemisphere, Area VI*

In the absence of any information to alter the assessment carried out last year (*Ibid* p. 122), the Committee recommends that this stock should remain protected.

9.3.3 *Fin whales, North Pacific*

The Committee received no information to change its decision of last year and recommends that this species remains protected in the North Pacific.

9.3.4 *Fin whales, North Atlantic*

Though some new information was available on stock identification, no changes in stock definition are recommended. In the stock analyses, new information was available for and attention was therefore focused on, the East Greenland – Iceland and Spain – Portugal – British Isles stocks.

(i) East Greenland – Iceland stock

This was again analysed by a model similar to BALEEN with, however, improved CPUE data and better input values for the biological parameters, although these are in part derived from Southern Hemisphere values. Last year there were two sets of CPUE data and uncertainty over the biological parameters; the analyses led to two quite different results and the Committee was unable to agree on a single recommendation.

This year the several model results are rather similar and imply that the classification should remain Sustained Management. The catch limit in the past has been based on the average catch over a long period under the assumption that the CPUE was stable. The more detailed analysis referred to above shows that this is not correct. However,

the model does provide an estimate of replacement yield of 158. The Committee therefore recommends that this stock be classified as a Sustained Management Stock with a catch limit of 158. In view of the fact that some estimates of stock size were below the conventional MSY level, the Committee recommends that catch limits be set one year at a time and that the stock be carefully monitored.

(ii) Spain – Portugal – British Isles stock

This was analysed primarily by methods similar to those used in the last two years though additional catch and effort information was available. The Committee was still unable to carry out a proper standardisation of recent effort data, so the analyses depend on catch and effort series of the 1920s. They are improved in using more complete catch data and additional runs have been made to explore alternative possibilities. On the basis of what some judge to be the best output of the model they recommend that the stock be classified SMS with catch limit 210.

Other members believed that the assessments attempted contained such uncertainties and problems that they did not provide a scientific basis for recommendations either for classification or for catch limits. They noted the average annual catch from Spanish land stations was 137 in the period 1968–77 during which the catch regime was apparently more or less stable; if the Commission wishes to set a catch limit on the basis of recent stable catches they believe that 137 would be an appropriate number.

(iii) Nova Scotia stock

In the absence of any new information, the Committee recommends that this stock remains protected.

(iv) West Greenland stock

The Committee recommends that this stock remains classified as a Sustained Management stock with a catch limit of 6.

(v) West Norway stock

The Committee recommends that this stock remains protected.

(vi) Newfoundland-Labrador stock (N-L) and (vii) North Norway stock (N-N)

The Committee was unable to agree on recommendations for these presently unexploited stocks. Three proposals were supported:

- that the stocks should be unclassified and retain the catch limits of last year: N-L, 90; N-N, 61;
- that the stocks should be unclassified with catch limits of zero;
- that the stocks should be classified as Initial Management Stocks with catch limits of zero.

The Committee noted that next year it would pay specific attention to classifying the North Atlantic fin whale stocks in a coherent and consistent way.

9.3.5 *Sei whales, Southern Hemisphere*

A relatively large number of sei whales were seen by Japanese scouting vessels in Area I off Chile last season (SC/33/ProgRep Japan) but no estimate of abundance was obtained. The Committee had no new information to alter its reassessment for Area I carried out last year (*Rep. int. Whal. Commn* 31: 129) and recommends that this stock remains protected. Similarly there were no new data for

Areas II–VI and the Committee recommends that these also remain protected.

9.3.6 *Sei whales, North Pacific*

Continuing Japanese sightings cruises suggest a slow recovery of the stock. The Committee recommends that this stock remains protected.

9.3.7 *Sei whales, North Atlantic*

(i) Iceland stock

In the absence of any new assessment, the Committee recommends that this stock remains classified as a Sustained Management Stock with a block quota of 504, for the period 1980–85, the annual catch not to exceed 100.

(iii) Nova Scotia stock

There was no new information concerning this stock and the Committee recommends that it should remain protected.

(iii) Northeast Atlantic Stock (or stocks)

Lacking any assessment, the Committee was unable to recommend a classification or catch limit.

9.3.8 *Bryde's whales, Southern Hemisphere*

The Committee clarified the boundaries proposed last year and suggested two new stocks—South African inshore and North Indian Ocean.

The proposed boundaries are shown in Annex F, Fig. 1.

The two proposed new stock areas are defined as follows:

- (i) the South African inshore stock area extends 30nm seawards off the southeast coast of South Africa from 25°S latitude down and around the coast to 25°E longitude;
- (ii) the North Indian stock area is that part of the Indian Ocean north of the equator.

All Bryde's whale stock boundaries are tentative.

Only the Peruvian stock was assessed at this year's meeting, primarily using updated sightings estimates and models similar to those used for North Pacific Bryde's whale stocks. The Committee recommends that this stock is classified as an Initial Management Stock with a catch limit of 244. Other classifications and catch limits remain unchanged and are given in Annex F, Table 4.

9.3.9 *Bryde's whales, North Pacific*

The Committee clarified the boundaries of these stocks as shown in Annex F, Fig. 1. The East China Sea stock area is divided from the western North Pacific stock area by the Ryuku Island chain. These stock boundaries are tentative. The East China Sea stock is presently classified as a Sustained Management Stock with a catch limit of 19 based on average annual catches during the period 1955–74 but no catches have been taken since. As the Scientific Committee has never assessed this stock, the Commission may wish to move it to unclassified status, but in any case the present catch limit should not exceed 19.

The Western North Pacific stock was reanalysed and updated along similar lines to those carried out last year. The reanalysis results in a very small change from last year's catch limit of 510. The Committee recommends that this stock be reclassified as IMS with a catch limit of 507. The Eastern North Pacific stock has never been exploited and should remain an Initial Management Stock with a catch limit of zero.

9.3.10 *Research and other proposals*

The Committee notes with approval the plan of Spain to undertake tagging and perhaps sighting later in 1981. It believes that continued sighting and tagging on the Peru Bryde's whale stock would be useful.

The Committee recommends that the Commission support an analysis of effort data using log book records from Antarctic whaling before 1970 and utilising this in a reanalysis of southern fin whale stocks (see Item 7.2.4).

It is recommended that the Republic of Korea continues to obtain photographs and baleen material from any large whales taken by its operations but the Committee sees no need for the Commission to send an expert to Korea to assist in identification of these animals as proposed in 1979 and 1980.

9.4 Other Protected Species and Aboriginal/Subsistence whaling

9.4.1 *Bowhead whales*

The Committee noted that the Alaskan Eskimo harvest for 1980 was 16 landed and 34 struck (IWC quota 18 landed and 26 struck).

The Committee noted with great concern that despite the official closure of the 1980 hunt on 27 May, five crews from Kaktovik and Nuiqsut villages had engaged in bowhead whaling during September and October, during which 3 bowheads were struck and 1 landed. The IWC quota had thus been exceeded by 8 strikes.

In the Spring 1981 hunt, 14 animals had been landed and 25 struck.

During the Spring 1981 migration, the total number of whales passing the ice camps was estimated to be between 2,025 and 2,459 animals, with a best estimate of 2,242 animals, depending on whether conditional sightings were classed as duplicates or new whales respectively. These figures include allowance for periods when no watch was kept, and as some of these were substantial it is possible that the interpolations used were imprecise. However some of these periods coincided with times when the lead was closed. Hence the 1978 estimate of 1,783 to 2,864 animals for this stock is still considered the most accurate.

An updated estimate of the 1848 population size of the Bering/Chukchi Sea stock of bowheads was 9,000 to 18,000. However, the magnitude of the early bowhead catch (about 15,000 in the first four decades of the pelagic fishery) suggested to the Committee that the initial population size probably lay nearer the top end of the range given than the lower.

The present population could therefore be estimated as 10 to 32% of its initial size, taking the two extremes of the highest N1978 estimate and lowest N1848 value and the lowest N1978 estimate and highest N1848 value. Because of the magnitude of the early pelagic kill, the Committee believed that the present population size is more likely to be nearer 10% than 32% of its initial size.

In considering the status of this population, the Committee drew attention to the following:

- (a) the best estimate of present gross recruitment rate (from aerial calf counts) is 3.4%;
- (b) assuming 75% mortality of struck and lost animals the 1980 harvest represents 1.3% of the best estimate of present population size (2,264).

Given the estimates of adult natural mortality rate made for other baleen whale species apart from minke whales (4–8.5%), the Committee concluded that even if there is

no kill the population may only be stable or even decreasing. Therefore any kill whatsoever will increase the risk of this already small population declining further. The Committee reaffirms its view of the last four years that to reduce the probability of extinction of the population, no catch should be taken. The Committee therefore recommends as the only safe course for the Commission that the catch limit be zero.

Given that the Commission last year decided to set a three-year quota for the Bering Sea bowhead population, and if it decides to continue this regime, the Committee strongly recommends that removals of any kind should be (a) of sexually immature animals (less than 12m long) in order to maximize reproduction in the short term and (b) taken in a manner that will reduce the struck and lost rate to zero to minimize total removals.

The Committee recommends that other populations of the species should also be protected from all hunting.

9.4.2 *Right whales*

The Committee believes that apart from the remnant of the Okhotsk Sea stock, the continued existence of viable stocks of right whales in the rest of the North Pacific is in doubt.

The Committee recommends that the People's Republic of China should be asked to provide data on the status of right whales off China together with details of any past catches.

In the North Atlantic, 26 right whales were seen in 1980 in the Bay of Fundy, together with another possible 40 outside the Bay. The Committee recommends that surveys of this population be continued, especially in view of proposals for accelerated industrial development in the area.

Seventy-four right whales were seen off Western Australia and 166 right whales off South Africa during aerial surveys in 1980.

The Committee recommends that sightings vessels in transit to and from the Antarctic should undertake systematic surveys in the following area where concentrations of right whales are believed to occur, i.e. 40°–50°S, 170°–130°E, from November to February.

No information was available from Argentina on the status of this species off Peninsula Valdez. The Committee repeats its requests of last year for information on population size and trends to be made available, and recommends that the Secretary contact the relevant Argentine authorities.

The Committee further recommends that:

- (a) all right whale stocks should remain protected; and
- (b) as last year, studies of historical records should be undertaken to reconstruct the pattern of exploitation in the eighteenth and nineteenth centuries.

9.4.3 *Blue whales*

The Committee recommends that:

- (a) blue whale stocks should remain protected in all oceans; and
- (b) that a re-analysis of Southern Hemisphere blue whale stocks (both 'normal'—Series B and C—and pigmy—Series D) should be undertaken. The latter study will be facilitated now that catch and effort data for the Southern Hemisphere are available on computer tape at the IWC. This study can be executed at the same time as the proposed log-book study for Southern Hemisphere fin whales (see Item 7.2.4).

9.4.4 *Humpback whales*

A new estimate of the initial population size for the northwest Atlantic humpback whale of 4,230 was presented in SC/33/PS14, based on a historical reconstruction of the catch. A workshop held in New England during 1980 (SC/33/PS9) concluded that the current population of humpback whales overwintering in the West Indies is at least 2,000. This population is therefore substantially below its initial level.

A total of 13 humpback whales was landed in Greenland in 1980. It was explained that in early July reports of the landing of 10 humpbacks were received, and although an immediate instruction was given to stop catching, later reports revealed that in fact 12 had been caught before the date on which catching ceased. One further humpback was landed after the season had been closed.

On the eastern coast of Newfoundland during 1980 there were 61 reported encounters of humpback whales with fishing gear, resulting in the known death of 17 animals. Due to under-reporting it was estimated that 20 humpback whales might have died. Warning devices attached to gear (principally visual and either passive or active acoustic devices) had not proved entirely successful in reducing the rate of entanglement.

The Committee noted that (excluding possible catches at Bequia and St Lucia/St Vincent, for which no data were available) the estimated total removals for humpback whales in the North Atlantic in 1980 was 33. This represents 1.7% of the lowest reasonable estimate of current population size. A conservative estimate of gross recruitment rate might be the number of calves seen on Silver, Navidad and Mouchoir banks in 1980 (57—SC/33/PS2) as a proportion of the minimum population estimate of 2,000, i.e. *ca.* 3%. Present estimated removals are therefore a significant proportion of this recruitment rate. As the present population is believed to be still substantially below its initial level, the Committee recommends that every effort be made to reduce the number of removals. In spite of Canadian investigations and efforts towards solving the problem, the number of reported deaths due to entanglement in fishing gear has remained at a high level. The Committee recommends the continuation of the study of the incidence of net entanglements and means to reduce the mortality resulting therefrom. Until such time as more reliable estimates of population size, recruitment, trends in abundance, stock identity and loss rates in the fishery are available, the Committee recommends that the exemption for a Greenland catch of 10 humpback whales be removed (as previously recommended). The Secretary is requested to contact the responsible authorities in Bequia, St Lucia and St Vincent to determine whether humpback whaling is continuing.

The Committee also recommends that:

- (a) all humpback whale stocks should remain protected,
- (b) the current status of the humpback whale stocks off Peru should be surveyed as soon as possible,
- (c) all scientists with access to either live or dead humpback whales should be encouraged to attempt to obtain photographs of the colour pattern of the ventral surface of the tail flukes, and to exchange these photographs with other interested observers in the area. A catalogue of 1,000 fluke photographs is already available for the northwest Atlantic, and the comparison of photographs is proving a useful method of identifying individuals.

9.4.5 Gray whales

The Soviet catch of gray whales for its aboriginal people totalled 179 animals in 1980. Females again predominated in the catch (71.4%). The USSR was concerned about this imbalance, and would work towards adjusting the sex-ratio in the catch and reducing the proportion of pregnant females to the extent possible. The Committee urges them to continue investigating means by which the sex-ratio of the catch could be adjusted, although the inherent difficulties of the situation are recognised. The Committee welcomes the substantial increase in the amount of information and materials collected from the Soviet harvest in 1980, especially the age and reproductive material, and the information on feeding and behaviour. The Committee recommends continuation of studies in the breeding lagoons, as well as in the sea in their immediate vicinity, in order to understand the pattern of habitat usage by gray whales during their breeding season.

Two gray whales were landed by US eskimos in 1980 (SC/33/ProgRep USA), so that total known removals from the stock were 181. This represents 1.16% of the best estimate of current size (15,587 animals). A new simulation model of the population history of the Californian gray whale indicated that the initial population size might have been 24,000 animals, reduced to just under 12,000 by 1800. If the estimate of initial stock size is accepted, then the present population is at 64.9% of its initial level, and 13% above the estimated MSY level. According to the model, the predicted net recruitment at this population level is about 3.5% (compared to an average rate of population increase observed between 1967 and 1980 of 3.7%). Consequently the population should continue to increase despite the current level of the harvest.

The Committee recommends that the Eastern Pacific stock of gray whales should remain in the Sustained Management category. Any catch should be held at the same level as the average of the last five years (i.e. 179 animals), for the following reasons:

- the high proportion of females in the catch;
- the present assessment of initial stock size is very sensitive to certain parameters such as the size of the aboriginal catch prior to 1800; and
- further growth of this stock should be encouraged in order to increase the possibility of repopulation of the area once occupied by the Korean stock.

Because the Californian gray whale stock is the stock for which the most information on recovery rates is available, the Committee strongly recommends that periodic systematic counts of gray whales (possibly restricted to a key period of the migration wave) should be continued, in order to maintain adequate monitoring of the stock.

9.4.6 Consideration of protected species

In view of the matters raised under Commission Agenda Item 9, the Committee reviewed the degree to which the actions of the Commission in extending protection have resulted in the intended recovery of the species concerned.

The Committee concluded that there were essentially two categories of protected stocks, those that had been or were being systematically monitored by programmes directed towards measuring population trends (Table 2) and those for which only non-systematic or incidental observations were available. There were only 11 stocks which were being or had been systematically monitored. It was important to note that all these studies had commenced relatively recently, the longest series dating from 1967. Only three were believed to provide evidence of a significant trend, and all indicated an increase. The remaining 8 stocks had only been studied from 1 to 5 years, so that it was too soon to reach reliable or significant conclusions.

There are a number of incidental observations available from scouting vessels, whale catchers and other vessels, that have not been collected in a systematic fashion (at least as regards the protected species). These results are obviously more difficult to interpret, although some attempts have been made in the past. In some cases (Eastern North Pacific right whales, Spitsbergen bowheads) sightings are extremely few and any recovery of the stock is obviously doubtful. On the other hand there are indications that some populations may be increasing under protection (e.g. Californian blue whales). For most of the others the data base is insufficient or too erratic to allow any interpretation of trends.

The Committee recognises the importance of this subject, and recommends that it form a priority item for next year's agenda for this group. National groups are encouraged to analyse any available historical or recent data for a protected stock that will clarify (a) initial unexploited population levels, (b) trends in population

Table 2

Stocks of protected species for which systematic monitoring is being or has been executed.

Species	Stock	Method	Period covered	Annual trend ¹	Source
Gray whale	East Pacific	Shore counts	1967-79	+2.5% ²	Reilly <i>et al.</i> (SC/32/PS4)
Gray whale	East Pacific (Mexico)	Aerial and shore counts		*	Fleischer (pers. comm.)
Right whale	Southern Africa	Aerial counts	1969-79	+7%	Best (SC/32/PS4)
Right whale	Western Australia	Aerial counts	1976-	*	SC/33/ProgRep Australia
Right whale	Argentina	Aerial and shore counts	1970?-	+ ?	Payne (unpubl.)
Right whale	North Atlantic	Aerial counts	1980-	*	Tillman (pers. comm.)
Bowhead	Bering/Chukchi Seas	Shore counts	1978-	*	SC/33/PS4
Humpback	Western Australia	Aerial counts	1976-	*	SC/33/ProgRep Australia
Humpback	Eastern Australia	Aerial and shore counts	1978-	*	SC/33/ProgRep Australia
Humpback	Northwest Atlantic	Aerial counts	1980-	*	Tillman (pers. comm.)
Humpback	Northwest Atlantic	Shipboard counts	1977-	*	SC/33/PS9
All species	North Pacific	Shipboard counts	1978-	*	Yamamura (pers. comm.)

¹ Over the period of monitoring.

² If simultaneous removals considered, trend becomes +3.7%.

* Insufficient information available (see text).

size, or (c) current population levels, the results to be submitted to the 1982 meeting.

9.4.7 *Aboriginal/subsistence fisheries*

The Committee considered the five items from the Agenda of the forthcoming meeting of the *ad hoc* Technical Committee Working Group on Subsistence Whaling, on which it believed that scientific advice might be required:

Item 7.1 Scientific Committee advice on population sizes, trends, and yields of stocks of whales subject to aboriginal hunting in relation to natural and manmade factors directly affecting them.

The Committee considered that such advice should be provided on a stock-by-stock basis.

Item 7.2 Consideration of catch limits where on biological grounds catches should be reduced or suspended.

The Committee considered that it was unable to provide any general criteria for such catches because (a) they should be considered on a stock-by-stock basis, (b) the size of the minimum viable population for each species was unknown, and (c) adverse environmental changes could have considerable impact on populations depleted to very low levels.

Item 8.1 General consideration of data gathering and reporting requirements.

In recognition of the particular difficulties surrounding data collection in these harvests, the Committee recommends the following list of data requirements.

A. *Essential data* (from each whale landed)

1. Location, date and time of kill
2. Species
3. Length
4. Sex
5. If female, presence of milk
6. If female, presence of foetus
7. Degree of stomach fill

Extra data

8. Length and sex of foetus
9. Collection and preservation of both ovaries
10. Collection of at least one ear plug, tooth or bulla
11. Collection of an eyeball (frozen)
12. Collection of sample of stomach contents.

With regard to the latter biological data, the Committee strongly recommends that the maximum material possible should be collected from the landed catch in any aboriginal fishery, as often such catches may be the only source of material for the species concerned.

B. In addition, the Committee recommends that a simple form of primary effort measurement, such as number of boats or hunters involved and the length of the season, should be reported, and that the type of effort unit used should be stated.

C. Struck-and-lost rates in any aboriginal/subsistence fishery should be specified as follows:

- (1) Struck, known to be killed but lost;
- (2) Struck, lost alive but believed mortally wounded;
- (3) Struck, lost alive but believed not to be mortally wounded.

(b) *Research and monitoring requirements*

The Committee concluded that the following were the biological requirements of any basic management scheme

for an aboriginal/subsistence harvest, and recommends their inclusion in such a scheme.

Essential requirements

- (1) Knowledge of population size and identity;
- (2) Estimate of yield;
- (3) Knowledge of population trends.

Extra data

- (4) Population status (relative to initial).

Items 10.1 and 10.2 Developing of guidelines for the management of subsistence harvest stocks—Biological considerations—Research efforts.

Although some members of the Committee felt that it should be prepared to comment on these Items, other members felt that it was inappropriate to comment on them at this stage.

10. SMALL CETACEANS

(also see Annex H)

Directed and incidental catches by IWC members of small cetaceans reported to the Scientific Committee, BIWS or published are listed in Appendix 3 of Annex H. The estimated total is 112,006 dolphins, porpoise and small whales. The small cetaceans sub-committee concentrated in its deliberations on the white whale and narwhal (in response to the explicit request by Canada) and on the killer whale (as proposed last year). Other species and fisheries were only surveyed for new developments.

10.1 Status of stocks

10.1.1. *Northern bottlenose whale*

No new information was available on this Protected Stock.

10.1.2 *White whale*

The Committee reviewed available information for white whale stocks in Cook Inlet, Bering Sea, Chukchi Sea, Beaufort Sea, Mackenzie Delta, Barents Sea, White Sea, Okhotsk Sea and High Arctic and the Western Hudson Bay stock but concentrated its attention on the heavily-impacted Eastern Hudson Bay, Ungava Bay and Cumberland Sound stocks.

The Committee recommended last year that the Cumberland Sound stock be classified as a Protected Stock, with zero catch limit. That recommendation was not acted upon by the Commission, and 43 whales were taken from the stock in 1980. Present size is estimated at 600–700, approximately 12–14% of original. Because the available information is not adequate for estimating net reproductive rate, e.g. there is no data-based estimate of natural mortality rate, the Committee can make no estimate of replacement yield or MSY level. In any case, the stock is far below the MSY level and should be fully protected (see Recommendations below).

The situation is similar for the Ungava Bay stock (at <500 whales, estimated at <20% of original) and the Eastern Hudson Bay stock (at <500 whales, estimated at <10%), and these stocks should also be fully protected.

The Western Hudson Bay stock is estimated to be at 80–90% of its original size of about 10,000. Estimates of the original size are not available for the other stocks presently exploited by Canada (High Arctic and Beaufort-Mackenzie) but they are thought to be closer to original size than are the three depleted stocks discussed above and

not in a crisis situation. Recent takes ranged from 1.0 to 5.6% of present population size (see Table 1 in Annex H).

Because of the lack of estimates of net reproductive rate it was not possible to make the 5-year projections requested by the Canadian government. It is clear, however, that continued takes of recent size (ranging to 44% or more of present population) may well result in extinction of some stocks, in particular the Ungava Bay and eastern Hudson Bay stocks, in a very few years. In part, the problem seems to be that the hunters have recently acquired very powerful outboard engines that allow them to reach the estuarine areas quickly, making the hunt more practical than it was formerly.

In addition to recommending protection for some stocks of white whales, the Committee urges Canada and the other nations taking white whales to collect and report more complete catch statistics and to expand research to better define stocks and estimate vital rates (see Recommendations).

10.1.3 Narwhal

There was no new information available that would allow assessment of status of stocks, estimation of replacement or other yields, or the projections requested by Canada. There is persuasive evidence for the existence of one main stock that winters in Davis Strait and summers in northern Greenland and the Lancaster Sound region, with possibly a very much smaller stock inhabiting northwestern Hudson Bay. Present takes from the main stock are thought to be on the order of 3-6% of the present population of up to 20,000. Research of the type described above for the white whale is also needed for this species, although the situation is less urgent.

10.1.4 Killer whale

The Committee received and reviewed the report of the recent Workshop on Identity, Structure and Vital Rates of Killer Whale Populations (SC/33/Rep 4).

The workshop concluded that while killer whales may be found in nearly every area of the world's oceans, concentrations are mainly near coasts and in high latitudes. Morphometrics and colouration may be useful tools in defining some type of geographic or ice-edge/open water units, but existing evidence of a high degree of isolation over a few hundred miles for animals in coastal waters of the eastern North Pacific suggests that broader-scale stock areas as used for larger species may be inappropriate for killer whales. Given the extreme stability of local populations and the possibly low reproductive rates evidenced by the available data, any exploitation can be expected to have very long-term impacts on population size and structure.

Based on a long catch history, the killer whales in the eastern North Atlantic were provisionally recommended by the Committee last year to be classified as a Sustained Management Stock with catch limit of 52, pending review this year of information necessary for identification of stocks and assessment of their status (*Rep. int. Whal. Commn* 31: 68). The Commission did not act on the recommendation, but Norway voluntarily limited the catch in 1980 to 52 animals.

The conclusions of the workshop indicate that the take may be from one or a few localized stocks, and in any case, the available data are still inadequate for stock assessment. For these reasons, the Committee believes that the killer whales off the coast of Norway should be designated as an

Unclassified Stock with zero catch limit and makes recommendations for necessary research (see Recommendations).

Information available on Southern Hemisphere killer whales, from the workshop is still inadequate to define stocks for management. Data and analyses are inconclusive with respect to the six to eight longitudinally-defined stocks proposed by Mikhalev *et al.* (1981). Various data do indicate that at least two and possibly more forms of killer whales exist in the Antarctic. An estimate of total abundance south of 60°S, based on sightings data from the IDCR minke whale cruises and sightings data from Japanese scouting vessels is 254,900. There are problems with some of the assumptions of the method used, however, especially with that of uniform distribution of density of killer whales within 5° squares close to the ice. The data and analyses will be re-examined during the coming year.

Lacking a basis for delineating stocks, there is no basis for catch limits. Pending results of more research of the type done elsewhere on population structure and stock identity, the Committee believes that there should be no catches of Southern Hemisphere killer whales (see Recommendations).

Analysis and stratification of the sample of killer whales taken by the USSR in 1979/80 may help to clarify the situation, but at present no identification of separate stocks can be made.

10.1.5 Pilot whales

The Committee notes an increased take of short-finned pilot whales in Japanese drive fisheries. It is unclear whether the 1980 figure represents an increase in takes or simply a better reporting system. The status of the stock(s) has not been assessed, and the Committee urges that Japan implement a reporting system by village and a summary of historical fishing effort, abundance and composition of catches.

The same comments apply to the large catches of long-finned pilot whales in the Faroes.

10.1.6 Striped dolphin

The Committee notes with concern that the reported catch of striped dolphins in Japan increased greatly in 1980 to 16,344 from 2,193 in 1979. The population in 1974 was at less than 50% of estimated original of more than 404,000. MSY at that time was estimated to be 4,140-6,530. The take of over 16,000 is clearly far more than the sustainable yield.

The Committee is extremely concerned about this severe over-exploitation of the striped dolphin population. There is a clear need for re-assessment of the populations of this and other species taken in the drive fisheries and for management of these presently unmanaged stocks on a scientific basis.

The small cetaceans sub-committee also reviewed new information for several other directed fisheries and considered incidental takes (Annex H).

10.2 Recommendations for research and management

The small cetaceans sub-committee prepared an extensive list of recommendations (see Annex H). Only those the Committee believes most important are listed here, although the Committee endorses the remaining (research) recommendations in principle.

10.2.1 Northern bottlenose whale

The Committee again recommends that the research programme recommended for the northern bottlenose whale in 1977–78 be carried out and that the stock remain classified a Protected Stock with zero catch.

10.2.2. White whales and narwhals

(1) The Committee notes that the status of most small cetaceans in the IWC remains unresolved and that a resolution adopted at the 1980 meeting of the Commission (*Rep. int. Whal. Commn* 31: 31, Appendix 8) established an interim working arrangement for continuation of the work of the small cetaceans sub-committee and provision of scientific advice to the member governments. The resolution also calls for provision of data and analyses to the Scientific Committee by member governments. The Committee recognizes that advice promulgated under the present working arrangement has resulted in expansion of national research programs on some species and adoption of voluntary internal catch limits for some stocks. Nonetheless, most members of the Committee believe that for scientific reasons the white whale and narwhal should be managed on the same basis as the other Arctic whales, although some members believe that making this recommendation is inappropriate. Common factors affecting scientific management are summarised in Annex H. Most members of the Committee recommend that the white whale and narwhal be listed in the Schedule (paragraph 1) thus:

'white whale' (*Delphinapterus leucas*) means any whale known as white whale, beluga, belukha

'narwhal' (*Monodon monoceros*) means any whale known as narwhal, sea unicorn

and that stock classifications and catch limits be set in accordance with the Commission's management procedures. Ivashin expressed the opinion that this recommendation is inappropriate in view of the resolution of last year by the Commission; Øritsland, Kapel, Brodie and Ohsumi wish to be associated with this view.

(2) The Committee notes the responsive and considerable expansion of studies of populations of white whales and narwhals in Canadian and Greenland waters and recommends that Canada and Denmark be encouraged to continue this very important work, giving particular attention to stock identity, migration, abundance, calf production, collection of complete and accurate catch statistics, and collection of age and reproductive samples from as many animals as possible.

(3) Noting the seriously depleted status of the stocks summering in Cumberland Sound and the importance to the species of estuarine calf-rearing grounds (estimated to be at less than 14% of original size), Ungava Bay (less than 20% of original) and eastern Hudson Bay (less than 10% of original), the Committee recommends that each of these separate stocks be classified as a Protected Stock with zero catch, and that the critical habitat of these stocks be recommended for protection.

10.2.3 Killer whales

(1) The Committee last year recommended that because of a long history of catches the killer whales in the northeastern Atlantic be classified provisionally as a Sustained Management Stock, pending review of identity and status of stock(s) at this year's meeting. Data necessary to establish identity and assess status of the stock(s) are still

not available. In addition, the catch data and new information on the size and nature of stocks elsewhere indicate that the recent takes on the northern coast of Norway may have come from one or a few localized stocks rather than from an overall northeastern Atlantic stock. For these reasons, the Committee recommends that the killer whales on the coast of Norway be designated an Unclassified Stock with zero catch limit, pending identification of stocks and assessment of their status.

(2) Because available effort data are inadequate for CPUE analyses, the Committee recommends that should the fishery continue, improved reporting of effort be initiated. Such reports should include at least: time leaving port, time returning to port and estimated time searching.

(3) Noting that passive acoustic and photographic enumeration techniques have produced successful results in defining killer whale populations in other areas, the Committee recommends that use of such techniques be considered for use in delineating the stocks in the northeastern Atlantic and Antarctic.

(4) Because of the continuing uncertainty over stock identities, and consequently the abundance of any Southern Hemisphere stock, the Committee again recommends that the stock(s) be classified as an Initial Management Stock with a catch limit of zero.

(5) Noting that a large sample (916) of killer whales was taken in 1979/80 by the USSR and has not yet been fully reported on, the Committee recommends that the USSR be requested to provide suitable report(s) to next year's meeting of the Committee. The report(s) should include analysis of reproductive data and specimens collected, analysis of morphometric, meristic and colour-pattern data, exact locations of catches, sightings and catch per effort data, and information on hunting strategy and tactics, especially as they may relate to possible sex, age or size bias in the samples from the catch and to possible biases in sighting effort. If possible, samples for morphological analyses should be stratified by age.

10.2.4 Pilot whales

Noting that takes of short-finned pilot whales (in Japan) and long-finned pilot whales (in the Faroes) were larger in 1980 than in 1979, and that the status of these stocks has not been assessed, the Committee recommends that Japan and Denmark (Faroes) be encouraged to provide to the Scientific Committee summaries of historical fishing effort, and to initiate studies of abundance and of composition of catches.

10.2.5 Striped dolphin

Noting that there is the possibility that drive fisheries in Japan are overexploiting a population of striped dolphins, and noting that the population is at present unmanaged, the Committee urges that the status of the stock(s) be reassessed to provide the scientific basis for appropriate management action.

10.2.6 Statistics

Catch statistics provided to the Scientific Committee or to BIWS by member nations are incomplete or inadequately detailed. The Committee again recommends that member nations be requested to collect and submit full statistics as detailed in *Rep. int. Whal. Commn* 30: 124. Member nations known to have taken small cetaceans but which did not report the takes or reported them incompletely include Argentina (Incidental), Australia (I), Brazil (I), Canada

(Directed and I), Chile (I), France (D,I), Iceland (Live-capture), Republic of Korea (I), Mexico (I, L), Netherlands (I), Peru (I), Spain (I), UK (I), USA (D, I, L) and USSR (I).

10.3 Plans for the 1982 meeting

The Committee noted that the sub-committee on small cetaceans plans to concentrate on dolphin stocks in the eastern tropical Pacific and the eastern tropical Atlantic, and dolphin stocks taken by the Japanese drive fisheries. The Committee urges that relevant studies and data reports be submitted to next year's meeting.

10.4 Status of the sub-committee on small cetaceans

The Committee agreed that the small cetacean sub-committee should remain a standing sub-committee.

11. DATA COLLECTION, STORAGE AND MANIPULATION

11.1 Central computer facilities

11.2 Exchange and centralisation of existing data

Free presented a progress report on the IWC computing and data facility, which is available as IWC Technical Note No. 9. A summary of the principal conclusions and recommendations follows.

The setting up of the central computing facility has closely matched the original proposal (*Rep. int. Whal. Commn* (Special Issue 2): 125-6). The establishment phase is now essentially complete and requires no further financial provision. However, the process of compiling the data bank is proving more time-consuming than envisaged, chiefly because of poor coding of non-IWC material. Considerable progress is being made in correcting and documenting source tapes, but it is expected that another two years will be needed to complete the coding and checking of the majority of data.

Free reported that his visit to BIWS in Norway had resolved all outstanding problems with the format of the Southern Hemisphere master tapes, which were now being released in fully corrected versions.

A new system is in operation at the IWC which can code tabular information far faster and more efficiently than conventional methods. The Committee agreed that this system should be used to code some of the large body of data to be provided by Japanese scientists and to update the BIWS data tapes.

The University of Cambridge continues to offer an excellent inexpensive service to the IWC throughout the year. In addition, special arrangements were made to provide the greatly expanded computing facilities available at the 1981 meetings of the Scientific Committee. The Committee therefore recommends that the Secretary express its appreciation of the major contribution which the assistance of the Computing Service had made to its work.

Documentation on various aspects of the IWC computing facility and, in particular, the revised data sets, is now being published as a series of IWC Technical Notes, which are available on request from the Secretariat. This format is especially suitable for information which is either provisional or too specialised to warrant publication in the Annual Report.

The Committee recommends that Free attends the post-FIBEX data interpretation workshop in Hamburg (Agenda Item 6). Free reported that he will be visiting

the South-West Fisheries Centre, La Jolla, USA, at the invitation of Dr T. Smith to discuss data handling.

The Committee noted that several computing and data compilation projects had been proposed; a working group, convened by Tillman, will meet during the Brighton meetings to discuss priorities. The group will consider questions of procedure raised by Free concerning the status and validation of computer programs used in assessments.

The Committee thanks Free for his work on their behalf and recommends that he should continue the development of the IWC computing facility as a permanent member of the Secretariat.

11.3 Review of biological material awaiting treatment

Information on biological material awaiting treatment is given in the reports of the sub-committees.

12. EFFECTS OF POLLUTION ON WHALE POPULATIONS, INCLUDING SMALL CETACEANS

The small cetaceans sub-committee reviewed new information on effects of pollution and industrial development (Annex H). The Committee supports the view expressed by ICES that studies of pollution should not only deal with levels but also with effects, and that anatomical and histological information should be included in reports so that possible confounding effects of infections etc. may be examined. The efforts of ICES to standardise assay techniques were noted. The report of the IWC observer to the 68th ICES meeting is given in IWC/33/11A.

SC/33/Ba1, examined DDT and PCB contamination in North Atlantic fin whales. Although the detected levels were not considered to be harmful by the authors, they considered them to be high for a species with a low metabolic rate and occupying a low trophic level. Comparison with an earlier Canadian study (Addison, Zinck and Ackman, 1972, *J. Fish. Res. Bd Can.* 29: 349-55) revealed lower levels of DDTs and higher levels of PCBs. The former are associated with agricultural chemicals while the latter are associated with industrial pollution. It was pointed out that the situation could be expected to be worse in toothed whales which occupy a higher trophic level.

The Committee recommends

- (i) that member nations should ensure that appropriate sampling and analysis is carried out, particularly with respect to toothed whales;
- (ii) that relevant studies should be listed in Progress Reports; studies of particular interest should be presented more fully;
- (iii) that the IWC should co-operate with ICES on this matter; in particular it recommends that Harwood should be the IWC representative at the ICES meeting in Woods Hole, USA in October at which pollution will be discussed.

The Committee agreed that next year this Agenda Item should be expanded to include the effects of industrial development and environmental degradation (in particular see Annex G, pp. 104-112).

13. BEHAVIOURAL STUDIES AND HUMANE KILLING

13.1 Proposals for 1981-82 meeting on behavioural studies

In 1980 the Commission accepted a recommendation

endorsed by the Technical Committee that a behavioural workshop be established in 1981/82 by the Scientific Committee for further detailed examination of those matters identified as being of greatest significance to the assessment and management of cetaceans. Tillman confirmed that he would convene the proposed workshop in Seattle during 5-9 April 1982. A small steering group was formed to prepare a tentative agenda, list of participants, and budget for the workshop.

13.2 Report of the Technical Committee Workshop on Humane Killing Techniques

Gambell introduced the report of the workshop held in Cambridge in November 1980 (IWC/33/15). Yamamura reported verbally on the results of the Japanese experiments with penthrine during the last season which were mentioned in the report. He also noted that the average death time for minke whales had been reduced from 5.2 to 3.4 minutes using an improved electrical lance. A full report will be submitted to the Technical Committee. In January 1981, Norway announced that it is funding a five year project to improve killing techniques in its small type whaling operations (SC/33/ProgRep Norway).

The Committee noted that this otherwise comprehensive workshop report did not adequately review current methods and technology used in aboriginal/subsistence fisheries. As pointed out in SC/32/PS22 a variety of techniques are used in such fisheries, ranging from harpoon guns in the Greenland humpback fishery to hand harpoons and lances in Portuguese sperm whaling. A full treatment of the humane killing issue for aboriginal/subsistence fisheries should address the problems inherent in this wide range of technologies. The Committee therefore believes it is appropriate that the matter be considered further by the IWC *ad hoc* Working Group on Management Principles in Subsistence Whaling.

Best asked whether the statement that M99 would be left as toxic residues was based on experimental evidence and was told that it was not. He also drew attention to the experience in Australia where two stranded rorquals had been despatched with explosive charge placed on the neck.

The Committee endorsed the report and its recommendations.

Parry reported on a proposal to send a British veterinarian to Iceland to extend the work carried out there by Rowsell (*Rep. int. Whal. Commn* 30: 59). The Committee supported the proposal but stressed that any such project must ensure that those whales for which death times are collected are also autopsied. Information from such a study will also be of relevance to the struck-and-lost problem in the Alaskan bowhead fishery.

14. ANNUAL SUMMARY OF NATIONAL RESEARCH PROPOSALS

The Committee reviewed IWC/33/25, in particular the recommendation that a summary of recently completed but unpublished projects and current and proposed projects on cetaceans supported by Contracting Governments, be appended to national progress Reports, and that similar information be sought from organisations such as WWF, FAO and UNEP.

While many members support the aims of the proposal (in particular to reduce duplication of research effort) the Committee believes that there would be considerable

practical problems in implementing the proposal as formulated; the administrative practicality of the proposal should be examined by the Technical Committee. The Committee recommends that as recommended last year (*Rep. int. Whal. Commn* 31: 70) national groups be encouraged to report wherever possible, on at least all government sponsored research both recently completed, current and proposed. Such information (or details of publications or newsletters which contain such information) should be appended to the national Progress Reports; it would not be printed in the Annual Report, but collated information should be available on request from the Secretariat.

15. PUBLICATION ARRANGEMENTS

A subgroup was established during the meeting to review publication policy in view of the comments in last year's Scientific Committee Report (Item 16, *Rep. int. Whal. Commn* 31: 70) and the Commission's Report (Item 26.2(b), *Rep. int. Whal. Commn* 31: 27), where the Committee was asked to include in its review of publications policy consideration of methods of reducing costs.

The subgroup consisted of five sub-committee convenors (Best, Horwood, Kirkwood, Perrin, Tillman), Braham, Donovan, Gambell, Ivashin, Leatherwood, Mitchell, Ohsumi; Bannister was Chairman.

Based on that subgroup's review, the Committee recommends that the following policy be adopted:

- (i) The Scientific content of the Annual Report should constitute in effect the 'report of proceedings' of the Committee's work during the year;
- (ii) The Annual Report should include, as at present
 - the Report of the Committee's Annual Meeting
 - Report(s) of Special Meeting(s)
 - Progress Reports on Cetacean Research (prepared by National groups and submitted in the agreed format to the Committee at its Annual Meeting)
 - Reports of sub-committees appointed to review the major species or stocks.
- (iii) In addition, in place of the present published 'Papers submitted to the Scientific Committee', selected 'key' papers should be published in full. At the same time a complete list of titles should be included. Titles of papers not published would be accompanied by appropriate annotations (abstract/summary/resumé, as authors wish).
- (iv) The following procedure should be adopted for selection of 'key' papers:
 - each sub-committee will review all documents submitted, and select those which, for example, are specifically referred to in the sub-committee report, or have made some other substantial contribution to the sub-committee's work;
 - the sub-committee may suggest ways in which particular selected papers may be improved; in the case of long papers especially, it may suggest ways in which they may be shortened;
 - papers selected by the sub-committees will then be referred to an 'Editorial Board', appointed annually from members of the Scientific Committee, but including the Secretary and Scientific Editor. The Board shall have final responsibility for deciding which papers shall be published;

- papers selected for final publication will be subject to review by 2 persons appointed on the basis initially of advice from the sub-committee. Such review will be under the control of the Scientific Editor, acting within Editorial Board policy. A footnote to any published paper will indicate that a review has occurred, and by whom;
 - no key paper, except in exceptional extenuating circumstances, will be more than 10 printed pages long;
 - where a key paper requires considerable editing or revision before publication, resulting in alterations to conclusions or other substantial material, a note to that effect will be appended to each publication.
- (v) In addition to the Annual Report, two other compilations should be available to the Committee at Annual or other meetings.
- (a) full sets of copies of all papers submitted to previous meetings, in an agreed format;
 - (b) sets of tabular data, both computerised and in other forms, in an agreed format.
- (vi) Copies of papers submitted to the Committee, whether published or not, shall be available on request to the Secretariat, at an agreed fee. An appropriate note to this effect will appear in each Annual Report.

Given the experience of some sub-committees already at this meeting, it is unlikely that any immediate large reduction in number of papers published will be achieved if this procedure is adopted; there should, however, be some economies through shortening of some papers. Nevertheless the proposed procedure, if adopted, should permit the scientific standard of published papers to be raised, without either increasing the costs of publication unduly, or reducing the ability of future workers to review the background of previous decisions in detail.

16. FUTURE MEETINGS AND THE NEED FOR SPECIAL STUDIES

(i) Conference on Cetacean Reproduction (and see Annex H, p. 113)

The Committee notes that the Conference will take place in La Jolla, California from 28 November to 7 December 1981. The Workshop following the Conference is fully subscribed. The USA is providing \$24,000 for the conference and the Committee recommends that the Commission provides the additional £6,000 required. It also recommends that a member of the Secretariat attends the Conference.

(ii) Workshop on Behaviour

This is discussed under Item 13.1.

(iii) AEWG Meeting on bowhead whales

The AEWG (Alaskan Eskimo Whaling Commission) intend to hold a meeting on the biology of the bowhead whale, in Anchorage, Alaska, before January 1982. The Committee recommends that it should be represented at this meeting by the Convenor of the sub-committee on protected species and aboriginal whaling (Best) or if he is unavailable, another member of that sub-committee.

(iv) Right Whales

The Committee notes that the sub-committee on protected species and aboriginal/subsistence whaling has agreed to

give special consideration to right whale stocks, particularly those in the Okhotsk Sea/Sea of Japan, Northwest Atlantic, South Atlantic and around Australia (Annex G, p. 104). If the response is too great to be handled at next year's annual meeting, then consideration might be given to holding a special meeting in 1982/83.

(v) Logbook studies of Antarctic fin whaling

This is discussed under Item 7.2.4.

17. INITIAL AGENDA FOR 1982 MEETING

A number of items were noted for inclusion, or priority in discussion in this report. Members were asked to advise the Chairman of any new items for inclusion in the next meetings agenda.

18. OTHER BUSINESS

18.1 Representation at the Technical Committee Meeting on non-IWC whaling

The Committee recommends that Allen attends this meeting on its behalf.

18.2 Other meetings of interest

The following meetings were drawn to the attention of the Committee:

18.2.1 3rd Theriological Congress, Helsinki, August 1982

This will include a symposium on marine mammals chaired by Dr. Yablokov.

18.2.2 4th Bi-Annual Conference on Marine Mammals, San Francisco, December 1981

Further information can be obtained from Tillman.

18.2.3 7th Annual Meeting of the Mexican Society for Marine Mammal Research in Mexico, La Paz, Baja California, February 1982.

Further information can be obtained from Fleischer.

18.3 Language

Early in the meeting, the Committee recognised the difficulties faced by non-English speaking members in following the discussions in both plenary sessions and sub-committees. It also recognised the difficulties faced when insufficient time was allowed for them to study documents produced during the meeting, especially those produced towards the end of the meeting.

19. ELECTION OF OFFICERS

Bannister and Tillman were re-elected as chairman and vice-chairman respectively. The following were appointed to convene sub-committees at next year's meeting:

- Kirkwood; sperm whales
- Tillman; minke whales
- Chapman; other baleen whales
- Best; protected species and aboriginal/subsistence whaling
- Perrin; small cetaceans

20. OTHER BUSINESS

The Committee wished to record its appreciation of the long hours, hard work and prompt service of the Secretariat during the meeting.

Annex A

List of Participants

AUSTRALIA	F. Kasamatsu	PERU	H. Braham
K. R. Allen	H. Kato	J. Valdivia	D. G. Chapman
G. R. V. Anderson	S. Misaki		W. G. Clark
J. L. Bannister	M. Miyahara	SEYCHELLES	G. Jarrell
G. P. Kirkwood	N. Nakamura	S. J. Holt	S. Mizroch
W. de la Mare	S. Ohsumi		W. F. Perrin
	T. Saito		M. F. Tillman
BRAZIL	Y. Shimadzu	SOUTH AFRICA	
J. da Rocha	K. Shirakihara	P. B. Best	IWC
	S. Tanaka		G. Donovan
CANADA	J. Tedor	SPAIN	C. A. Free
E. D. Mitchell	S. Wada	A. Aguilar	R. Gambell
P. Brodie	K. Yamamura	E. de Salas	
K. Hay		C. Sanpera	
K. Finley	KOREA		INVITED
	J. W. Choi	UK	PARTICIPANTS
CHILE	Y. Gong	S. G. Brown	J. Beddington
R. Maturana		J. Harwood	J. Berney (CITES)
	MEXICO	A. R. Hiby	D. Butterworth
DENMARK	L. Fleischer	J. Horwood	J. Cooke
F. O. Kapel		M. Klinowska	M. Dahlheim
	NETHERLANDS	C. Lockyer	R. Duguy
FRANCE	J. G. van Beek	A. R. Martin	J. Gulland (FAO)
M. Pascal		A. J. B. Rudge	P. Hammond
M. Mackintosh		USSR	S. Leatherwood
	NEW ZEALAND	R. G. Borodin	R. V. Walker
ICELAND	M. Donoghue	M. V. Ivashin	
J. Jónsson		Y. Riyazantsev	OBSERVERS
J. Sigurjónsson	NORWAY		W. J. Jordan (PTES)
	I. Christensen	USA	J. Gordon-Clark (MAC)
JAPAN	T. Øritsland	T. Albert	P. Spong (Greenpeace)
I. Ikeda	C. J. Rørvik	K. Balcomb	P. Vodden (RSPCA)
M. Kakibaya			M. Schultz (IYFESC)

Annex B

Agenda

1. Chairman's welcome and opening remarks.
2. Appointment of rapporteurs.
3. Adoption of agenda.
4. Arrangements for meeting:
 - 4.1 Meeting procedure, establishment of sub-committees, time schedule.
 - 4.2 Computer arrangements.
5. Review of available documents and reports.
 - 5.1 Documents submitted.
 - 5.2 Progress Reports on Research.
 - 5.3 Reports of Special Meetings and Workshops:
 - 5.3.1 Sightings Workshop.
 - 5.3.2 Minke Whale Workshop.
 - 5.3.3 Killer Whale Workshop.
 - 5.3.4 Management Procedures.
 - 5.3.5 Humane Killing.
 - 5.4 Scientific Permits:
 - 5.4.1 1980-81: reports.
 - 5.4.2 1981-82: advance review.
 - 5.5 Previous season's catches and other statistical material.
 - 5.6 Whale Marking:
 - 5.6.1 Progress of International Scheme including Commission's contribution to costs.
 - 5.6.2 Reports of special cruises—Minke whales.
 - 5.7 Sighting programme—data reports from commercial operations 1980-81.
 - 5.8 Indexed list of Scientific Committee publications.