

A Preliminary Review and Evaluation of Scientific Whaling from 1986 to 1996

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SUMMARY

1. In the ten years since 1986, when the moratorium on commercial whaling came into force, Japanese scientists have killed a total of 3,526 minke whales in the Antarctic and Northwest Pacific under special permits for scientific research. Also under special permits, Norway has killed 288 minke whales in the Atlantic off Norway; Iceland 292 fin whales and 70 sei whales in the Atlantic, off Iceland, and Korea 69 minke whales in the Sea of Japan. Only the Japanese scientific whaling programme is continuing.
2. The Japanese research began in the 1987/88 season with a two year feasibility study and was followed by the main research programme which is intended to run for fourteen years. Between 1987 and 1995, there were annual takes of about 300 animals in Antarctica. In 1995/6 the research was extended into a wider area and currently up to 440 whales are killed in Antarctica each year. Research in the North Pacific began in 1994, where up to 100 minke whales are killed each year.
3. Under the International Convention for the Regulation of Whaling (ICRW) countries considering giving special permits for lethal research must submit the proposals to the Scientific Committee of the International Whaling Commission (IWC) for review and comment. The Scientific Committee has to advise the IWC whether the objectives and methodology of the research meet certain criteria. The main criteria are its necessity for the Comprehensive Assessment or other 'critically important' reason; that the results cannot be obtained by non-lethal means; that it will produce reliable answers to the questions being addressed; and that it will not have an adverse effect on the stock. Non-lethal research is preferred by the IWC as part of its commitment to conservation as required under the ICRW.
4. There has been considerable debate and dispute inside the Scientific Committee about whether the research meets the criteria developed. There has never been unequivocal approval of any research proposal and the IWC has repeatedly passed Resolutions requesting Governments to reconsider giving special permits for lethal research.
5. The general objectives of the Japanese research programme in Antarctica are to estimate biological parameters for stock management and to elucidate the role of the minke whales in the ecosystem. The determination of age-specific natural

mortality rates of minke whales has been the most important specific objective. Determining stock identity and general biological parameters are other important parts of the research.

6. The main aim of the North Pacific research is to investigate stock identity using genetic studies, measurement of parasite and pollutant burdens, morphometrics and allozyme studies. The Japanese wished to prevent any unnecessary restrictions on catch quotas in their traditional whaling grounds which might arise through inappropriate stock boundaries.
7. The Japanese Antarctic research programme has faced considerable methodological difficulties which have resulted in the primary focus being changed from estimating age-specific natural mortality, to the less ambitious one of estimating average natural mortality rates. This is for a variety of reasons, including that it has proved impossible to take a truly random sample of whales because of the age and sex segregation of minke whales in both time and space. Large groups of whales have proved easier to sample than small groups or individuals and difficulties with ageing techniques have added to the problems. The confidence which can be placed in any results therefore remains in question. Many of the problems which have been encountered were raised by other scientists on the Scientific Committee during discussions of the research proposals but largely disregarded by the Japanese.
8. Stock identity studies using genetic techniques have provided valuable information on the populations of whales in both the Antarctic and the North Pacific. However, this information could have been obtained using non-lethal biopsy techniques.
9. The efforts the Japanese have made to develop their lethal research methodologies are in contrast to the limited effort placed in developing non-lethal alternatives such as biopsy sampling. The higher costs of non-lethal research, where costs cannot be recouped by the sale of products have influenced this.
10. None of the Japanese research results to date have been used either to improve upon current management plans or to develop new plans. Only the stock identity work, using information from genetic studies, is being used in *implementation simulation trials* with the Revised Management Plan (RMP), the IWC's current approach to the management of whaling.
11. The focus of the Norwegian research has been to collect data for use in developing mathematical models of the Barents sea ecosystem. The Norwegians wish to use such models to improve management of fisheries. The research was composed of a pilot study from 1988 to 1990 and a full programme from 1992 to 1994. The majority of studies have been on feeding and energetics. Most of this information is not directly relevant to the work of the IWC.
12. The Icelandic Program from 1986 to 1989, had a similar approach to the Norwegian study, but was not specific about how the data would be used for

management or conservation. The Korean research take was only conducted for one year in 1986. It involved the collection of biological data but was very poorly planned and came in for considerable criticism. The data from both programmes has contributed little to the work of the IWC.

13. Therefore, none of the scientific whaling programmes fulfilled the IWC's criteria. Despite substantive criticisms, many of which have been shown to be valid in retrospect, the research programmes have gone ahead with little modification. The IWC and the Scientific Committee have not taken control of the scientific whaling programmes to ensure their quality. In part this is because the Scientific Committee have failed to institute mechanisms of review which would be generally considered consistent with good science - those involved in the research are part of the review and thus even basic standards of impartiality are not met.
14. Illegal trade in whale meat has taken place in the space created by sales of meat from the scientific catch. What the impacts of illegal sale of whale meat on other stocks of whales maybe, or how the research funding is influencing the Japanese research away from non-lethal methods has not been considered during the Scientific Committee's review process.
15. Political and social factors, not science alone, are influencing the research. Governments' responses to requests not to issue special permits because of failure to meet the IWC's criteria, has been that nations have a sovereign right to conduct scientific research. In debates inside the Scientific Committee scientists from countries which have, or have had, lethal research programmes give each other consistent support. Scientists with no personal interest in the research going ahead, take much more critical positions. Research priorities are being set to gather data to justify re-open commercial whaling, rather than from an independent perspective.
16. In the light of evidence of non-scientific influences on the scientific whaling programmes its proponents cannot decry opponents as biased and politically opposed to whaling when it is clear that they have opposing bias and politics in their scientific whaling programmes. All those who have had scientific whaling programmes have used this strategy to discount and discredit the views of others who oppose it. However, there is more behind the scientific whaling programmes than simply a desire to reveal the truth.
17. Because scientific whaling programmes have proceeded in the face of considerable scientific scepticism about their outcomes, this throws into doubt the whole ability of the IWC ever being able to 'manage' whaling. As the Scientific Committee has failed to control scientific whaling, there seems to be little chance that the RMS and RMP will be able to control the political and economic forces of commercial whaling if the moratorium is lifted.

INTRODUCTION

Currently whales are not allowed to be killed for commercial purposes, although Norway has a commercial hunt 'under objection' to the IWC moratorium. However, whaling for scientific research has continued. Several countries, including Japan, the Republic of Korea, Iceland, Norway and the (then) USSR, argued that not only may the moratorium be unnecessary for some populations of whales, such as the Antarctic minke whales, but that it would hinder the acquisition of scientific knowledge about whales. For example, Japanese scientists have said:

“Above all the detriment to the science, the moratorium has blocked the flow of biological information into the studies essential for the assessment of the current whale populations and for the prediction of the future dynamics of the whale stocks” (Institute of Cetacean Research, 1989)

The Government of Japan (1987a) have said that the member nations of the ICRW had a duty to undertake scientific research to achieve the objectives of the ICRW to “ensure proper conservation and optimum utilisation of the great and natural renewable resources represented by the whale stocks” and that research during the moratorium was essential to ensure the ‘continuous progress’ in the study of whales was not disrupted. Because it is not possible to age whales while they are alive and this information is considered vital by the Japanese, they argue lethal research in particular is needed. The moratorium has also been presented as an opportunity for scientific research to be able to collect data which is not biased by commercial catches (IWC, 1993a).

Using these sorts of rationale, Japan, Norway, Iceland and the Republic of Korea have all carried out scientific whaling programmes of different durations and objectives since the moratorium on whaling came into force in 1986. This paper reviews the outcomes and justifications of the ten years of scientific whaling from 1986 to 1996. Table 1 gives brief details of the scientific whaling programmes conducted since 1987. Japan has had the most extensive programme and is the only country still conducting lethal whale research under special permit today. Therefore this review covers the Japanese research in most detail.

The legal framework

The moratorium on commercial whaling was agreed at the 34th Annual Meeting of the International Whaling Commission (IWC) in 1982. A paragraph was added to the Schedule of the International Convention for the Regulation of Whaling (ICRW) as 10(e):

“Notwithstanding the other provisions of paragraph 10, catch limits for the killing for commercial purposes of whales from all stocks for the 1986 coastal and the 1985/86 pelagic seasons and thereafter shall be zero. This provision will be kept under review, based upon the best scientific advice, and by 1990 at the latest the Commission will undertake a comprehensive assessment of the effects of this decision on whale stocks and consider modification of this provision and the establishment of other catch limits”

However, during this period, lethal scientific research programmes have been carried out under ‘special permits’ issued by the Government of the particular country. Such special permits are allowed under Article VIII of the ICRW which states:

1. “Notwithstanding anything contained in this Convention any Contracting Government may grant to any of its nationals a special permit authorising that national to kill, take and treat whales for purposes of scientific research subject to such restrictions as to number and subject to such other conditions as the Contracting Government think fit, and the killing taking and treating of whales in accordance with the provisions of the Article shall be exempt from the operation of this Convention. Each Contracting Government shall report at once to the Commission all such authorisations which it has granted. Each Contracting Government may at any time revoke any such special permit which it has granted.
2. Any whales taken under these special permits shall so far as practicable be processed and the proceeds be dealt with in accordance with directions issued by the Government by which the permit was granted.
3. Each Contracting Government shall transmit to such body as may be designated by the Commission, in so far as practicable, and at intervals of not more than one year, scientific information available to that Government with respect to whales and whaling, including the results of research conducted pursuant to paragraph 1 of this Article and to article IV.
4. Recognising that continuous collection and analysis of biological data in connection with operation of factory ships and land stations are indispensable to sound and constructive management of the whale fisheries, the Contracting Governments will take all practicable measures to obtain such data.”

Under paragraph 30 of the Schedule of the ICRW it is a requirement that countries considering giving special permits for lethal research submit the proposals to the Scientific Committee of the IWC for review and comment. Paragraph 30 also sets out some basic requirements of the proposal:

30. “A Contracting Government shall provide the Secretary to the International Whaling Commission with proposed scientific permits before they are issued and in sufficient time to allow the Scientific Committee to review and comment on them. The proposed permits should specify:

- (a) objectives of the research;
- (b) number, sex, size and stock of the animals to be taken
- (c) opportunities for participation in the research by scientists of other nations; and
- (d) possible effects on conservation of the stock

Proposed permits shall be reviewed and commented upon by the Scientific Committee at the Annual Meetings when possible. When permits would be granted prior to the next Annual Meeting, the Secretary shall send the proposed permits to members of the Scientific Committee by mail for their comments and review. Preliminary results of any research resulting from the permits should be made available at the next Annual Meeting of the Scientific Committee.”

Debate inside the International Whaling Commission

As soon as the commercial moratorium came into force the IWC began to receive proposals for special permits for scientific whaling of a type and scale which had not been experienced before. Therefore, during the 36th, 37th and 38th Annual meetings in 1985, 1986 and 1987 the objectives of scientific whaling came under new scrutiny. In the Commission many countries were concerned that ‘commercial whaling may be introduced under the guise of scientific study’ (IWC, 1988a) and that allowing trade in the products of scientific whaling could bring conflicts between the requirement of science and generating income (IWC, 1987a; IWC, 1986a). Resolutions were passed which voiced these fears (Appendix 1, Resolution 2) and making the criteria under which proposal should be evaluated more specific (Appendix 1, Resolutions 1 and 3). All the Resolutions passed by the IWC since 1986 which relate to the general aspects of research proposals for special permits are given in Appendix 1.

Criteria for assessing special permits

These resolutions, and the provisions of paragraph 30 of the Schedule to the ICRW, resulted in the adoption of a scheme by which proposals for scientific permits were to be reviewed by the Scientific Committee. The full text of this ‘Review of Scientific Permits’ is given in Appendix 3 and includes an assessment of whether the research fulfils the following criteria:

- (1) “The research addresses a question or questions that should be answered in order to conduct the comprehensive assessment or to meet other critically important research needs;
- (2) The research can be conducted without adversely affecting the overall status and trends of the stock in question or the success of the comprehensive assessment of such stock;
- (3) The research addresses a question or questions that cannot be answered by analysis of existing data and/or use of non-lethal research techniques; and
- (4) The research is likely to yield results leading to reliable answers to the question or questions being addressed.”

More recently the Commission passed two further Resolutions (see Appendix 1, Resolutions 6 & 7) at the 47th Annual Meeting in 1995 one of which called on Governments not to issue special permits for lethal research in Sanctuaries (the Indian and Southern Oceans) and the other recommending that non-lethal methods should be used for research as part of the Comprehensive Assessment and that only in ‘exceptional circumstances’ should special permits be issued. The second resolution also asked the Scientific Committee to review existing lethal scientific research programmes and consider whether the data obtained justified the taking of whales. This Resolution replaced the earlier resolutions on special permit whaling and, therefore, being able to justify lethal research in the light of non-lethal methodologies has gained increased prominence in recent years.

The Comprehensive Assessment.

In the Scientific Committee’s evaluation of research programmes, important factors include that the research should contribute to the comprehensive assessment or other ‘critically important research needs’. However, the Scientific Committee does not seem to have identified any research that falls outside the comprehensive assessment as ‘critical’.

When the ban on commercial whaling was agreed in 1982, the Commission decided to undertake a ‘comprehensive assessment of the effects of this decision on whale stocks’. The task of defining the ‘comprehensive assessment’ fell to the Scientific Committee and, following a Japanese initiative, ‘the Commission agreed with a Scientific Committee proposal that it should begin to plan for still undefined comprehensive assessment by looking at problems in current information on whale stocks and what ‘conceptual’ approaches might be used to provide the Commission with more effective advice’ (Donovan, 1989).

As the Scientific Committee has defined the ‘comprehensive assessment’ the term has acquired both capital letters and a very broad remit. It was agreed, at a special meeting in 1986, that the ‘comprehensive assessment can be considered as an in-depth evaluation of the status of stocks in the light of management objectives and

procedures' (IWC, 1989d). The management objectives were being agreed by the IWC at the same time to test management schemes and these were to provide for:

- i) the stability of catch limits;
- ii) catches not being allowed on stocks below 54% of the estimated carrying capacity;
and
- iii) the highest possible continuing yield from the stock (Donovan, 1995)

The Scientific Committee decided, therefore, that the Comprehensive Assessment could include examination of current stock size, recent population trends, carrying capacity and productivity' and they identified the need to:

- a) 'review and revise assessment methods and stock identity; review data quality, availability requirements and stock identity;
- b) plan and conduct the collection of new information to facilitate and improve assessment;
- c) examine alternative management regimes' (IWC, 1989d).

Strikingly, however, the Comprehensive Assessment, an important criterion in the assessment of special permits, no longer had anything to do with an evaluation of the effects of the moratorium. The Comprehensive Assessment has become a tool mainly for developing mathematical models to calculate catch quotas and the collection of data to run these models and the Revised Management Plan (RMP) in particular.

The Revised Management Plan

The failure of the New Management Plan (NMP) to prevent over-exploitation of whales in the 1970s led to the search for alternative management approaches during the 1980s. Several were brought forward by different members of the Scientific Committee and developed, during the moratorium, as part of the Comprehensive Assessment (IWC, 1989d). In 1994, one of these, the Revised Management Procedure (RMP) was accepted by the IWC as the basis for future management. The RMP calculates catch quotas using an algorithm which accounts for uncertainty in the abundance estimates. The more the uncertainty the lower the catch quota. The basic inputs to the RMP are a historical abundance estimate, usually calculated using historical catch data, and a current abundance estimate for a particular stock.. In situations where the stock identity is uncertain, rules are applied on a "small areas" basis together with catch capping or catch cascading with adjacent areas depending on the knowledge of historical whaling. Assumptions are also built into the current version of the RMP such as a maximum sustainable yield rate between 0-5% (Young, 1993).

The RMP, therefore, is now driving much of the work of the Scientific Committee and its research priorities. It forms the core of the Revised Management System (RMS) which also includes the plans for, among other things, recording catches and monitoring. The RMP is being tested for various stocks using so-called

implementation simulation trials, which consider different scenarios and the effects of catches. The data requirements of the RMP have, therefore, become particularly important in the assessment of the relevance and quality of scientific whaling by the Scientific Committee.

The Scientific Committee

The Scientific Committee of the IWC has to assess the special permit proposals according to the criteria agreed by the IWC and the requirements of the Comprehensive Assessment and RMP in particular. The Committee is composed of scientists nominated by the member Governments and invited participants who are considered to have complementary expertise. It also includes members from inter-governmental organisations such as the International Union for the Conservation of Nature and observers from non-governmental organisations.

The Scientific Committee normally meets immediately prior to the Annual Meeting of the IWC. This annual meeting may be complimented by special meetings on certain topics and working groups who communicate by mail. Historically the Scientific Committee's agenda was structured on a species basis. A gradual move towards more process based advice has lead to the suggestion that work now be organised on process lines with, *inter alia*, working groups to review special permits, abundance estimates and environmental impacts (IWC, 1997). However, until now, the review process for special permits has taken place during the main session except for special meetings in 1987 and 1997.

Countries can send any number of scientists and the largest contingencies come from Japan and the United States who may have up to 15 or 16 scientists present. The UK and Norway typically have 5 to 8 scientists present and other countries 1 to 5. However, the discussions over particular aspects tend to become dominated by certain individuals. In the case of scientific whaling this has been those involved in undertaking the research together with persistent critics such as de la Mare, Lankester, Tillman, and Cooke. Those supporting a scientific whaling programme tend to be from countries which have or have had scientific whaling programmes and some other individuals such as Butterworth. Many of these people have been members of the Scientific Committee for many years.

The highly technical nature of some of the debates surrounding the potential outcomes of the research programmes, such as age-specific natural mortality rates, probably acts to exclude most members of the Committee. The Scientific Committee has already recognised such alienation of members when certain specific issues such as the development of the RMP are debated (IWC, 1997) and this probably extends to scientific whaling as well. This is not simply unfortunate for those feeling alienated, it means the Scientific Committee has to rely on a very small pool of expertise.

Controlling Scientific Whaling

The Scientific Committee has never given unequivocal approval of any research proposal. This lack of wholehearted support from the Scientific Committee, coupled with the concerns of some Commissioners themselves, has led to a series of Resolutions being adopted which call on those Governments involved to reconsider their research proposals and amend or revoke their research permits because they do not satisfy the criteria set down (see Appendix 2 for the text of these Resolutions which relate to individual Government's proposed special permits). In the light of such Resolutions the Republic of Korea (see Appendix 2 (D)) ended its research programme after one year and the (then) USSR (see Appendix 2 (E)) did not issue a special permit.

However, although Iceland, Norway and Japan have repeatedly been the subjects of such Resolutions their lethal research programmes were completed or, in the case of Japan, continue. Modifications have certainly been made to their research in the light of comments made in the Scientific Committee but these have been changes to methodological details rather than an acknowledgement and response to the more substantive criticisms of some scientists. In the last ten years of scientific whaling eight Resolutions have been passed which relate to Japanese scientific whaling. All of these Resolutions state that the research proposal under consideration 'does not fully satisfy the criteria specified' (see Appendix 2 (A)). Iceland collected three similar Resolutions (Appendix 2C) and Norway (Appendix 2B) six, during their periods of scientific whaling.

The IWC has failed, therefore, to have firm control over scientific whaling with the final decision making lying exclusively with the nation involved. Attempts to ensure that the IWC has the final decision making power over whether Contracting Governments should grant special permits for lethal research have been fiercely resisted by those countries wishing to undertake scientific whaling such as Japan, Iceland and Norway, who have portrayed this as 'unlawful' and as an infringement of their sovereign rights (e.g. IWC, 1989a).

This paper now reviews the lethal research which has taken place since the moratorium was put into place. It considers whether the science that has been conducted can be considered to have achieved its objectives and whether the killing of whales for scientific research has been justifiable. It also considers the role of the Scientific Committee, the way in which science has been used and questions how much 'science' there is in scientific whaling.

Table 1. Summary of Scientific Whaling Programmes

COUNTRY	PERIOD	REGION	NUMBERS	MALES	FEMALES	RESEARCH OBJECTIVES
KOREA	1986	Sea of Japan	69 minke	52	17	Determination of biological parameters and evaluation of stock density.

TOTAL: 69 minke

ICELAND	1986 **	North Atlantic off Iceland	76 fin 40 sei	27 22	49 18	To study role of whales in marine food web and state of whale stocks.
	1987 **	North Atlantic off Iceland	80 fin 20 sei	38 2	42 18	To study role of whales in marine food web and state of whale stocks.
	1988 **	North Atlantic off Iceland	68 fin 10 sei	31 2 *	37 7 *	To study role of whales in marine food web and state of whale stocks.
	1989 **	North Atlantic off Iceland	68 fin	23	45	To study role of whales in marine food web and state of whale stocks.

TOTALS: 292 fin
70 sei

NORWAY	1988**	Northeast Atlantic off Norway	29 minke	21	8	Role of minke whales in ecosystem and to use data in multi species modelling.
	1989**	Northeast Atlantic off Norway	17 minke	2	15	Role of minke whales in ecosystem and to use data in multi species modelling.
	1990**	Northeast Atlantic off Norway	5 minke	4	1	Role of minke whales in ecosystem and to use data in multi species modelling.
	1992**	Northeast Atlantic off Norway	95 minke			Role of minke whales in ecosystem and to use data in multi species modelling.
	1993**	Northeast Atlantic off Norway	69 minke	28*	35*	Role of minke whales in ecosystem and to use data in multi species modelling.
	1994**	Northeast Atlantic off Norway	73 minke	25*	45*	Role of minke whales in ecosystem and to use data in multi species modelling.

TOTAL: 288 minke

Data taken from Reports of the IWC's Scientific Committee - sex is not always recorded

* Sex not given for some animals if killed but lost at sea

** Programme of research included non-lethal techniques to investigate status.

Table 1 (continued). Summary of Scientific Whaling Programmes

COUNTRY	PERIOD	REGION	NUMBERS	MALES	FEMALES	RESEARCH OBJECTIVES
JAPAN	1987/88**	Antarctica Area IV	273 minke (including 1 diminutive)	154	119	Feasibility study for random sampling.
	1988/89**	Antarctica Area V	241 minke (including 5 diminutives)	86	155	Feasibility study for random sampling.
	1989/90**	Antarctica Area IV	330 minke	184	142	Main objective = age specific natural mortality.
	1990/91**	Antarctica Area V	327 minke (including 4 diminutives)	164	163	Main objective = age specific natural mortality.
	1991/92**	Antarctica Area IV	288 minke	165	123	Main objective = age specific natural mortality.
	1992/93**	Antarctica Area V	330 minke (including 3 diminutives)	167	163	Main objective = age specific natural mortality.
	1993/94**	Antarctica Area IV	330 minke	200	130	Main objective = age specific natural mortality.
	1994/95**	Antarctica Area V	330 minke	200	130	Main objective = age specific natural mortality.
		North-western Pacific	21 minke	18	3	Pacific programme introduced to investigate stock identity.
	1995/96**	Antarctica Area IV	440 minke	273	167	Antarctic take increases to facilitate stock identity studies - 100 taken in Area III.
		North-western Pacific	100 minke	91	9	Pacific programme introduced to investigate stock identity.
	1996/97**	Antarctica Area V	439 minke			Antarctic take increases to facilitate stock identity studies - 100 taken in Area VI
		North-western Pacific	77 minke			Stock identity studies continue
	TOTALS:			3526 minke		

Data taken from Reports of the IWC's Scientific Committee - sex is not always recorded

* Sex not given for some animals if killed but lost at sea

** Programme of research included non-lethal techniques to investigate status.

THE RESEARCH PROGRAMMES

JAPAN

Overview of research plan, aims and objectives in Antarctica

(a) Initial plans

Japan's first proposal to take minke whales in Antarctic Areas IV and V was presented to the Scientific Committee at the 38th Annual Meeting of the IWC in 1987 (IWC, 1988b). The aims of the research (Government of Japan, 1987a, p3) were:

- a) “[the] estimation of the biological parameters required for the stock management of the southern hemisphere minke whale.
- b) [the] elucidation of the role of whales in the Antarctic marine ecosystem.”
(emphasis added)

The main biological parameter the Japanese research wished to determine was age-specific natural mortality using random sampling in combination with systematic surveys. In addition, data were to be collected to determine stock identity, investigate whether presumed stock boundaries were real and to determine reproductive parameters such as pregnancy rate. Stomach contents of minke and sperm whales were to be used in combination with analysis of blubber and energetics studies to investigate the krill-whale energy flow and increase understanding of the Antarctic ecosystem.

The programme of minke whale research was to run for 12 years with Antarctic Areas ‘IV’ and ‘V’ being sampled in alternate years (see Figure1) (Government of Japan, 1987a). The first stage (Years 1-4) data were to be compared to the second stage (Years 4-8) data to establish age-specific natural mortality of minke whales, with the details of the third stage (Years 9-12) being determined in the light of the earlier results. Eight hundred and twenty five whales were to be killed each year. As well as contributing to the determination of age-specific mortality the animals were also to be used for the second dimension of the research - elucidating the role of whales in the ecosystem. The research also proposed a take of 50 male sperm whales a year for eight years for stomach, blubber and pollutant analysis specifically for the ecosystem dimension of the work.

However, scientists in the Scientific Committee raised doubts about whether the objectives were achievable and also whether understanding the role of whales in the ecosystem was important research for the IWC (IWC, 1988b). The Commissioners, therefore did not feel the Japanese research fulfilled the criteria relating to special permits and passed a Resolution (Appendix 2 A, No 1) recommending that Japan did not issue a special permit until it was able to resolve the scientific uncertainties involved.

Figure 1. Antarctica Stock Management Areas I -VI.

(b) The Feasibility Study

In response to the criticisms of the Scientific Committee, the Japanese Government submitted a new proposal to the IWC for a two year feasibility study (Government of Japan, 1987b). The feasibility study differed from the original proposal in the removal of all takes of sperm whales together with a reduction in the annual take of minke whales to 300. However, in all other respects, the proposal was identical to the original but with specific methodological objectives added:

- a) “a feasibility study of a newly refined sampling scheme to determining whether random sampling of the southern hemisphere minke whale population is possible in order to have an accurate reflection of the population in samples collected.
- b) a feasibility study of the technical problems of vessels collecting both sightings data and taking whales.
- c) an investigation of segregation by age, sex and reproductive condition.
- d) an investigation on the effect of school size on uniformity of biological samples.
- e) a sightings survey in low latitudes to examine stock identity, migration, whale density etc.” (Government of Japan, 1987b).

A special meeting of the Scientific Committee was convened to consider the proposal (IWC, 1989c). However opinion was divided between those who considered the objectives achievable and worthwhile and those that did not (IWC, 1989c). Some felt that since the objectives of the main programme were unlikely to be achievable, a feasibility study may not be justified at all. Despite a lack of consensus in the Scientific Committee the research vessels were already in place in the Antarctic and Japanese scientific whaling began on December 23rd 1987, only seven days after the end of the special meeting of the Scientific Committee.

(c) The Main Programme

Following the feasibility study, the Japanese embarked upon their main programme of research in the 1990/91 season in Area IV (IWC, 1990; Government of Japan, 1989). Whilst not clearly stated, the intention seems to be that this will last fourteen years (IWC, 1995). The programme, although intended to be long term, is presented annually to the Scientific Committee for assessment of the following season’s work. Methodological changes were made to the research in light of the findings of the feasibility studies which included the incorporation of a third catcher vessel and a

sampling strategy which attempted to allow for the seasonal migration of minke whales south to the ice edge. The objectives, however, remained as in the original research proposal (Government of Japan, 1987a).

Disagreement persisted inside the Scientific Committee over whether the main programme could achieve its major objectives and its relevance to the Comprehensive Assessment. This lack of agreement amongst scientists led to another Resolution being passed by the Commission calling on the Japanese to reconsider issuing a special permit as the proposed research did not meet all the criteria laid down (Appendix 2 A, Resolution 2). Despite this, the proposed research went ahead essentially unchanged.

The following year, Japan made an identical proposal to continue the study in Antarctic Area V (Government of Japan, 1990) and almost exactly the same disputes arose in the Scientific Committee as in previous years (IWC, 1991). Again a Resolution was passed by the IWC inviting Japan to reconsider issuing the special permit (Appendix 2A, Resolution 3) and again the proposed research took place. This pattern has continued every year since.

A significant change to the programme of research came in the plan for 1992/93 when the primary objective moved from estimating age-specific mortality to average natural mortality (IWC, 1993b; Government of Japan, 1992). In many ways this change of focus was a tacit acceptance of the difficulties in establishing age-specific mortality which are discussed in detail later. However, age-specific mortality remains a long term objective of the Japanese (IWC, 1994), although it is now clear that rather than the 12 years initially considered to be sufficient (Government of Japan, 1987a) this is going to take well over twenty years and probably require at least twenty five years of sampling (IWC, 1992). Estimating average natural mortality - a less complicated factor - will require some 15 years of research (IWC, 1992).

(d) Extending the research

A significant expansion of the Antarctic research programme came with the introduction of an extra take of 100 minke whales in 1995/96 which was intended to clarify problems of stock identity and to address questions about the population's age structure (Government of Japan, 1995). As well as taking 300 whales in Area IV, an extra 100 were to be sampled in the eastern part of Area III, as earlier sampling may not have been representative of the population as a whole and extending the range would enable a comparison to be made with a neighbouring region. The same extended programme in Antarctica was proposed for 1996/7 (Government of Japan, 1996). This time the sampling being extended from Area V, where 300 whales were to be taken as before, into the western part of Area VI, where an additional 100 would be sampled.

At the same time, following an internal Japanese review of past research, there was a subtle change introduced in the basic objectives. No longer does the first aim state that

the estimation of biological parameters was 'required' for management but that it would 'contribute toward improved stock management' (Government of Japan, 1995).

An additional general objective was also added to the research which was 'Elucidation of the effect of environmental change on cetaceans' (Government of Japan, 1995). This addition was in response to the IWC's developing interest in the effects of environmental change on whale populations. Lethal research was said to be necessary to examine the effects of climate change, ozone depletion, noise and indirect effects of fisheries, although how these would be determined was not discussed. Pollutant analysis was the only specific action identified as part of this objective. In this proposal the Japanese also indicated that they were considering strengthening the environmental aspects of their research programme in future years by including toothed whales in the lethal research programme and specifically beaked whales, such as the Southern bottlenose whale. They have not been included to date.

The Scientific Committee's response to the expanded research proposal was that a major review of the Japanese southern hemisphere research was needed. The IWC agreed and requested that the Scientific Committee undertake such an inter-sessional review (IWC, 1996a) during 1996. However, this review was delayed and took place in mid-1997. Its findings have not yet been published.

Overview of the Research Plan, Aims and Objectives in the North Pacific

The Japanese research introduced a new programme of lethal research on North Pacific minke whales in 1994 (Government of Japan, 1994) (see Figure 2). The objectives of this research were more limited than those in the Antarctic and were to clarify the stock structure and mixing rates of minke whales around Japan using genetic, allozyme, conception date and pollutant analysis. The presence of three stocks of minke whales in the North Pacific had been assumed for the RMP *implementation simulation trials* as one step towards calculating catch quotas - the 'J' stock (Sea of Japan and possibly the Yellow Sea and East China Sea), the 'O' stock (the Okhotsk Sea and east coast of Japan) and the 'W' stock (West Pacific) further offshore in sub-areas 9 and 11. The Japanese wanted to determine whether the stock known as 'W' actually exists and the

degree of mixing between it and the 'O' stock.

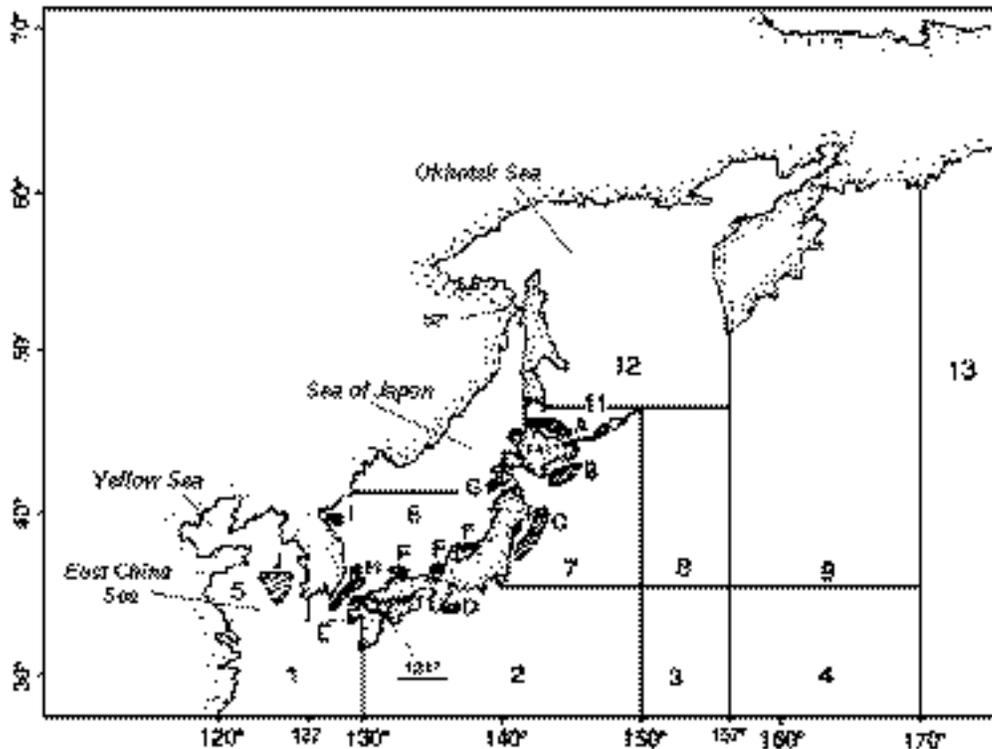


Figure 2 The sub-areas (1-13) and whaling grounds (A-J) of the North Pacific around Japan (from IWC, 1997).

The research also intended to investigate whether the hypothesis of 'small areas' around the coast of Japan also used in *implementation simulation trials* was correct (IWC, 1997). The Japanese believed that the sub-stock scenario was unrealistic and would 'lead to large and unnecessary reduction in catch limits calculated, especially in Japanese traditional whaling grounds' (Government of Japan, 1994). The research plan included taking 100 whales per year, the first year being a feasibility study.

Although such information on stock identity was considered important many scientists felt lethal research was not necessary to obtain it (IWC, 1995). Because the criteria for assessment of lethal research proposals had not been fully met, the IWC passed another Resolution (Appendix 2A; Resolution 7) inviting the Japanese Government to reconsider the proposed take of minke whales. Again the research went ahead but the catch was limited to 21 whales because of bad weather. The North Pacific take was repeated in 1995, 1996 and 1997 with 100, 77 and 100 whales respectively being taken and the same reactions in the Scientific Committee and the Commission.

Thus from the 1987/88 to the end of the 1996/97 season in Antarctica, Japan has had a continuous programme of scientific research involving a total take of 3526 minke whales. None of this research has had the full endorsement of the Scientific

Committee. The research is now considered in more depth by looking at three areas used to justify it: estimating age-specific natural mortality; the other general biological data and stock identity studies. The aspirations for the research, whether they have been, or are likely to be achieved and how they meet the IWC's other criteria are reviewed.

Age-Specific Natural Mortality

The most important yet contentious of the specific aims of the Antarctic research is the estimation of age-specific natural mortality rates. Whether it is possible to estimate age-specific natural mortality with sufficient accuracy to be useful in practice and whether this is, in fact, a parameter that is required at all for the conservation and management of whales have been the main points of dispute.

(a) assumptions in estimating age-specific natural mortality

Knowledge of population size and dynamics is fundamental to estimating age-specific mortality (de la Mare, 1989). The original approach proposed by the Japanese to calculate mortality rates was to take a sample of whales at a certain time and then take another sample some years later (Government of Japan, 1987a). The difference between the actual and expected number of whales in an age class is used to give a measure of natural mortality rate. For this calculation certain basic assumptions have to be made (de la Mare, 1989):

- the population size is not changing;
- a random sample of the population has been obtained;
- age can be determined correctly
- there is an accurate abundance estimate of the population and;
- techniques will be precise enough to give practically useful information.

Concerns about whether these assumptions can be fulfilled, and thus the whole feasibility of estimating age-specific mortality, have been expressed ever since the Japanese made their first proposal to the Scientific Committee (IWC, 1988b). Why these assumptions are important, the problems the research has had in practice and the responses to them are considered next, together with the need for an estimate of age-specific natural mortality at all.

(b) population dynamics

Recruitment and mortality rates were confounded in the original approach taken because there was no way to distinguish between their effects on population size (de la Mare, 1989). By taking a fixed approach in time it is assumed that the total population size remains the same. However, this may not be the case as there may have been changes in the birth rate of the population, with either more or less animals surviving and joining the population because of changing environmental conditions, for

example. In addition, the actual killing of whales as part of the research (and past commercial whaling) may influence recruitment to the population.

Because of these issues, which the Japanese had to agree with (Tanaka, 1990; Nakamura, 1991), the theoretical approach was modified to be iterative and to use abundance estimates derived during as part of the research surveys (Nakamura, 1991; 1992;1993) as a way of separating the effects of recruitment and mortality. The Japanese also consider that the numbers of whales killed in the research is very small in relation to the population size and so can be ignored (Nakamura *et al.*, 1989; Tanaka, 1990). However, no estimate of age-specific natural mortality rate using real data has yet been made and the one estimate of average natural mortality (Tanaka and Nakamura, 1996) still assumes that population growth is zero. This is because accurate abundance estimates and trends in the population size have yet to be determined.

(c) random sampling

It is important to have a random sample of whales to provide information about the age structure of the population. If this is not possible, and some ages are more or less likely than others to be taken, bias is introduced. It has, in fact, proved impossible to obtain a completely random sample in terms of its sex and age distribution, which is most marked among young animals which are under-represented (IWC, 1995; Butterworth and Punt, 1996b). Part of the reason for this is that there is seasonal migration of minke whales which varies for different age groups and sexes (Kasamatsu *et al.*, 1993; Fujise *et al.*, 1993). In addition practical difficulties have arisen in obtaining a reliably representative sample of those animals seen. Individual whales and small groups are less easy to sight than larger groups of whales making larger groups (with different age and sex compositions) more likely to be sampled. As well as this, according to the Japanese protocol, when one or two whales are seen the whole group should be taken and when a group of three or more is seen, two whales are sampled according to a random selection process. However, it has proved difficult to take one or both whales in a small group and, even in larger groups, random sampling has not always been successful, as animals can escape into the pack ice, dive for long periods or move too quickly resulting in only around 55% (and a maximum of 75%) of those targeted being taken (Kato *et al.*, 1989a; Kato *et al.*, 1990a; Fujise *et al.*, 1993).

Although the Japanese programme has made great efforts to overcome the difficulties of random sampling by, for example, structuring their sightings and sampling programme to resample areas during one cruise and altering the sampling protocol so only one animal is taken from any school size (Institute of Cetacean Research, 1993), it remains an intractable problem.

(d) ageing error

To have confidence in an estimate of age-specific natural mortality, ageing techniques must be reliable. To determine the age of a baleen whale, the annual laminations in the

ear plugs are counted or, in the case of very young animals, the presence or absence of a neonatal notch in the baleen plate determined. However, ageing baleen whales is difficult and prone to error (Kato, 1984; Konradsson and Gunlaugsson, 1990; Kato *et al.*, 1991b). Counting the laminations in ear plugs requires experience, differences between observers is not uncommon and young animals are the most difficult to age.

The Japanese initially respond to these problems by saying that ageing techniques will improve over time but it has remained a niggling problem. Although success rates of ageing have improved considerably, up to 20% of whales caught still cannot be aged by either ear plug or baleen plate methods (Kato *et al.*, 1989b; Fujise *et al.*, 1991).

(e) accuracy of abundance estimates and population trends

To be able to estimate the number of animals in an age class from a sample, knowledge of the total population size is required. In fact the precision of the estimate of mortality depends crucially on the accuracy of the abundance estimate (Tanaka, 1990). By combining sampling and sightings surveys in the Antarctic research programme, the Japanese hoped to obtain unbiased population estimates and, in recognition of the importance of abundance estimates, an increased sightings effort was made in 1992 by assigning one of the three sampling vessels exclusively to sightings (Government of Japan, 1992).

However, discrepancies exist between the population estimates made during the Japanese research program and the sightings surveys conducted as part of the IWC's contribution to the second International Decade of Cetacean Research and combining sightings and sampling work has proved not to be straightforward (Kasamatsu *et al.*, 1990; Kasamatsu *et al.*, 1991). The density of minke whales in the research area varies considerably (e.g. Kato *et al.*, 1989a). Because time has to be taken from sightings to chase and catch whales, the effort that will be spent on sightings in areas of high density will be disproportionately low which probably accounts for the lower abundance estimates obtained. Clustering of high densities of whales around the ice edge may reflect food availability and other environmental conditions which may vary widely from day to day and from year to year. This also makes a reliable estimate of absolute or relative (to follow trends) abundance, difficult to obtain.

(f) precision

As well as the abundance estimate being important to calculate the number of animals in any one age class, it also influences the potential to detect a real effect. If there is considerable uncertainty in the estimation of the overall population size (see e.g. IWC, 1991c for examples of the range of abundance estimates for Antarctic minke whales), small changes in the numbers of a certain age-class would be lost in the range of uncertainty and be undetectable. Thus little confidence may be able to be placed in estimates of age-specific natural mortality, making it of little practical use.

Deciding what size of sample would be needed to detect a real effect was one of the early difficulties of the research. The initial estimate in the 1987 proposal was that 825 whales a year for four years would be needed for each Area studied (Government of Japan, 1987a) (a total of 3,300 for each Area). However, to achieve its aim of producing a better estimate with a lower coefficient of variation than for existing estimates of natural mortality, this was thought to be too small a sample size. One alternative estimate was that 25,242 whales would need to be taken, which was clearly not possible (Goodman, 1988). A later evaluation by a Scientific Committee working group on catch-at-age data (IWC 1989b) decided that the revised, repeated sample size of 300 from each Area could be used to estimate trends in age-related mortality, but estimation of absolute age-specific mortality could only be achieved with a large variance (IWC 1990).

A balance also has to be established between the need for time to be spent conducting sightings (to find the whales and estimate numbers) and the time spent chasing and catching whales. In evaluating this problem, Tanaka, *et al.*, (1992) concluded that precision was similar if the sample size was between 200-400 annually for eight years. Because not all whales can be aged and because of the heterogeneous distribution of whales, the larger sample size was thought necessary. The paper concluded that 'If the natural mortality increases by 4% with age, eight samples of n=400 may provide a possibility of detecting age-dependency in natural mortality with a power of 50%. If the age dependency is weak, or observation error is relatively large, the detection power is very low' (Tanaka, *et al.*, 1992). Thus trends, not absolute measures have become the focus of research although the chance of detecting trends of 4% or less remains at fifty/fifty or lower.

(g) data requirements of the IWC

As well as the difficulties involved in making reliable estimates of age-specific mortality, it is also questionable whether this information is needed at all. Initially the Japanese argued that the reason the Scientific Committee had been unable to set a catch quota for the Antarctic minke whales was a lack of knowledge of the natural mortality and its age-specific pattern. However, it seems a lack of knowledge of recruitment rate used to be a more pressing problem under the old management approach (e.g. Holt, 1988; Horwood, 1988).

It is difficult to see what essential knowledge age-specific mortality rates, trends in mortality rates or average mortality rates provide. They are not required for operation of the RMP. Mortality data may help improve estimates of Maximum Sustainable Yield Rates and Maximum Sustainable Yield Level which could be used to develop scenarios for *implementation simulation trials*. However, this depends upon reliable input data and whilst the precision of estimates of mortality rates remains so uncertain, values derived from them in some way will be equally or more so.

There is also a practical reason why the knowledge gained may prove to be of little direct value to the management of whaling. The IWC has established a sanctuary in

the Southern Ocean in which commercial whaling is not allowed (although the Japanese have a reservation on this decision). This decision is not due to be reviewed until 2004 and, if re-established, may mean the Antarctic stock will not be hunted for commercial reasons for many years if ever.

(h) creating false expectations

The initial proposition by the Japanese scientists that they could determine age-specific mortality rate using two samples, four years apart, (Government of Japan, 1987a) has been shown to be grossly optimistic. There have been no estimates of age-specific mortality and, in 1992, the Japanese implicitly acknowledged that age-specific natural mortality rate was not an achievable goal in the short or medium term. They announced in their research plan for 1992/93 (Government of Japan, 1992) that 'for the time being the research will focus on the estimate of average natural mortality'. After ten years of research, estimates of trends are only now beginning to be made (Tanaka and Nakamura, 1996) and these still make the assumption that population growth is zero. This was identified several years earlier as a major source of uncertainty in the calculation and the required testing of this assumption to attain a reliable estimate of natural mortality will take a considerable period of time (IWC, 1996b). Abundance estimates are also proving problematic. Estimating average natural mortality is now predicted to take at least 15 years, age-specific natural mortality around 25 years and recruitment rates even longer than this (IWC 1992b).

Thus, there seems little prospect of establishing a reliable and useful (in management terms) estimate of age-specific natural mortality in the medium term without the killing of an unquestionably unacceptable number of animals. The Japanese say that the programme is long term and its results should not be judged too soon (IWC, 1991b). However, despite this, considerable uncertainties remain and even the long term prospects remain in doubt.

General Biological Data

The Japanese research also collects general biological data including reproductive parameters, age at maturity, sex, pollutant levels and morphometrics. The goals for this research are much more poorly defined than the determination of age-specific natural mortality and, therefore, it is less easy to evaluate them. The most developed are studies of segregation and age at maturity. Studying the effects of environmental change is a more recent addition to the aims of the research programmes. The usefulness of the data to the IWC is far from clear and, in addition, the lack of a completely random sampling technique hampers interpretation of all the data. Alternative, non-lethal, approaches to collecting data about the natural history of whales are also available making justification difficult.

(a) Segregation

Information about school size, age and sex segregation has been gathered showing that there are spatial and temporal variations according to age, sex and reproductive status (Kasamatsu *et al.*, 1993; Fujise *et al.*, 1993). In Area IV, mature females are concentrated in the South and Prydz Bay and mature males are found throughout the area (Fujise *et al.*, 1993). Older mature females are found in larger schools close to the ice edge and younger females offshore (Kato *et al.*, 1990b). In Area V, mature females dominate in the Ross Sea and, again, younger females are found offshore (Kato *et al.*, 1991a). Immature animals and males tend to be found as individuals or in small groups. The distribution of whales changes during the survey period as whales migrate south towards the ice edge and densities in different regions varies from year to year (Nishiwaki *et al.*, 1996).

However, whilst these studies have provided interesting data they have not as yet shed light on the reasons for such segregation and the changes that arise.

(b) Age at maturity

One justification of the biological components of the research programme has been to investigate the 'krill surplus' hypothesis. This is that the number of minke whales in Antarctica increased in the 1950s to 1970s, as numbers of large baleen whales fell due to over exploitation and there was a consequent increase in food available to minke whales (Kojima, 1993). The evidence for this comes from commercial whaling data, where a reduction in age at maturity of females from 11 years to 6 between the 1950s and 1980s has been estimated. This finding has relied upon studies over this period that show the 'transition phase' is appearing at a younger age in minke whale earplugs.

The ear plug transitional-phase is a change in the physical appearance of the laminations which may be associated with attainment of maturity although considerable doubt remains about its significance (IWC, 1996b). Not all adults show the transition phase even though they must have reached maturity and it is difficult to distinguish in younger animals. Cooke (1985) concluded that observed trends in age at maturity could be an artefact as there was almost no correlation between the readings of some pairs of readers.

The Japanese plan to extend past studies of age at maturity by using data from the research catch together with the commercial catch data. However, the first studies to use the data in this way, which appear to confirm the reduction in female age at maturity, have not been corrected for ageing errors and uncertainty remains about the reality of this apparent change (Butterworth and Thomson, 1996).

Efforts are also being made to estimate historic recruitment rates using catch-at-age data both from commercial catches and the research take to investigate whether there have been changes over time (e.g. Butterworth and Punt, 1990; Bergh *et al.*, 1991;

Butterworth and Punt, 1996b). Although these approaches are showing promise, they depend critically on an accurate picture of the age structure of the population.

Despite the efforts being made to collect data to support the krill surplus hypothesis, it is unclear whether the findings can be interpreted in this way. The statistical power may not exist to distinguish between increased recruitment (through increased food availability) or an increasing mortality with age without accurate corrections for possible errors in ageing (Butterworth and Punt, 1990). More importantly, even if it is shown that age at maturity has declined, this does not shed any light on the underlying reason for such an effect. It may be that during the 1950s to 1970s primary production of krill (the major diet of Antarctic minke whales) increased for a reason unassociated with the decline in numbers of other baleen whales. The extent of sea-ice plays a primary role in determining krill abundance (Loeb *et al.*, 1997) and, for example, could have had a more important influence on minke whale numbers than the abundance of other krill consumers.

(c) effects of environmental change

In 1995, the Japanese introduced the objective of examining the effect of environmental change on populations (Government of Japan, 1995). None of the actual research is specified however, but there is one statement saying that the behaviour of pollutants, as affected by age and trends over time will be followed. In one sentence the Japanese 1996/97 proposal (Government of Japan, 1996) says that 'effect of pollutants on the whale body will be mainly in the form of cancer and metabolic disorder, the data on which can be obtained only through lethal research'. Not only does this statement ignore much recent research on more subtle effects of pollutants but contains no reference to the difficulties of linking cause and effect in complex systems (Mayer and Simmonds, 1996). It is also questionable whether more research on pollutant levels in wildlife is the most useful knowledge for those regulating pollution discharges (Thompson and Mayer, 1996).

This area of research may prove even more complex than others. The cause-effect relationships between environmental change and effects on whales are unlikely to be straightforward or simple. Many interactions may have to be considered which will require considerable thought and a multi-disciplinary effort.

(d) Non-lethal alternatives

Collecting age-related biological information has been the primary justification of the Japanese lethal research in the Antarctic. Since most animals can only be aged once dead, this is seen as one of the most important pieces of knowledge gathered during

lethal research. Not only is the age information useful in itself to understand age distributions of populations, but also it allows interpretation of other data such as sexual maturity, pollutant burdens, and so on, in an age context (Ohsumi, 1995).

In particular the Japanese say that, in contrast to non-lethal techniques, large amounts of data including information on internal organs can be obtained quickly from fast moving species (such as minke whales) and that studies can be conducted even in poor conditions. Another advantage they cite is that lethal research is much cheaper than non-lethal techniques as the sale of whale products can be used to offset costs (Ohsumi, 1995). The Japanese acknowledge that information is only gathered at one point in time about an animal but their research objectives are dominated by physical measurements and physiological sampling making the comparison with non-lethal techniques look very weak (see for example, Table 2 of Ohsumi, 1995).

However, the IWC has made its preference for non-lethal techniques clear and, therefore, a need to justify the killing of whales remains. The questions that have to be asked are whether the same information could be collected using non-lethal means and if it cannot, does the data gathered provide essential information for the conservation and management of whales. Table 2 gives the various types of information that the IWC has identified as priorities for the Comprehensive Assessment and the lethal and non-lethal research methods available to address them. This was also addressed in Hutchinson *et al.*, 1996.

It is clear that, in many cases, non-lethal research cannot be simply substituted for lethal research methods. The types of data each provides are qualitatively and quantitatively different. Preference for non-lethal research is not necessarily simply a sentimental reaction to the killing of whales. Non-lethal research gives a different understanding of whale behaviour and ecology that lethal research cannot mimic. Behavioural research, for example, may be better placed to aid conservation and prevent recurrences of the management failures of the past. For example, understanding why there is segregation of minke whales according to age and sex in the Antarctic seems an important question for conservation. It could indicate areas where disturbance should be strictly avoided. It is impossible to answer questions like this using lethal techniques.

Table 2. Research requirements identified by the Scientific Committee of the IWC and the lethal and non-lethal methods available.

RESEARCH NEED	LETHAL SAMPLING FOR:	ALTERNATIVE NON-LETHAL TECHNIQUES	COMMENTS
Stock Identity	Genetic studies Morphometrics Parasite burdens Pollutant loads	Genetics using biopsy techniques Photo-identification Observation	Parasite and pollution levels unlikely to give sufficient

			discrimination
Population size	Catch per unit effort (CPUE)	Sightings surveys	CPUE estimations of population size now considered unreliable except to identify major population crashes
Population trends	Collection of age-related data to estimate mortality and recruitment	Repeated sightings surveys	
Productivity	Pregnancy rates Age at maturity	Photo-identification Observation	

The only non-lethal method of collecting age data is through prolonged observation (ideally from the birth of an animal) and the use of mark-recapture techniques. With minke whales, mark-recapture methods rely mainly on photo-identification of dorsal fin and lateral body scars and pigmentation, although it may also be possible to develop other tagging and marking methods including radio-telemetry. Photo-identification has been used successfully with minke whales in the west Pacific and other parts of the world (Dorsey *et al.*, 1990). The Japanese argue that studying whales in the Antarctic or North Pacific in this way is not feasible because the poor weather conditions preclude good photography, there are too many minke whales in Antarctica to make it practicable to expect to be able to re-sight identified whales and that it would simply take too long to gather a useful data set (Ohsumi, 1995). Thus little effort has been placed in attempting photo-identification. However the length of time lethal research methods are going to take to produce data with sufficient precision to establish practically useful estimates of average or age-related mortality rates (at least 15-25 years), make the comparison much less stark than it might at first have appeared.

Although long-term observation and photo-identification inevitably cannot give the same type of data on age and its relation to other factors, it could provide a much richer picture of the life histories and social relations of minke whales, parameters which are proving impossible to unravel by lethal techniques.

(e) biological data requirements of the IWC

The Japanese have said that the biological data they collect will help towards the long-term goal of developing 'highly sophisticated management' (Ikeda, 1990). They also argue that biological knowledge especially of the reproductive system will assist in understanding population dynamics and thus 'rational management of the stock'. The

Japanese scientists feel more data on these parameters is important because 'it is also known that massive outbreaks of parasites and diseases, or unexpected changes of pregnancy rate and growth rate etc., can occur in mammal populations and cause sudden changes in their population dynamics' and these can only be identified using lethal techniques (Ikeda, 1990). They also claim that a steady flow of biological information is important or there will be an 'irreparable loss' (Ikeda, 1990), particularly to monitoring of the population (Government of Japan, 1990). The work is also defended by saying the information will assist with the tuning of any management plan and aid prediction of future trends in population dynamics, even if it is not essential to management schemes now (IWC, 1990).

However, the newer methods of managing whales have moved away from using estimates of biological parameters such as age-specific mortality because these have proved so unreliable in the past (Tillman, 1990). The RMP, now the accepted approach of the IWC, relies on abundance estimates and historical whaling data, not biological factors. Even before this, none of the four management plans under consideration to replace the discredited New Management Procedure were reliant upon estimates of net recruitment, natural mortality, Maximum Sustainable Yield (MSY) or MSY level.

In response, the Japanese point to the fact that examination of alternative management regimes was identified as part of the Comprehensive Assessment (Government of Japan, 1990). Whilst not being specific as to what form such plans may take, they argue that all biological data will contribute to such plans. However, the Japanese have implicitly acknowledged that general biological data are not a prerequisite for the IWC's management and conservation of whales. In 1995, the wording of their research objectives changed slightly, but significantly, so the biological data was now contributing to, not required for, management (Government of Japan, 1995).

Stock Identity

Whilst it is questionable whether the age-specific mortality rate, pregnancy rate and other biological data are requirements for the Comprehensive Assessment or important to the work of the Scientific Committee, there is agreement that information on stock identity is a priority for research as part of the Comprehensive Assessment and to operate the RMP. A variety of information is needed to contribute to confirmation on stocks or identify sub-species or new species. For example, two types of spinner dolphins exist which are genetically identical by mtDNA analysis but morphologically different (Dizon *et al.*, 1991). The Japanese programmes in Antarctica and the North Pacific both rely on genetic studies, morphometrics, parasite and pollutant burdens to determine stock identity.

(a) Genetic studies

The rapid progress in molecular biology in recent years has led to it becoming established as an important technique in studies of species and sub-species (Dover, 1991; Lande, 1991). The genetic data derived from the lethal studies in Antarctica indicate that the stock identity picture in the Antarctic cannot be simply represented by a hypothesis of Area IV and V stocks. A 'core' stock has been hypothesised in Area V and part of eastern Area V. The same 'core' stock is also found in western Area IV late in the feeding season and could include individuals from a genetically different stock (Pastene *et al.*, 1996). Thus a complex picture is emerging which varies in time and space. The use of stored samples from past commercial whaling have built on this complex picture with the possibility emerging of a third stock in Area VI and a 'western' stock in western Area IV early in the feeding season (Pastene *et al.*, 1996; 1997b). The Japanese estimated a further 150-200 samples are needed to give sufficient power to determine the validity of such hypotheses. Similar genetic studies have also confirmed that separate dwarf and ordinary forms of minke whales exist in the Antarctic (Pastene *et al.*, 1994). All these have involved mitochondrial DNA (mtDNA) analysis, which has been chosen because all mtDNA is maternally derived and is preferred by the Japanese for studies of stock identity (Pastene *et al.*, 1993). However, a complete genetic definition of stocks should include information from nuclear as well as mtDNA (Lande, 1991).

In the North Pacific, the data from both commercial whaling and scientific studies of minke whales using mt DNA analysis, isozyme analysis, morphometrics, parasite and pollutant burdens (IWC 1996b; Goto and Pastene, 1996; Butterworth and Punt, 1996a; Butterworth and Clarke, 1996) have been used to investigate stock identity. The results suggest that separate 'O' and 'J' stocks exist and mix in sub-area 11 in April. There is no evidence for separate sub-stocks in the waters around the east of Japan but there is less data for minke whales off the west of Japan and uncertainty remains.

(b) Isozyme studies

The use of allozyme and isozyme analysis has been common in stock identity studies for some time. The technique looks for differences in the forms of enzymes (isozymes), using electrophoresis, or genetics to determine whether there is evidence of different populations. However, to be used with confidence, the studies require large numbers of random samples because isozymes have relatively low levels of variability in most cetacean species. The technique is therefore much less powerful than the more recently developed genetic studies which examine highly variable regions of nuclear and mitochondrial genes (Baker and Palumbi, 1995).

The results of the Japanese allozyme studies of North Pacific minke whales supporting separate 'J' and 'O' stocks (Wada, 1996) may be of an inadequate sample size (IWC, 1996). The only value of isozyme studies, therefore, are in providing some confirmation of other approaches.

(c) Pollutant levels

The pollutant analysis published to date has shown that levels of persistent pollutants such as organochlorines are higher in North Pacific minke whales than those in Antarctica and that age and sex differences in accumulation are the same as reported elsewhere (Institute of Cetacean Research, 1994; Aono *et al.*, 1996). Since Antarctic minke whales feed predominately on krill and North Pacific minke whales on fish, this difference could be accounted for by their occupation of different trophic levels. Levels of pollutants may also be higher in lower latitudes because animals are closer to the source of emission. Levels of heavy metals and organochlorines found in North Pacific minke whales have not shown differences between sub-areas 7 and 9, but no other area comparisons have been reported yet (Aono *et al.*, 1996; Fujise, 1996). The complex picture of stock identity which is emerging from genetic studies in the Antarctic (Pastene *et al.*, 1996), with overlaps in some areas, suggests pollutant levels are unlikely to be very helpful in stock identity studies in that region. Both pollutants and prey are mobile, making their levels in highly migratory species like whales affected by more than the stock identity of the whales. Studies of pollutant levels in prey and their movements and distribution will be important for interpretation of these studies.

(d) Parasitology

Parasitology studies in the North Pacific have shown similarities between species found in whales from sub-areas 9 and 7 (Araki *et al.*, 1996). However, the levels and presence of parasite species, like pollutant burdens, may be unable to give the degree of discrimination which is needed in stock identity studies. Little is known about the life cycles of many common cetacean parasites. Until the distribution of secondary hosts and mechanisms of transmission are better understood, the potential of parasitology to discriminate stocks remains in serious doubt. Similarly, the questions concerning secondary hosts are not addressed in the ongoing research. Applying genetic techniques to the parasites might help, for example, in determining whether distinct parasite populations exist.

(e) Non-lethal alternatives

Whilst these studies help build up information on the stock identity, it is quite possible that the same information could have been collected using non-lethal skin biopsy techniques. The use of skin biopsy samples has been extended from restriction fragment length polymorphism techniques to sequencing analysis by Japanese scientists in their studies of humpback whales in Antarctica Areas IV and V (Pastene *et al.*, 1997a). The Japanese argue that these techniques are difficult to apply to the fast moving minke whales in the difficult conditions found at sea. Although there have been some efforts to develop biopsy sampling methodologies for minke whales, these have not been as well reported and do not appear to have been pursued with the same enthusiasm as other parts of the programme. Kato *et al.*, (1990) report on trials with carcasses using a crossbow and various heads. Since then airguns have been used to

improve performance (Kasmatsu *et al.*, 1993) but seem to have been little used in practice. In the North Pacific, of seven attempts, three animals were biopsied in 1995 (Fujise *et al.*, 1996). In the Antarctic during the four seasons from 1992 to 1995, biopsy sampling was undertaken only in the 1994/5 season with eight animals being sampled on 'an opportunistic basis' (Institute of Cetacean Research, 1996). Although poor success and long chasing times were reported in the North Pacific in biopsy attempts (Fujise *et al.*, 1996), by comparison, during the 1988/98 special permit take, for example, 45% of animals targeted for killing escaped (Kato *et al.*, 1990). Poor killing rates of targeted animals resulted in efforts being made to improve the success rate of lethal sampling but this does not appear to have been undertaken for biopsy sampling.

Because of the potential of biopsy techniques to provide genetic data it becomes difficult to justify the use of lethal techniques. To supply the supporting data to genetic studies when making decisions about stock identity, the strategic use of stored samples and other data from past commercial whaling may be an alternative approach to parasite and pollutant studies which require samples from dead animals. Archived morphometric data could be a useful adjunct to genetic studies using biopsy data.

In their proposal for the North Pacific programme, the Japanese also justified lethal studies to determine conception date as 'one of the best sources of evidence for stock identity' (Government of Japan, 1994). The collection of these data has probably been thwarted by the strong bias towards males in the take. For example, in 1995 of 100 whales killed, 91% were males. This bias in sampling also complicates interpretation of the other data.

Effects on the Stocks

Removing animals from a population has the potential not only to end individual's lives but to affect the whole population's prospects for survival and growth. The moratorium on commercial whaling was introduced because of the successive crashes in whale stocks as they were over-hunted. Therefore, the potential effect of a kill for whatever reason demands special attention. This will inevitably have to be a matter for judgement, as uncertainty about all stocks of whales exist. In particular a weighing up of the quality of the research against the potential impacts on a population has to be made.

In 1987, when the annual take of 300 minke whales in Antarctica was first proposed, the Scientific Committee had difficulty in coming to a conclusion about the impact of this take. Whilst some members of the Committee considered there would be no effect as the number was below any estimate of replacement yield, others felt that there were insufficient data available on which to base a decision (IWC, 1989c). They identified uncertainty in the identity of the stock and its status as key problems.

In defence of their program as it has progressed, the Japanese have referred to estimates determined since their lethal survey work began. In particular they refer to

estimates of population sizes agreed by the Scientific Committee meeting in 1991 for Areas IV and V (Government of Japan, 1991; 1992).

The issue of how to proceed when uncertainty about a stock existed was left in abeyance until the Japanese applied to extend their programme to the North Pacific in 1994 (IWC, 1995). Again there was a split between scientists as to whether they considered there were sufficient data to make an assessment. It was recognised that proposals which were made to them on an annual basis would always have what seemed like a negligible effect for one year but, if continued indefinitely, may have a negative effect on a population. In the light of this it was decided to attempt to produce an agreed approach to providing advice on the effect of special permit catches on stocks. A working group produced a report and proposal in 1995 (IWC, 1995) but this was not fully accepted and, in 1996, only a provisional approach for short term projects was agreed.

Provisional agreement was reached that, for short programmes of 1-5 years, an upper level of 2% of the lower fifth percentile of estimated abundance should be allowed (IWC 1995b) and that there must be a recent (not more than 10 years old) abundance estimate which has been discussed (thought not necessarily agreed) by the Scientific Committee. Some members of the Committee were becoming concerned that the approach was taking the form of a management procedure and others that applying the RMP as if catches were to take place for 100 years (as had been proposed), was too strict (IWC, 1996).

A real danger seems to exist that the Scientific Committee will be forced into making *ad hoc* judgements as scientific whaling proposals are made. These will then become *de facto* accepted as having no effect on a population and possibly as the basis for a commercial take. The lack of any strict rules makes this scenario increasingly likely.

NORWAY

Outline of research programme, aims and objectives.

(a) pilot studies

Norway's scientific whaling programme has been much smaller in scale than Japan's (see Table 1). The first three years from 1988 to 1990 formed part of a pilot study, for methodological testing. The general objectives (Institute of Marine Research, 1988) were to identify stocks, undertake stock assessments and carry out ecological studies. The ecological part of the research was most important to the Norwegians and involved studies of:

- i) minke whale food selection and intake - to provide data on minke whale feeding in relation to energetic requirements
- ii) food digestion in minke whales - to provide a basis for evaluation and analysis of stomach contents through studies of the transport and digestion of food items

iii) the body composition, fat content and thermal radiation of minke whales - to obtain data for calculation of parameters for the whale energetics model (known as WHAERG).

The information from these studies was to be used as inputs to the multi-species model (called MULTSPEC) that Norway was developing for the Barents Sea. The potential loss of fish for human consumption was partly behind the research (Blix and Oritsland, 1989).

[Multi-species modelling](#) is a cornerstone of Norway's aspirations for ecosystem management of the region. This is an approach which has not been favoured by the IWC as it is considered that the complexities of the system make it unlikely to be understood sufficiently accurately. Norwegian scientists argued in the Scientific Committee (IWC 1989b) that, although the ecological objectives did not fit with the needs of the Comprehensive Assessment, they were a 'critically important research need' for Norway and that information on stock identity was relevant to the Comprehensive Assessment.

Scientists in the Scientific Committee were divided about the relevance of the studies and some felt that there was insufficient information to determine whether the data obtained were important for the multi-species models being developed (IWC, 1989b). In the light of this lack of a clear endorsement of the proposal, the IWC passed several Resolutions (Annex 2B, Nos 1, 2 and 3) asking the Norwegian Government to reconsider its special permit. However, only minor amendments were made to the proposal (such as the removal of live capture, anaesthesia and release) and the research take went ahead.

(b) the main programme

No lethal research was undertaken by Norway during 1991 but a new proposal was made for a three year research programme for the years 1992-1994. This involved the killing of around 70-100 minke whales each year with the prime objective being the MULTSPEC model. The full research program intended to progress the work through concurrent estimates of prey availability and stomach sampling and to determine changes in energetic status in different areas.

As well as being reviewed by the Scientific Committee the proposal was also sent to ICES for review. Two reviews were received, one from the ICES Multispecies Assessment Working Group in consultation with ICES study group on Analysis of Feeding Data and the other from a member of the ICES study group on pilot whales (IWC, 1993c). The Multispecies Assessment Group were unanimous in considering that the spatial and temporal scope of the project should be reduced to improve the quality of the data obtained and the likelihood of achieving its objectives. The group noted that 'even in marine mammal species where stomach sampling has been undertaken (e.g. harp seals), feeding studies with large sample sizes have yet to provide insight into capelin mortality rates or competition with cod'. Thus they

believed the project should be focused in small areas where more data could be gathered. Importantly the ICES multispecies working group identified that whale management would not benefit from the work which had more relevance to fisheries management. They said that ‘...it is difficult to see how trophic studies would be relevant in managing whales *per se*. It is the trophic consequences of whale feeding in relation to their prey (capelin-herring-crustaceans) and the cascading influence on other predators of these three stocks (especially cod) that are most relevant in the proposal as written.’ The group also felt greater emphasis could be placed on non-lethal approaches and concluded that ‘...many of the critical population level questions regarding minke whale effects on prey resources can be resolved with synoptic, non-lethal methods.’

The single reviewer from the ICES pilot whale working group (IWC, 1993c), in a much shorter review was more positive about the Norwegian proposal only questioning whether more samples might be needed. In response, the Norwegians argued that a representative sample of the whole sea was needed and that because insufficient data was available on prey distribution, they had to have a wide area to be able to investigate prey preference.

Scientists inside the Scientific Committee were split about the merits of the research and the reality of whether it was possible to construct a reliable multi-species model of the Northeast Atlantic (IWC, 1993b). Again the IWC passed a Resolution (Appendix 2B, No 4) asking the Norwegians to reconsider issuing the special permit. This pattern was repeated each time the proposal was presented and discussed in subsequent years.

Evaluating the outcomes

During the period of the pilot study, members of the Scientific Committee repeatedly said they were unable to judge the research proposal as there was no detailed information on the models so the importance of the whale research to the model was impossible to assess (IWC, 1990). The pilot studies took between 5 and 29 minke whales each year and this raised concerns about being able to draw conclusions from such small sample sizes. The Norwegians responded to this by saying that these were pilot studies and not expected to produce conclusive data. However, the data were used in obtaining an estimate of minke whale food composition and estimating metabolic rates (IWC, 1993b).

The Norwegians presented the findings of their full research programme to the 47th Annual Meeting of the IWC in 1995 (IWC, 1996b). The findings had confirmed that minke whales food intake tends to reflect local prey availability and the only prey preference that might be evident was for fish rather than krill. The MULTSPEC model was adapted to include data on food preference and estimates of energy expenditure derived from the scientific take. The model also includes plankton, herring, capelin, cod and harp seals (Bogstad *et al.*, 1995) and the tentative conclusion of an increasing minke whale stock was that the herring stock would be most affected.

It remains difficult to assess whether the full Norwegian scientific whaling programme achieved its goals because it is so inextricably intertwined with the multispecies modelling. Empirical data would be needed to examine whether the conclusions of the model outputs are correct. As the Scientific Committee noted, unless the food web had been accurately specified, a wide range of results can be obtained with models such as MULTSPEC (IWC, 1995).

Non-lethal alternatives

Non-lethal alternatives to determine the diet of minke whales have been proposed to give information on feeding frequency (which cannot be assessed by lethal means), prey preference and intake (Stern *et al.*, 1992). These involved the direct observation of minke whales, the use of remotely operated vehicles to observe feeding under water and sampling of the available food. Together with the results of earlier studies such data could be used to calculate estimates of energy requirements. The Norwegians did conduct concurrent sampling of prey but did not consider that the non-lethal observation techniques would be feasible in the sea conditions of the northeast Atlantic.

Effect on the stock

The effect of the take on the stock, has proved difficult to reach consensus upon in the Scientific Committee. The stock has been listed as 'Protected' by the IWC and there was no agreed population estimate when the pilot studies began. However, it was thought the small size of the take would have a negligible effect (IWC, 1989b). At the time the full program was discussed, the Scientific Committee had agreed a population estimate of 87,736 (61,000 - 117,000) and did not believe that the research take over a three year period would be significant (IWC, 1993b).

Since 1994, there has been no research take of minke whales by the Norwegians. But in 1993 they resumed their commercial take 'under objection'.

ICELAND

In 1985, Iceland presented a four year research plan to the IWC Scientific Committee (Sigurjónsson, 1985) which was intended to run from 1986-1989. The main objectives were:

“..to increase the knowledge of the state of the exploited whale stocks off Iceland, and to investigate the ecological role of large and small cetaceans in these waters”. (Sigurjónsson, 1985).

The initial proposal involved takes of fin, sei and minke whales, with the possibility of also taking blue and humpback whales. How it was intended that the data from the lethal aspects of the research would improve cetacean conservation of management was not specified. 'General biology' and 'continuation of monitoring of age, growth,

mortality and productivity in the stock...’ ‘to collect information on feeding habits’ (Sigurjónsson, 1985) was the very general way in which aims were described. The most specific description was the use of protein markers in blood and tissue and later mtDNA to undertake stock identity studies. No details were given of sampling methodology and it is never clear whether random sampling was attempted and, on its first evaluation, the Scientific Committee considered the additions to knowledge would be ‘minimal’ (IWC, 1986b).

The Scientific Committee was as divided on this proposal as it was on those from other countries. However, ‘most members of the Committee believed that the information likely to be obtained from the proposed permit would provide only a minimal improvement on our current knowledge with respect to providing management advice’ (IWC, 1986b). Certain elements of the original proposal were later dropped, including a take of minke whales and consideration of humpback and blue whales as part of the programme, because insufficient data were likely to be produced to make the project worthwhile, and data on the state of the stocks of blue and humpback whales were unlikely to be available (IWC, 1987c).

As with other nations’ research proposals that did not fulfil the guidelines, the IWC passed a Resolution (Appendix 2 C, No 1) asking Iceland to refrain from issuing special permits. Similar Resolutions were passed in the following two years (Appendix 2C, Nos 2 & 3). Iceland responded to the last two Resolutions by reducing the 1988 take of sei whales from 20 to 10 and reducing its catch of fin whales from 80 to 68.

During the four years of the scientific take, Iceland killed a total of 292 fin whales and 70 sei whales (see Table 1) in the north Atlantic off Iceland. Studies on these animals included determination of age and reproductive status, analysis of stomach contents, genetic and isoenzyme analysis for stock identification, pollutant analysis and parasite identification. In parallel, Iceland also conducted non-lethal research using arial and sightings surveys, radiotracking of minke whales and sampling to determine phytoplankton and zooplankton distribution, composition and calorific value.

Because the data from the scientific programme has been mixed with past whaling data it is difficult to evaluate the outcomes of the research itself (IWC, 1989b).

KOREA

The original objective of the Korean research during a four year research programme taking 160 whales per year take was:

“to make the scientific basis for a precise assessment and rational management by working out the biological parameters of minke whales” (National Fisheries Research and Development Agency, 1987).

The Korean research program was intended to last for four years but was only undertaken for one (see Table 1). Studies were rather poorly described and came under

considerable criticism inside the Scientific Committee. For example, it was said that 'the ad-hoc nature of the proposed sighting would produce no useful results' (IWC, 1987b).

There were also concerns that a continued take could prevent recovery of the stock which studies had indicated was depleted (IWC, 1987b). The Korean work was poorly presented and they had little research experience to call upon. Even the Japanese, Norwegian and Icelandic scientists who gave each other's lethal research programmes consistent support, found the Korean proposal hard to defend. Repeated proposals to the Scientific Committee led to one of the few occasions when the Committee agreed the work was not justified and called on the Commission to urge the Koreans not to undertake it (IWC, 1988b). The IWC passed a Resolution (Appendix 2D) which called on the Republic of Korea not to issue or to revoke a special permit in 1987. Although they had been scientific whaling in 1986, the Koreans appeared to respect the opinions expressed and undertook no further lethal research work.

SCIENCE AND SCIENTIFIC WHALING

Japan, Norway, Iceland and Korea have justified the killing of whales during the commercial moratorium on the grounds of scientific research. However, for science to be valid and authoritative, it must be of good quality and impartial. Because the authority of science rests upon systematic, careful observation and experiment coupled with critical evaluation in an atmosphere of openness, science polices itself carefully to maintain standards. Peer review is considered fundamentally important to quality control.

Objectivity is also fundamental to the authority of science. Claims to it are implicit in many of the rhetorical statements of those undertaking or supporting the scientific whaling research. For example, one has said '... Japan [should] ...lead the way to show the world that science wins over the emotional idolisation of the whales as the symbol of the environment?' (Misaki, 1993). But are the scientific whaling programmes themselves free of emotion and other influences and is the science of high quality?

Scientific quality - peer review failures

(a) technical competence

It is difficult to question the technical ability of the members of the Scientific Committee who regularly evaluate special permits. Most of them are eminent in their fields and are respected outside the IWC. Many of them have spent considerable time assessing the research proposals in a manner which has often required them to undertake calculations and modelling on an ongoing basis. There was much more intensive effort during the middle and late 1980s, when the research proposals were first made, but this has waned until the recent review of the Japanese Antarctic

programme in 1997, the findings of which have not yet been published. However, there are only a few people actively involved in the evaluation of very wide ranging research proposals which limits the expertise available.

(b) poor peer review procedures

Where serious problems clearly do arise in the Scientific Committee's evaluation of special permits is in the procedures which have been established to evaluate them and the response of the researchers to substantive criticism. This process is a form of peer review which should form the basis of advice to the IWC. In a recent report concerning peer review of research proposals, the Royal Society (1995) said that 'Peer review is to scientific enterprise what democracy is to the running of the country'. 'Peers' have to be qualified to make judgements by virtue of their training, experience and knowledge. However, the Royal Society identified one important exclusion from being a peer reviewer - people who stand to benefit from the research being given approval.

"Peer review should be conducted by members of the peer group who do not personally benefit from the outcome of the matter to be decided, and whose judgement can, to that extent, be accepted as impartial and disinterested" (Royal Society, 1995)

However, in the IWC's Scientific Committee reviews of the scientific whaling programmes those actually undertaking the research are part of the review process. This inevitably sets up an adversarial situation with no clear opinion being formed, especially as there no system of arbitration as normally occurs with peer review. It is difficult to envisage how the IWC can obtain the advice it requires to make an informed decision with such a state of affairs. The problem of being unable to form a Committee view on special permits was first raised at the 38th Annual Meeting in 1986 (IWC, 1987b) when the Committee was seeking to avoid a 'compilation of individuals' views'. However, this failed and partly in response to the Commission's requests for particular views to be attributed, the current practice was established of attaching names to differing views which other scientists on the Committee can associate themselves with at the report reviewing stage (IWC, 1989b). Some members of the Committee did voice their objection to this likening it to 'voting' (IWC, 1989b).

In fact, members of the Scientific Committee often split into whaling and non-whaling camps according to nationality when special permits are considered. For example, in the 1987 special meeting to review Japan's feasibility study, this split on national lines was evident under all the criteria considered (IWC, 1989c). Japanese scientists inevitably took a positive view about the proposal, supported by the Norwegian and Icelandic scientists present. Only on two occasions in the whole of the report of that meeting, are positive comments by another scientist (Horwood, UK) recorded about specific points under discussion. On no occasion is a scientist from a country with a scientific whaling programme critical. The basic shape of this situation is replicated in almost all of the subsequent discussions of scientific whaling proposals

Whilst there is unlikely to be unanimity about any research proposal even from impartial reviewers, at least the outcome is protected from defensive reactions of the researchers involved and is normally anonymous. Partial interest in the research was probably behind the successful attempts of scientists on the Committee to prevent clear statements of opinion to the IWC regarding whether a special permit should be granted or not. Comments are only given on accordance with guidelines (IWC, 1986b). This may seem an appropriate limitation to the power of the Scientific Committee but it gave political purchase to those wishing to emphasise the uncertainty in the outcomes and the importance of a flow of biological information.

(c) political refusal to accept scientific review findings

The adversarial nature of the Scientific Committee is compounded by the IWC being unable, or unwilling, to do more than request that Governments change or reconsider special permits. These requests are not enforced as those Governments undertaking lethal research have shown themselves unwilling to accept them, except by making minor methodological modifications to the work.

In refusing to accept the Resolutions passed by the IWC, Japan and others have claimed that these constitute an infringement of their sovereign rights under the ICRW (see e.g. IWC, 1991a). The Japanese also claim in their literature that opposition to scientific whaling is based on an emotional and ethical objection to all whaling (Kasamatsu, 1995; Nagasaki, 1993). However, given the detailed criticisms made by members of the Scientific Committee solely on the terms of the research itself, much of which has been proved to be well founded on *post facto* examination of the data collected, claiming national sovereignty to escape critical scientific review is hardly a rational 'scientific' response.

Thus, although the IWC is supposed to be acting according to scientific advice, it is in a position where it is unable to do so. Japan today and Norway, Iceland and Korea in the past, whilst making much of the need for a 'scientific' approach to the management of whaling, have not been bound by the basic practices of good science. One element of providing scientific advice to the Commission is that proper practice should be put in place. The Scientific Committee appear to have failed in this respect.

(d) opportunities to correct shortcomings in peer review

At its last two meetings the Scientific Committee has begun to re-examine its objectives and priorities. In 1995 a working group drafted a statement of the Scientific Committee's responsibilities and objectives (IWC, 1996c) which included the 'Development of improved methods for giving scientific advice and for scientific research on cetaceans'. At the 1996 meeting it was agreed to continue this review (IWC, 1997).

Therefore an immediate opportunity exists for the Scientific Committee to put its review processes in order and to ensure scientists respect the findings of a peer review system. Of course no science or scientific review can ever be completely impartial and unbiased, any scientist is inevitably influenced by their own special interests and preferences. In the same way that democracy is never perfect, neither is peer review but there are some basic prerequisites that should be met and attempting to remove the most obvious bias is an important first step for the Scientific Committee to make. As well as having a system which attempts to have an element of independent review, introducing expertise from outside specialists with no connection to, or interest in, the Scientific Committee might refresh the scientific debate.

Scientific quality - the IWC's criteria

The IWC's' criteria, by which the objectives and methodology of scientific research proposals should be judged, were agreed by the IWC in 1988 (see Appendix C) and later modified in 1995 (Appendix 1, Resolution 7). The role of the Scientific Committee is partly a straightforward peer review of whether the science is sensible and consistent with current knowledge and partly a 'quality' review of the feasibility and likelihood of objectives being fulfilled.

(a) Objectives

The criteria state that the objectives of the research have to meet research needs identified by the Scientific Committee; contribute information essential for rational management of the stock; address a question or questions that should be answered in order to conduct the comprehensive assessment or meet other critically important research needs.

Rational management

Assuming that the RMP is the currently accepted approach to whale management the usefulness of the knowledge gained from scientific whaling to the RMP gives an indication of its merit. Abundance estimates and stock identity are essential requirements for the RMP. However, stock identity data from the Norwegian and Icelandic programmes does not appear to have been conclusive or useful in this context and there is nothing else in the Norwegian, Icelandic or Korean lethal research programmes which has informed the RMP.

Use of abundance data from the Japanese Antarctic research has proved problematic because of the difficulties which have arisen from combining sightings and sampling. Abundance data for use in the RMP therefore comes from the dedicated sightings surveys that have been undertaken. The Japanese hope that the biological studies will help in obtaining estimates of the Maximum Sustainable Yield Rate for use in tuning

the RMP (Nagasaki, 1995) and that these will not be biased as previous estimates based on commercial catch data were. However, this is not essential information. In contrast, both the Antarctic and the North Pacific stock identity data, particularly from genetic studies, can and are being used in implementation trials of the RMP, indicating they clearly meet the criteria on objectives.

The Japanese have also argued they will use the data from lethal studies to develop new management approaches (Government of Japan, 1990; Ikeda, 1990). However, during ten years of scientific whaling the Japanese have not presented any such new approaches to management. The objectives of the Norwegian research were to fulfil the needs of their own management programmes. These were only marginally concerned with the management and conservation of whales as their declared primary objective was to improve fisheries management. Not accepting the RMP as the agreed 'rational' approach to management on which to focus allows any research to be encompassed and trying to judge whether a research proposal meets the criterion then becomes a rather pointless exercise.

The Comprehensive Assessment

Contributing to the Comprehensive Assessment is another potentially justifiable objective for lethal research, although in 1995 the IWC passed a Resolution which called for only non-lethal research to be used to carry out the Comprehensive Assessment. The needs of the Comprehensive Assessment identified by the Scientific Committee are to review and revise assessment methods and stock identity; review data quality, availability requirements and stock identity; plan and conduct the collection of new information to facilitate and improve assessment; and examine alternative management regimes (IWC, 1989d).

The Japanese argue that collecting data for alternative management schemes falls under the Comprehensive Assessment as well as 'rational' management in general (Government of Japan, 1990). However, since the RMP was eventually chosen from the four alternative schemes first considered at a Comprehensive Assessment Workshop on Management in 1987 (IWC, 1989d) this subject could be considered to be completed or, at the very least, its work prioritised and the Japanese justification on these grounds is considerably weakened.

The objectives of facilitating and improving assessments are another part of the Comprehensive Assessment which could justify lethal research - to determine pregnancy rates for example. Non-lethal sightings surveys to establish abundance estimates are seen as the backbone of this work and with repeated surveys will give fundamentally important information on the status of stocks. Until some knowledge of the trends in stocks is gained it will remain difficult to interpret the significance of the biological data.

Critically important research

If research objectives do not fulfil management needs or data required for the Comprehensive assessment, according to the IWC's approach they have to be 'critically important' for other reasons. Because the Norwegian research was directed to fisheries management, it is difficult to see how it could ever be considered critical to whale management or conservation. It could, of course, prove to have some application to whales but the directed nature of the work makes this incidental rather than important.

The Japanese argue that a flow of biological information about whales is a critical part of monitoring during the moratorium (Government of Japan, 1987a; 1987b; Ikeda, 1990). They also see the moratorium as an opportunity to gather data unbiased by commercial operations (IWC, 1993a). However, the Japanese have failed to explain or rationalise the sampling frequency as part of a monitoring programme except in the widest sense of repeated sampling. Strategic timing of sampling has not been investigated for many elements of the research but, if investigated, could perhaps reduce the number of samples needed. Simply calling a flow of biological information 'critical' without any underlying rationale does not seem adequate justification for a practice and can become a 'catch-all' for any research.

Stock identity

Determination of stock identity is the only one objective of any of the lethal research programmes that is unequivocally consistent with the criteria established by the IWC. It is clearly needed for the RMP and in following trends in distinct populations.

(b) Methodology

The second set of hurdles that research proposals have to overcome are methodological. The relevant criteria established (see Appendix 3) are that the proposed research methodology must be likely to achieve its scientific objectives; that it is not practically and scientifically feasible through non-lethal research techniques or by analysis of existing data and that the number, age and sex of whales to be taken are necessary to complete the research and will facilitate the conduct of the comprehensive assessment.

Ability to achieve objectives

As the research has progressed it has become clear that many of the early doubts about the feasibility of the programme which were expressed by scientists on the Scientific Committee were well founded. The inability to estimate age-specific natural mortality rates and the move to estimating average natural mortality are clear evidence of this. Estimating age-specific natural mortality rates was the primary motivation behind the original Japanese research plan and the refusal of the Japanese to delay their research

plans until the substantial criticisms raised beforehand raises doubts about the genuineness of their scientific endeavour.

Other parts of the research may also struggle to reach their objectives. Despite the Japanese scientists persistent efforts to take truly random samples, they have never fully succeeded. The data that has been collected on age and sex segregation over time and space in Antarctica, whilst interesting and adding to the basic data base of knowledge about minke whales in the area, still leave the basic questions about the populations' range and identity uncertain. The ability of the data to be used to estimate reliable MSYRs is not clear. Some of these questions simply may not be answerable in a realistic time frame, if at all. Thus, although it may be argued that the objective of using biological data from lethal research could contribute to the Comprehensive Assessment, this is less convincing on methodological grounds.

Non-lethal alternatives available

Objectives relating to stock identity do fulfil the IWC's criteria, but there is increasing evidence that this information can be investigated using non-lethal biopsy methods and genetic studies. The other data collected for this purpose, such as parasite and pollutant burdens obtainable only through lethal techniques, seems unlikely to contribute significantly to the objectives and are thus difficult to justify.

Therefore, the only clear justification for research on grounds of objectives, namely stock identity, fails to fulfil the methodological criteria laid down by the IWC. Given the emphasis the IWC has placed on non-lethal research, and obvious alternatives, it is hard to understand how lethal studies of stock identity can be permitted. The failure of all the research programmes to meet the criteria both on objectives and methodology is evidenced by the Resolutions passed by the IWC asking Governments to reconsider their programmes.

Political interests in scientific whaling.

'Science' is commonly used as a justification for many activities in the policy domain calling, as it does, on the authority of science as impartial knowledge with claims to the universal validity for the truth to which it aspires (Yearley, 1996). Thus science is used to legitimise and defend actions and calls for policy to be based on scientific evidence are common. This is the situation in the IWC, where, for example, changes to the Schedule concerning catch limits and methods of catching are to be 'based on scientific evidence' (Article 5, ICRW) and the moratorium on commercial whaling is to be 'kept under review, based upon the best scientific advice' (paragraph 10 (e) of the Schedule to the ICRW).

Has the science of scientific whaling been free of prejudice and partiality in efforts to find the 'truth'? The way in which Governments have argued about the research and the way in which scientists have undertaken their studies indicate that there are

considerable political, social, economic and cultural influences on scientific whaling programmes. This is not surprising, many studies of all kinds of scientific studies research have similar findings, showing that rarely does science achieve complete impartiality.

(a) financial considerations motivate scientific whaling methods

The efforts the Japanese have placed in trying to make the lethal research more precise are in contrast to the relative lack of effort placed in developing non-lethal alternatives. Although the Japanese have invested heavily in sightings surveys to produce abundance estimates, the use of biopsy sampling, photo-identification, tracking and observation has been less enthusiastically pursued. The higher costs of non-lethal research, where costs cannot be recouped by the sale of products (Ohsumi, 1995), have influenced this.

Thus more than just scientific endeavour is influencing scientific whaling. If a government is unwilling to show a straightforward commitment to a scientific programme and fund it in full, preferring to recoup costs through sales of the research animal, a commercial dimension is introduced. The temptation may exist to sample more whales to finance more research even if the research of primary interest does not require the killing of whales, or to use lethal methods when non-lethal alternatives exist. This is an issue which was raised by members of the IWC at the 36th and 37th Annual Meetings (IWC, 1986a; IWC, 1987a) and resulted in a clause in a Resolution being incorporated recommending that the products of scientific whaling be used solely for local consumption (see Appendix 1, Resolution 1). Some governments' wished to make this much more stringent by prohibiting the international trade in the 'by-products' of scientific whaling but this was not adopted however.

As David Butterworth, (Butterworth, 1992) one member of the Scientific Committee who is sympathetic to whaling in principle said in 1992:

“As far as the lethal components of these [Japanese] research programmes are concerned, the empirical evidence thus far of their value towards an improved basis for management is poor. Potentially the strongest defence for 'scientific whaling' is that because surveys are enormously expensive, it is not unreasonable to recover the costs through harvests that are sufficiently low to pose no risk to the stock”

However, there is a fine line between recouping research costs and the temptation to expand the 'research' and increase the income of the enterprise. Whales may be killed not for strictly scientific reasons. Whether this is an adequate or legally sound justification for killing whales during a moratorium on commercial whaling seems doubtful.

Another commentator who is also sympathetic to whaling concluded his study of the justification for scientific whaling by saying:

“One reality which administrators must face is that, regardless of the scientific merit of catching samples, the research could not continue without the income from selling the by-products....[T]he research means...finding scientific evidence that will convince the IWC to lift the moratorium.... [T]he future of the whaling industry lies in science.” (Ward, 1990)

Ward (1990) not only identifies a direct financial dependence on killing whales but also an underlying political commitment to re-open commercial whaling. It also raises the question of whether maintaining markets in whale products (through scientific whaling) may be one hidden objective of the research programme to help maintain national political momentum, support and infrastructure.

(b) research strategy influenced by commercial whaling interests

The desire to re-open commercial whaling appears to be influencing what questions the science asks and how data is interpreted and presented. The Japanese have never concealed this desire and it has determined, in large part at times, what studies they undertake. The rationale behind stock identity studies in the North Pacific, for example, is to challenge the sub-stock hypothesis which ‘lead[s] to large and unnecessary reduction[s] in catch limits calculated, especially in Japanese traditional whaling grounds’ (Government of Japan, 1994). Cultural and social commitments to whaling and certain whaling grounds are revealed in this statement and set the agenda, not science alone. Appealing to ‘tradition’ is certainly not an accepted criterion for judging the worth of a scientific endeavour.

There also appears to be political commitment to whaling embedded in more subtle ways in the research the Japanese are undertaking. Behind the krill surplus hypothesis that minke whale numbers increased during the 1950s to 1970s as a result of declines in the numbers of large baleen whales, is the desire to use this as a ‘scientific’ justification for ‘culling’ minke whales to allow the depleted populations to recover (Kojima, 1993). However, the research they are undertaking will shed no light on the reason behind any change in numbers only whether it has occurred, any relationship may not be causal yet it seems likely to be used politically to justify catching minke whales.

(c) political use of scientific whaling

The rejection of critical scientific evaluation on grounds of a sovereign right to kill whales for science, further demonstrates some political motivation behind scientific whaling. If science is judged on scientific grounds alone, nationality should not be relevant. In the Scientific Committee it was only the Korean work that generated a consensus that it was not worthwhile, opinion about the others has been split. The enlists on all the other research programmes have almost always between scientists

from countries with philosophical commitments to lethal research such as Japan, Norway, Iceland and Korea and those who are less positive about the type of knowledge generated in this way.

It is not sufficient, therefore, in the light of evidence of non-scientific influences on the scientific whaling programmes for its proponents to decry opponents as biased and emotionally opposed to whaling when it is clear that they have opposing bias and emotion behind their scientific whaling programmes. However, there is particular political purchase to be achieved by maintaining scientific whaling as a ‘scientific’ matter alone because making claims to be talking science acts to exclude others:

“When an area of intellectual activity is tagged with the label “science”, people who are not scientists are *de facto* barred from having any say about its substance; correspondingly, to label something “not science” [e.g., mere politics] is to denude it of cognitive authority” (Jasanoff, 1990; p.14)

All those who have had scientific whaling programmes have used this strategy to discount and discredit the views of others who oppose it. However, as this report has shown there is often more behind the scientific whaling programmes than simply a desire to reveal the truth.

Scientific Advice for the IWC

Science and scientific research has played an increasingly important role in the IWC since it was first established (Peterson, 1992). The ICRW intends to ‘provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry’ and any changes to the Schedule (concerning catch limits, methods of catching) must be ‘as necessary to carry out the objectives and purposes of this Convention and to provide for the conservation, development, and optimum utilisation of the whale resources’ and ‘based on scientific evidence’. The Scientific Committee was established to provide this scientific advice to the IWC.

(a) the Scientific Committee’s agenda

Has the Scientific Committee in special permit reviews provided the most appropriate scientific advice to the IWC? For several decades, the Scientific Committee has been dominated by a form of science which is committed to conventional mathematical modelling and measurement of the physical characteristics of whales. There has been much less emphasis and importance placed, for example, on:

- behavioural observation of whales
- the exploration of new theoretical approaches such as chaos theory
- studies of whalers to understand what influences their behaviour
- exploring conservation approaches which are not based on individual stocks

In forming the agenda for the Comprehensive Assessment (which is used to judge research proposals), the Scientific Committee has maintained its historical commitment to counting and measuring whales without consideration of whether this is the best approach to deal with past failures in management. The problems of the New Management Plan have been attributed to the technical difficulties in estimating biological parameters with sufficient precision. Other plausible hypotheses such as the impossibility of ensuring compliance and collecting reliable catch statistics have been discounted by default or whether a whaling industry once re-started can be made to reduce its catches if these prove to be too high (which has made controlling whaling difficult in the past) (Peterson, 1992). Historical catch data are also important to the operation of the RMP although they are also uncertain as the recent revelations about large scale under-reporting of catches by the USSR after the second world war illustrate (Yablokov, 1994). These issues are seen as non-scientific whilst, at the same time, acknowledging that operation of the RMP rests upon accurate knowledge of catches which 'reinforces a need for a foolproof system' (Donovan, 1995). If the failure of past attempts to regulate whaling have been significantly influenced by ability to monitor and enforce them, perhaps as much as, or more than, ability to estimate biological parameters, the founding assumptions of the RMP would not be tenable as a 'foolproof' system may not be achievable.

Practical problems of managing whaling have been widely identified. The Japanese scientific whaling programme has confirmed earlier findings from commercial whaling of a predominance of female whales at the ice edge in Antarctica (Kasamatsu and Oshumi, 1981). Whilst they recognised that taking predominately females may have an adverse effect on minke whale populations, they noted that:

“..Minke whales are most abundant in the higher latitudinal waters near to the pack ice edge. These waters are also more suitable for operations because the weather and sea conditions are generally better. However, females are more abundant than males in these waters. The reduction in CPUE because of sex regulation of the catch would increase the cost of operations by prolonging the whaling season, or by increasing the number of catcher boats required”.
(Kasamatsu and Oshumi, 1981)

In their research whaling, the Japanese have found that smaller groups of whales are more difficult to take and that these are mainly composed of males (Kasamatsu *et al.*, 1990; 1991). How likely is it, therefore, that given these types of economic and practical constraints (e.g. time and weather) that any efforts to ensure a particular take would succeed?

(b) other knowledge needed

There are other scientific disciplines of economics, anthropology and sociology which might, among others, be able to shed light on such issues and whether the assumption that status of stocks is the key factor in 'safe' commercial whaling. The need for other such forms of knowledge in being recognised in the management of fisheries (Masood

1997). These other scientific disciplines may illuminate what systems might be practicable and what degree of tolerance to abuse would be needed in an acceptable management plan. These types of knowledge should be used to help set the framework of a management plan rather than being brought in as 'add ons' to a management scheme. However, the disciplines able to comment and design appropriate research to address such questions are not well represented, if at all, on the Scientific Committee whose version of 'scientific knowledge' is very largely constrained to counting and measuring whales.

Whilst the assumptions behind the RMP may not seem to have much to do with scientific whaling, they serve to illustrate the way in which the Scientific Committee has become committed to a certain type of scientific knowledge and approach to the management of whaling. These are not the only forms of knowledge nor necessarily the best ones to meet the needs of the IWC as it undertakes its difficult negotiations between conservation and consumption. Thus, rather than seizing the opportunity of the moratorium to look differently or more deeply at the issues, the Scientific Committee has stuck firmly to its old paradigms of science. This has determined the shape of the Comprehensive Assessment and thereby how the research is evaluated.

(c) a different Comprehensive Assessment

There have been clear opportunities for the Scientific Committee to rethink its approach as the moratorium has progressed. Some new evidence has emerged which may indicate that accurate population estimates may not be the key to the effective regulation of whaling. For example, genetic studies have revealed that illegal killing of whales has taken place since the moratorium was introduced. Surveys of whale meat on sale in Japan and Korea show it comes from species and locations which cannot be accounted for as the by-products of scientific whaling. These included meat from both a humpback whale, a species prohibited from whaling since 1966, and from northern hemisphere minke whales, possibly from Norway, despite the export ban (Baker and Palumbi, 1994; Baker *et al.*, 1996).

These studies provide one example of the type of work that could have been more actively pursued to examine the effect of the moratorium. In a moratorium, when the movement of whale products should not be taking place outside the supposedly tight controls on scientific whaling, any infringement should be more easily detected. The Scientific Committee could have prioritised this work, to discover whether there were reliable and technically feasible scientific methods to monitor whaling activities. If a moratorium fails to prevent illegal whaling, when a commercial take is allowed this appears even less likely. There would seem little point, therefore, in developing a complicated model to calculate catch limits if there is not a reasonable likelihood of its safe operation in practice however much hard work goes into it.

Other Scientific Advisory bodies have suffered from ignoring the practical difficulties of applying their supposedly robust risk assessment and risk management strategies in practice. The IJC's advisory committee on pesticides has pronounced many

pesticides to be safe as long as the instructions are followed (Wynne, 1989). However, the assumptions of safe use have proved to be impracticable in a farm situation. Protective clothing may be too hot to wear or sheep dip, for example, may run up farmers' arms as they handle sheep. These issues escaped the scientists attention and were considered 'non-scientific' yet have proved to be among the crucial factors in safety.

Whether the IWC has been well served by the framework which the Scientific Committee have created for them is therefore questionable. The effect of the moratorium has not been explored and by defining the Comprehensive Assessment as concerned with biological parameters of the whales alone, many other potentially important issues have been marginalised. Time, effort and finances may have been wasted in carrying out the wrong sort of research, reviewing and analysing it.

CONCLUSIONS

In the ten years since 1986, when the moratorium on commercial whaling came into force, Japan has killed a total of 3,526 minke whales in the Antarctic and North-western Pacific under special permits for scientific research. Also under special permits, Norway has killed 288 minke whales in the Atlantic off Norway; Iceland 292 fin whales and 70 sei whales in the Atlantic off Iceland and Korea 69 minke whales in the Sea of Japan.

Justifying scientific whaling

Opinion on whether scientific whaling programmes have been justified will depend in part on the value which is placed on the type of knowledge they provide. Because there will always be uncertainty both in whether they can achieve their objectives and whether their objectives are the right ones, decisions require judgements and are not matters of fact.

The type of knowledge scientific whaling generates is fixed in nature and may be difficult to interpret. It is able to state what the condition of an animal is, but is less able to explain why it has arisen. Understanding the interactions between whales and their environment, including with human systems, therefore, is not adequately addressed by lethal research although this may be the knowledge required for understanding the best way to conserve and manage whales. However, there has never been a systematic review and evaluation of whether the research needs identified by the Scientific Committee are the most appropriate ones for conservation and management in the broadest sense. The framework developed for assessment of scientific whaling programmes is very narrow and continues to focus on the biological characteristics of whales. Although interest in environmental change and its impact on whales is developing, this is not a feature of the research needs for the Comprehensive Assessment, for example.

Even inside the narrow framework which has grown up to assess special permits there is considerable doubt about the outcomes and necessity of scientific whaling. The definitions of the Comprehensive Assessment are broad enough to allow a case to be made for almost any kind of biological research and the RMP can use additional biological information for 'tuning'. However, these are difficult to support as 'critical' or 'essentially important' in the light of the IWC's preference for non-lethal research. None of the research programmes have been given wholehearted support by the Scientific Committee and over time many of the substantive criticisms made by some members have proved to be well founded.

In addition, the research programmes also raise broader questions. Illegal trade in whale meat has taken place in the space created by sales of meat from the scientific catch (Baker and Palumbi, 1994; Baker *et al.*, 1996) and the research has been funded through the proceeds (Ward, 1990). What the impacts of illegal takes on other stocks of whales maybe, or how the research funding is influencing the Japanese research away from non-lethal methods are important issues to address. However these dimensions of the impact of the research are not being taken into account in the review and justification process.

The future of scientific whaling

Japan appears to be intending to continue scientific whaling for at least another six years. The IWC and Scientific Committee are awaiting the report of the 1997 review of the Japanese Antarctic research. On past performance it will have little effect on future research however positive or negative the evaluation is. Japan, like Norway, is happy to make political capital out of claims to be scientific but is less willing to partake in systems to ensure its quality. The Scientific Committee must now take some initiative in developing review procedures which could give the IWC more authoritative advice than it currently receives. Otherwise the rather farcical review situation will continue.

The IWC and the Scientific Committee also need to think more creatively about the type of knowledge that it needs to steer through the apparently conflicting demands of conservation and exploitation. The inability of the IWC to control scientific whaling suggests that the manageability of whaling must become an important question for the Scientific Committee. One effect of the moratorium on commercial whaling is that it has revealed just how difficult management actually is. Using national sovereignty as an excuse for ignoring scientific critiques has revealed some of the political nature of scientific whaling and the determination of the pro-whaling nations to re-open commercial whaling.

Thus rather than science alone being the justification for scientific whaling, political, social and cultural factors are all involved. The way in which the scientific whaling programmes have developed throws the whole ability of the IWC ever being able to 'manage' whales into question. Should the moratorium be lifted now, where science

has failed as a controlling mechanism over political interests, RMP quotas seem unlikely to be able to control the political and economic forces of commercial whaling.

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GENERAL RESOLUTIONS ON SCIENTIFIC WHALING AND THE EVALUATION OF RESEARCH PROPOSALS

1. RESOLUTION ON SPECIAL PERMITS FOR SCIENTIFIC RESEARCH

Rep. Int. Whal. Commn, 37:25, 1987

WHEREAS the purpose of the International Whaling Commission is to provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry; and

WHEREAS the Commission has decided that catch limits for the killing for commercial purposes of whales from all stocks for the 1986 coastal and the 1985/86 pelagic seasons and thereafter shall be zero, this provision to be kept under review. based on the best scientific advice, the Commission being required by 1990 at the latest to undertake a comprehensive assessment of the effects of this decision on whale stocks and consider modification of this provision and the establishment of other catch limits; and

WHEREAS Article VIII of the International Convention for the Regulation of Whaling provides that notwithstanding anything contained in the Convention any Contracting Government may grant to any of its nationals a special permit authorizing that national to kill, take and treat whales for purposes of scientific research subject to such other conditions as the Contracting Government thinks fit; and

WHEREAS paragraph 30 of the Schedule of the Convention provides for all proposed permits to be reviewed by the Scientific Committee; and

WHEREAS the killing, taking and treating of whales for purposes of scientific research should only be undertaken in a manner consistent with the principles and in accordance with the provisions of the Convention.

NOW THEREFORE the Commission, until the Comprehensive Assessment under Schedule paragraph 10(e) is completed,

Recommends that prior to deciding on the granting of permits for the killing, taking and treating of whales for the purpose of scientific research, Contracting Governments while complying fully with Paragraph 30 of the Schedule, should also take account of guidelines drawn up by the Scientific Committee.

Recommends that Contracting Governments in deciding the issuance of, or modifications, postponement, or withdrawal of the permits, should take account of the comments of the Scientific Committee.

Recommends that the duration of any such permits issued by the Contracting Governments should be strictly limited to the need for completion of the proposed research.

Reaffirms that as stated in Paragraph 30 of the Schedule the preliminary results of the scientific research will be subject to annual review by the Scientific Committee.

Recommends that Contracting Governments when considering proposed research permits and the Scientific Committee when reviewing such permits and when reviewing the results of research from permits previously issued in accordance with the procedures of the Convention should take into account whether:

- (1) the objectives of the research are not practically and scientifically feasible through non-lethal research techniques;
- (2) the proposed research is intended, and structured accordingly to contribute information essential for rational management of the stock;
- (3) the number, age and sex of whales to be taken are necessary to complete the research and will facilitate the conduct of the comprehensive assessment;
- (4) whales will be killed in a manner consistent with the provisions of Section III of the Schedule, due regard being had to whether there are compelling scientific reasons to the contrary.

Recommends that Contracting Governments ensure that maximum scientific information be obtained from any whales taken under special permits for scientific research.

Recommends that, taking into account Paragraph 2 of Article VIII of the Convention, following the completion of scientific treatment the meat as well as the other products should be utilised primarily for local consumption.

Recommends that great care should be taken by Contracting Governments when considering issuing special permits for the taking of whales from a Protection Stock. Contracting Governments should take care to ensure that the proposed catch will not further deplete the stock or substantially impede its recovery.

Reiterates that Contracting Governments should grant no permits until the proposals for such

Recommends that Contracting Governments submit proposals for scientific permits and results of research obtained from permits previously issued in accordance with the procedures of the Convention, to the Secretary of the Commission not later than 60 days before the next Annual meeting of the Scientific Committee.

2. RESOLUTION ON SCIENTIFIC PERMITS

Rep. Int. Whal. Commn, 36:26, 1986

WHEREAS, Article VIII of the International Convention for the Regulation of Whaling, 1946, exempts from the operation of the Convention the killing, taking and treating of whales in accordance with special permits issued by Contracting Governments, for the purposes of scientific research; and

WHEREAS Paragraph 30 of the Schedule provides for all proposed permits to be reviewed by the Scientific Committee;

THE COMMISSION:

1. NOTES the draft resolution proposed by Sweden and seconded by Switzerland on the subject of scientific permits and recalls the discussion thereon;
2. DECIDES to set up a working group to study this proposal and any relevant matters with a view to taking a decision at the next session of the Commission;
3. URGES any Contracting Government proposing the issue of scientific permits in the intervening period to take account of the serious concerns expressed in the Commission at the possibility of whaling for scientific purposes in the period referred to in Schedule paragraph 10(e) assuming the characteristics of commercial whaling; and
4. INVITES Contracting Governments to ensure that any whaling under such permits is conducted strictly in accordance with scientific requirements, and in particular to take account of the advice and guidelines of the Scientific Committee.

3. RESOLUTION ON SCIENTIFIC RESEARCH PROGRAMMES

Rep. Int. Whal. Commn, 38:27, 1988

WHEREAS the International Whaling Commission adopted under Article V of the Convention and incorporated in paragraph 10(e) of the Schedule a regulation providing that catch limits for the killing for commercial purposes of whales from all stocks for the 1986 coastal and the 1985/86 pelagic seasons and thereafter shall be zero, this provision to be kept under review based on the best scientific advice, the Commission being required by 1990 at the latest to undertake a comprehensive assessment of the effects of this decision on whale stocks; and

WHEREAS Article VI of the Convention provides that the Commission may make recommendations to Contracting Governments on any matters which relate to whales or whaling and in accordance with Article VI the Commission adopted in 1986 a Resolution on Special Permits for Scientific Research (IWC/38/28) which remains in effect; and

WHEREAS Article VIII of the Convention provides that a Contracting Government may grant to any of its nationals a special permit authorizing that national to kill, take and treat whales for purposes of scientific research, and that such killing, taking and treating of whales in accordance with the provisions of this Article shall be exempt from the operation of the Convention; and

WHEREAS paragraph 30 of the Schedule to the Convention provides for the Scientific Committee to review all proposed special permits to be issued by Contracting Governments and research programs under existing special permits that involve the killing, taking, or treating of whales; and

WHEREAS the Commission recognises that the conduct of the comprehensive assessment as referenced in paragraph 10(e) of the Schedule to the Convention is considered of highest priority for the Commission while such paragraph is applicable;

NOW, THEREFORE, THE COMMISSION, in order to safeguard and promote its international whale conservation program and in furtherance of the objectives expressed in paragraph 10(e) of the Schedule;

REQUESTS that the Scientific Committee annually review all research programs involving the killing of whales under special permits and report their views on whether the programs under an existing or proposed special permit at least satisfy the following criteria in addition to such guidelines as may be applicable, including the criteria specified in the Resolution adopted in 1986 on Special Permits for Scientific Research (IWC/38/28):

- (1) The research addresses a question or questions that should be answered in order to conduct the comprehensive assessment or to meet other critically important research needs;
- (2) The research can be conducted without adversely affecting the overall status and trends of the stock in question or the success of the comprehensive assessment of such stock;
- (3) The research addresses a question or questions that cannot be answered by analysis of existing data and/or use of non-lethal research techniques; and
- (4) The research is likely to yield results leading to reliable answers to the question or questions being addressed.

AGREES to review, annually, beginning with the 39th IWC meeting, the report of the Scientific Committee regarding special permits involving the killing of whales.

AGREES, should an ongoing or proposed research program not satisfy the criteria specified in the Resolution adopted in 1986 on Special Permits for Scientific Research (IWC/38/28) and, additionally, beginning at the 40th IWC meeting, the above criteria in the view of the Commission, to so notify the Contracting Government concerned.

RECOMMENDS that Contracting Governments, in providing the Secretary with proposed special permits and in submitting reports on programs under special permits to the Scientific Committee for review, specify how each proposed special permit or program satisfies each of the above criteria in addition to such guidelines as may be applicable.

RECOMMENDS that Contracting Governments, in the exercise of their Sovereign rights, refrain from issuing or revoke, permits to its nationals that the Commission, taking into account the comments of its Scientific Committee, considers do not satisfy each of the criteria specified above and therefore are not consistent with the Commission's conservation policy.

4. RESOLUTION ON THE ISSUANCE OF SPECIAL PERMITS FOR THE PURPOSES OF SCIENTIFIC RESEARCH

Rep. Int. Whal. Commn, 39:31, 1989

WHEREAS it is desirable to operate within the annual calendar of the International Whaling Commission and of its Scientific Committee and that in normal circumstances the procedure for consideration of special permits for the purposes of scientific research is for them to be considered by the Scientific Committee and with its report by the Commission and that intersessional meetings should normally be avoided and called only in exceptional circumstances;

WHEREAS there is no clear procedure for the consideration of reports of the Scientific Committee on the results of intersessional meetings called to consider special permits for the purposes of scientific research and FURTHERMORE it is not the general practice of the IWC to convene intersessional meetings of Commissioners;

WHEREAS it is a responsibility for all Commissioners to have due opportunity to consider and discuss with one another the outcome of the deliberations of the Scientific Committee on all matters, and in particular on any proposals for special permits for the purposes of scientific research;

Now THEREFORE the Commission

RECOMMENDS that following consideration of any special permit(s) for the purposes of scientific research at any intersessional meeting of the Scientific Committee, the Contracting Government(s) responsible for the proposed special permit(s) refrain from issuing any special permit until the expiry of sixty days from the date of circulation of the report of the meeting, to give the Chairman of the Commission sufficient time to consult with the Contracting Governments in order to reach a decision as to how the Commission proceeds.

5. RESOLUTION ON SCIENTIFIC PERMITS

RECALLING that the Scientific Committee is charged with the task of reviewing the performance of scientific research programmes;

NOTING that the research programme to clarify the stock structure of minke whales in the northwestern Pacific (SC/46/NP1) has been reviewed by the Scientific Committee;

NOTING FURTHER that the full Scientific Committee agreed that all relevant guidelines concerning the proposal, its objectives and research cooperation have been met and that some questions were raised whether the methodology of the programmes was in accordance with the relevant guidelines (IWC/46/4);

Now, THEREFORE, the Commission:

ENDORSES the review of the Scientific Committee of the research programme to clarify the stock structure of minke whales in the northwestern Pacific.

6. RESOLUTION ON WHALING UNDER SPECIAL PERMIT IN SANCTUARIES

Rep. Int. Whal. Commn, 46:46, 1996

WHEREAS the International Convention for the Regulation of Whaling recognises the interests of the nations of the world in safeguarding for the future generations the great natural resources of the whale stocks;

WHEREAS the Commission has established, in Paragraphs 7a and 7b of the Schedule, sanctuaries in the Indian and Southern Oceans in which commercial whaling is prohibited;

WHEREAS Article VIII of the Convention provides that Contracting Governments may grant to any of their nationals a special permit authorising those nationals to kill, take and treat whales for purposes of scientific research, and that such killing, taking and treating of whales shall be exempt from the operation of the Convention;

WHEREAS Contracting Governments should nevertheless respect fully the wish of the Commission to ensure the conservation of whales in sanctuaries designated by the Commission;

NOW THEREFORE the Commission:

CONSIDERS that Contracting Governments should undertake, and collaborate in, the conduct of a programme of research in the Southern Ocean Sanctuary using non-lethal methods and, in the exercise of their sovereign rights, refrain from issuing Special Permits for research involving the killing of cetaceans in such sanctuaries.

7. RESOLUTION ON WHALING UNDER SPECIAL PERMIT

Rep. Int. Whal. Commn, 46:46-47, 1996

WHEREAS the International Convention for the Regulation of Whaling recognises the interest of the nations of the world in safeguarding for future generations the great natural resources represented by the whale stocks;

WHEREAS the Commission adopted in Paragraph 10(e) of the Schedule to the Convention zero catch limits on commercial whaling because of concern about over-exploitation of whale stocks;

WHEREAS Article VIII of the Convention provides that any Contracting Government may grant to any of its nationals a special permit authorising that national to kill, take and treat whales for purposes of scientific research, and that such killing, taking, and treating of whales in accordance with the provisions of this Article shall be exempt from the operation of the Convention;

WHEREAS Contracting Governments, in exercising their rights under Article VIII, should nevertheless respect fully the Commission's arrangements to conserve whales and ensure that the killing, taking and treating of whales for scientific research is only undertaken in a manner consistent with the provisions and principles of the Convention;

WHEREAS the Commission is developing a Revised Management Scheme for commercial whaling and has adopted a Resolution (IWC 1994-5) accepting that the specification of the Revised Management Procedure given in Annex H (*Rep. int. Whal. Commn* 44:145-52) completed the main scientific component in the Scheme;

WHEREAS with the development of modern scientific techniques it is not necessary to kill whales to obtain the information that is needed for initial implementation of the Revised Management Procedure for a particular whale stock;

NOW THEREFORE the Commission:

RECOMMENDS

that scientific research intended to assist the comprehensive assessment of whale stocks and the implementation of the Revised Management Procedure shall be undertaken by non-lethal means;

that scientific research involving the killing of cetaceans should only be permitted in exceptional circumstances where the questions address critically important issues which cannot be answered by the analysis of existing data and/or use of non-lethal research techniques;

REQUESTS the Scientific Committee, with respect to all Special Permit research programmes:

to undertake a comprehensive review of all existing programmes notified to it and report its views on whether such programmes remain justifiable in the light of the recommendations above and, in particular, on whether any lethal scientific research substantially contributes to answering critically important questions which cannot be answered by other means;

to consider all new programmes submitted to it in the light of the above recommendations;

to undertake annual reviews of all programmes and to undertake more intensive reviews of all long-term programmes at five year intervals;

to structure its reviews of programmes to:

identify the relationship between programme objectives and research needs previously identified by Scientific Committee;

evaluate the likelihood of the programme meeting its objectives by providing reliable answers to the questions posed:

identify, where a proposal specifies lethal methods, non-lethal methods and alternative sources of data which might be used in meeting the research objectives;

AGREES, should a continuing or proposed special permit research programme not, in the view of the Commission, satisfy the criteria specified in this Resolution to so notify the Contracting Government concerned;

RECOMMENDS that Contracting Governments, in providing the Secretary with proposed special permits and in submitting reports on research programmes to the Scientific Committee for review, specify how each proposed special permit or programme satisfies the above recommendations;

REQUESTS each Contracting Government to ensure that all scientific information and data available to it with respect to whales and whaling, including results of research conducted pursuant to Articles IV and VIII of the Convention, are submitted promptly to the Scientific Committee for review, analysis and consideration;

RECOMMENDS that Contracting Governments, in the exercise of their sovereign rights, refrain from issuing or revoke, permits to its nationals that the Commission, taking into account the comments of its Scientific Committee, considers do not satisfy the criteria specified above and therefore are not consistent with the Commission's conservation policy;

RECOMMENDS that, if whales are killed under the provisions of Article VIII of the Convention, this should be done in a manner consistent with the provisions of Section III of the Schedule;

AGREES that this Resolution replaces the Resolutions adopted in 1986 and 1987 on Special Permit whaling (*Rep. int. Whal. Commn* 37:25 and 38:27).

APPENDIX 2

RESOLUTIONS RELATING TO SPECIFIC GOVERNMENT'S RESEARCH PROPOSALS

(A) JAPAN

1. RESOLUTION ON JAPANESE PROPOSAL FOR SPECIAL PERMITS

Rep. Int. Whal. Commn, 38:29, 1988

WHEREAS the International Whaling Commission adopted in 1986 a Resolution on Special Permits for Scientific Research (IWC/38/28):

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC 39/4) concerning the research programs to be conducted under special permits;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a special permit authorizing the killing, taking or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its Sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE the Commission

ADOPTS THE VIEW that the proposed take of Southern Hemisphere Minke Whales and Sperm Whales under the proposed research program as described in SC/39/O 4 does not satisfy the criteria set out in the 1986 Resolution in Special Permits for Scientific Research in that the proposed research does not appear, on present information, to be structured so as to contribute information essential for rational management of the stock and that the proposed take will not, at least at this stage, materially facilitate the Comprehensive Assessment; and

REQUESTS the Secretary so to notify the Government of Japan; and

RECOMMENDS the Government of Japan to refrain from issuing special permits to its nationals for the taking of such whales under the research program described in SC/39/O 4 until such time as the Scientific Committee is able to resolve the serious uncertainties identified in its discussion as to the capability of the research methods proposed to contribute sufficiently reliable results needed for the Comprehensive Assessment or for other critically important research needs.

2. RESOLUTION ON THE PROPOSED TAKE BY JAPAN OF WHALES IN THE SOUTHERN HEMISPHERE UNDER SPECIAL PERMIT

Rep. Int. Whal. Commn, 40:36, 1990

WHEREAS the Commission in 1987 adopted a resolution recommending that the Government of Japan refrain from issuing special permits for the taking of whales under the programme until such time as the serious uncertainties identified in the Report of the Scientific Committee (IWC/39/4 and Report of the Special Meeting Cambridge 1987) were resolved;

WHEREAS the Commission has considered the reports of the Scientific Committee (IWC/39/4, Report of Special Meeting Cambridge 1987, IWC/40/4 and IWC/41/4) concerning the research described in SC/39/O 4, including the improvements specified in SC/41/SHMi13, to be conducted under Special Permits;

WHEREAS the Commission recognises the important contribution of the Government of Japan to the development of non-lethal whale population assessment methods especially through sightings surveys conducted under the IWC/IDCR programme of Southern Hemisphere Minke Whale Assessment Cruises during the last decade;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking, or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE the Commission

ACCEPTING that the Scientific Committee was not unanimous in its view of the research programme described in SC/39/O 4, including the improvements described in SC/41/SHMi13 (IWC/41/4);

CONSIDERS that the programme does not fully satisfy the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes, more particularly in that the proposed research is not structured to provide or demonstrate that any existing methodology can solve the problems or satisfy the objectives which have been set, and therefore the proposed research does not contribute information essential for rational management of the stock, neither will the proposed take of minke whales in the Southern Hemisphere in 1989/90 under Special Permit materially facilitate the Comprehensive Assessment, nor has it been established that the proposed research addresses critically important research needs;

INVITES the Government of Japan to reconsider its research programme in light of the criticisms based on the above-mentioned criteria.

3. RESOLUTION ON SPECIAL PERMIT CATCHES BY JAPAN IN THE SOUTHERN HEMISPHERE

Rep. Int. Whal. Commn, 41:47-48, 1991

WHEREAS the Commission has considered the Report of the Scientific Committee IWC/42/4 concerning the results of the Japanese catches of minke whales in the Southern Hemisphere described in SC/42/SHMi28, the proposed catch in 1990/91 described in SC/42/SHMi9, and the responses in SC/42/SHMi9 of the Government of Japan to earlier criticisms of the research programme arising in the Scientific Committee's reports (IWC/39/4; Report of Special Meeting Cambridge 1987, IWC/40/4 and IWC/41/4);

WHEREAS the Commission recognises the important contribution of the Government of Japan to the development of non-lethal whale population assessment methods especially through sightings surveys conducted under the IWC/IDCR programme of Southern Hemisphere Minke Whale Assessment Cruises; and that the Government of Japan, through its various modifications to the original research programme, including those outlined in SC/42/SHMi9, has attempted to address the concerns expressed by the Scientific Committee in its reports;

NOTING that the Scientific Committee was not unanimous, it indicated in its report it could not identify changes in the programme which negate criticisms arising from the previous reports of the Scientific Committee;

WHEREAS the Commission takes cognisance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a special permit authorising the killing, taking or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE, the Commission CONSIDERS; taking into account the comments of the Scientific Committee; that the proposed take of minke whales in the Southern Hemisphere described in SC/42/SHMi9 does not fully satisfy the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes in that the proposed research is not structured so as to contribute information essential to the rational management of these stocks, though the research addresses some of the general research needs;

INVITES the Government of Japan to reconsider the proposed research under special permit in 1990/91 in the light of the above.

4. RESOLUTION ON SPECIAL PERMIT CATCHES BY JAPAN IN THE SOUTHERN HEMISPHERE

Rep. Int. Whal. Commn, 42:46, 1992

WHEREAS the Commission has considered the Report of the Scientific Committee IWC/43/4 concerning the results of the Japanese catches of minke whales in the Southern Hemisphere described in SC/43/Mi11, the proposed catch in 1991/92 described in SC/43/Mi19, and the responses in

programme arising in the Scientific Committee's reports (IWC/39/4; Report of Special Meeting Cambridge 1987, IWC/40/4, IWC/41/4, IWC/42/4);

WHEREAS the Commission has encouraged Contracting Governments to base their research programmes to the maximum extent possible on non-lethal methods (*Rep. int. Whal. Commn* 42: 70) and the Government of Japan has made important contributions to the development of non-lethal whale population assessment methods especially through sightings surveys conducted under the IWC/IDCR programme of Southern Hemisphere Minke Whale Assessment Cruises;

WHEREAS the Government of Japan, through its various modifications to the original research programme, including those outlined in SC/43/Mi19, has attempted to address the concerns expressed by the Scientific Committee in its earlier reports;

WHEREAS the Commission takes cognisance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking, or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE, the Commission

CONSIDERS; taking into account the comments of the Scientific Committee; that the proposed take of minke whales in the Southern Hemisphere described in SC/43/Mi19 does not fully satisfy the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes in that the proposed research is not structured so as to contribute information presently required for the management of these stocks, though it addresses general research needs;

INVITES the Government of Japan to reconsider the proposed research under special permit in 1991/92 in the light of the above.

5. RESOLUTION ON SPECIAL PERMIT CATCHES BY JAPAN IN THE SOUTHERN HEMISPHERE

Rep. Int. Whal. Commn, 43:49, 1993

WHEREAS the Commission has considered the Report of the Scientific Committee IWC/44/4 concerning the results of the Japanese catches on minke whales in the Southern Hemisphere described in SC/44/SHB10 and SC/44/SHB11, the proposed catch in 1992/93 described in SC/44/SHB14, and the responses of the Government of Japan to earlier criticisms of the research programme arising in the Scientific Committee's reports (IWC/39/4; Report of Special Meeting, Cambridge 1987; IWC/40/4, IWC/41/4, IWC/42/4 and IWC/43/4);

WHEREAS the Commission has encouraged Contracting Governments to base their research programmes to the maximum extent possible on non-lethal methods (*Rep. int. Whal. Commn* 40: 70) and the Government of Japan has made important contributions to the development of non-lethal whale population assessment methods especially through sightings surveys conducted under the IWC/IDCR programme of Southern Hemisphere Minke Whale Assessment Cruises;

WHEREAS the Government of Japan, through its various modifications to the original research programme, including those outlined in SC/44/SHB14 has attempted to address the concerns expressed by the Scientific Committee in its earlier reports;

WHEREAS the Commission takes cognisance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking, or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

NOW THEREFORE, the Commission:

CONSIDERS, taking into account the comments of the Scientific Committee, that the proposed take of minke whales in the Southern Hemisphere described in SC/44/SHB14 does not fully satisfy the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes in that the proposed research is not structured so as to contribute information presently required for the management of these stocks, though it addresses research needs;

INVITES the Government of Japan to continue to reconsider and improve the proposed research under special permit in 1992/93 in the light of the above.

6. RESOLUTION ON SPECIAL PERMIT CATCHES BY JAPAN IN THE SOUTHERN HEMISPHERE

WHEREAS the Commission has considered the Report of the Scientific Committee IWC/45/4 concerning the results of the Japanese catches on minke whales in the Southern Hemisphere described in SC/45/SHBa11, 12, 13, 14 and 15, the proposed catch in 1992/93 described in SC/44/SHB14, and the responses of the Government of Japan to earlier criticisms of the research programme arising in the Scientific Committee's reports (IWC/39/4; Report of Special Meeting, Cambridge 1987; IWC/40/4, IWC/41/4, IWC/42/4, IWC/43/4 and IWC/44/4);

WHEREAS the Commission has encouraged Contracting Governments to base their research programmes to the maximum extent possible on non-lethal methods (*Rep. int. Whal. Commn* 40: 70) and the Government of Japan has made important contributions to the development of non-lethal whale population assessment methods especially through sightings surveys conducted under the IWC/IDCR programme of Southern Hemisphere Minke Whale Assessment Cruises;

WHEREAS the Government of Japan, through its various modifications to the original research programme, including those outlined in SC/45/SHBa10 has attempted to address the concerns expressed by the Scientific Committee in its earlier reports;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking, or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE, the Commission

CONSIDERS; taking into account the comments of the Scientific Committee; that the proposed take of minke whales in the Southern Hemisphere described in SC/44/SHB14 does not fully satisfy the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes in that the proposed research is not structured so as to contribute information presently required for the management of whaling in these areas on this species, though it addresses certain research needs;

INVITES the Government of Japan to reconsider the proposed research under special permit in 1993/94 in the light of the above.

7. RESOLUTION ON SPECIAL PERMIT CATCHES BY JAPAN IN THE NORTH PACIFIC

Rep. Int. Whal. Commn, 45:47, 1995

WHEREAS the Commission has encouraged Contracting Governments to base their research programmes to the maximum extent possible on non-lethal methods (*Rep. int. Whal. Commn* 40:70);

WHEREAS the Commission recognises the past efforts by Japan in research on whales in the North Pacific, which do not involve the taking of whales;

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC/46/4) concerning the proposed catch of minke whales described in SC/46/NP1;

WHEREAS the Commission acknowledges that the Scientific Committee has agreed that the objectives of the research proposal directly address questions of scientific interest; and at the same time the Commission notes that these questions could also be addressed by non-lethal methods using biopsy sampling and DNA-analyses;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE, the Commission:

CONSIDERS taking into account the comments in the Report of the Scientific Committee (IWC/46/4), that the proposed kill of minke whales in the North Pacific described in SC/46/NP1 does not fully satisfy the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes;

RECOMMENDS the Government of Japan to restructure its research programme concerning minke whales in the North Pacific in such a manner that the research interests are adequately addressed with non-lethal methods;

INVITES the Government of Japan to reconsider the proposed research take of minke whales in the North Pacific under special permit in 1994 in the light of the above.

8. RESOLUTION ON SPECIAL PERMIT CATCHES BY JAPAN IN THE SOUTHERN

Rep. Int. Whal. Commn, 45:47, 1995

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC/46/4) concerning the results of the Japanese catches of minke whales in the Southern Hemisphere described in SC/46/SH11, 12, 13, 14, 15, 20 and O24, the proposed catch in 1994/95 described in SC/42/SH16, and the responses of the Government of Japan to earlier criticisms of the research programme arising in the Scientific Committee's reports (IWC/39/4; Report of Special Meeting Cambridge 1987, IWC/40/4 and IWC/41/4, IWC/42/4, IWC/43/4 and IWC/44/4);

WHEREAS the Commission has encouraged Contracting Governments to base their research programmes to the maximum extent possible on non-lethal methods (*Rep. int. Whal. Commn* 40:70) and the Government of Japan has made important contributions to the development of non-lethal whale population assessments methods, especially under the IWC/IDCR programme of Southern Hemisphere Minke Whale Assessment Cruises;

WHEREAS the Government of Japan, through its various modifications to the original research programme, including those outlined in SC/46/SH16 has attempted to address the concerns expressed by the Scientific Committee in its earlier reports;

WHEREAS Japan has not provided any information which adequately addresses the concerns expressed in the Scientific Committee on the ability to estimate the age specific mortality of Southern Hemisphere minke whales;

WHEREAS the Commission takes cognisance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE, the Commission:

CONSIDERS taking into account the comments of the Scientific Committee, that the proposed kill of minke whales in the Southern Hemisphere described in SC/46/SH16 does not fully satisfy the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes in that the proposed research is not structured so as to contribute information presently required for the management of whaling in these areas for this species, though it addresses certain research interests;

RECALLS that each of its previous resolutions on the catches under Special Permit under this research programme, which have expressed similar conclusions, has not produced the required restructuring of the scientific research programme;

INVITES the Government of Japan to reconsider the proposed research take of minke whales under special permit in 1994/95 in the light of the above;

RECOMMENDS the Government of Japan to restructure its research programme concerning minke whales in the Southern Hemisphere in such a manner that the research interests can be adequately addressed with non-lethal methods.

9. RESOLUTION ON SPECIAL PERMIT CATCHES BY JAPAN

Rep. Int. Whal Commn., 47, 1996

WHEREAS Article VIII of the Convention provides for the issuing by Contracting Governments of a special permit for scientific research;

WHEREAS paragraph 7(b) of the Schedule establishes a Sanctuary in the Southern Ocean;

RECALLING IWC Resolution 1995-8 in which the Commission considered that research in the Southern Ocean Sanctuary should be undertaken using non-lethal means and requested Contracting Parties to refrain from issuing special permits for research involving the killing of cetaceans in such sanctuaries;

FURTHER RECALLING IWC Resolution 1995-9 on Whaling under Special Permit which establishes criteria against which the Scientific Committee should assess and provide advice on special permit research programmes and recommends that Contracting Governments refrain from issuing or revoke any permits that do not satisfy the criteria so specified;

NOTING nevertheless that the Government of Japan continues to issue special permits involving the killing of cetaceans and that the number of whales killed under special permit has increased substantially to 440 Southern Hemisphere minke whales and 100 North Pacific minke whales in the 1995-96 season;

NOTING FURTHER that the Government of Japan proposes as part of its 1996-97 research programme to issue special permits to take up to 440 Southern Hemisphere minke whales and 100 North Pacific minke whales;

NOTING ALSO that the JARPA programme is to be reviewed by the Scientific Committee;

NOW THEREFORE the Commission:

CONSIDERS that neither proposal for special permit has been found to meet the criteria for such permits established under IWC Resolution 1995-9;

REAFFIRMS that contracting Governments should refrain from issuing special permits for research involving the killing of cetaceans in sanctuaries and expresses its deep concern at Japan's continuing proposal to conduct lethal research within the Southern Ocean Sanctuary;

REQUESTS that the Government of Japan, in the exercise of its sovereign rights, refrain from issuing a special permit for the take of Southern Hemisphere minke whales, particularly in the Southern Ocean Sanctuary and refrain also from issuing a special permit to take minke whales in the North Pacific;

FURTHER REQUESTS that the Government of Japan reconsider and restructures its research programmes so that research objectives are achieved by the use of non-lethal means.

(B) NORWAY

1. RESOLUTION ON NORWEGIAN PROPOSAL FOR SPECIAL PERMITS

Rep. Int. Whal. Commn, 39:30, 1989

WHEREAS the International Whaling Commission adopted in 1986 a Resolution on Special Permits for Scientific Research (IWC/38/28) and in 1987 a Resolution on Scientific Research Programmes (*Rep. int. Whal. Commn* 38: 27);

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC 40/4) concerning the research programmes to be conducted under special permits, and recognises that the continuation of sighting surveys of the Norwegian Research Programme would continue to make an important contribution to knowledge of the distribution and abundance of whales in the Northeast Atlantic, and further encourages the implementation of the projects dealing with natural marking studies and the development of passive acoustic methods;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a special permit authorising the killing, taking or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE, the Commission
CONSIDERS; taking into account the comments of the Scientific Committee; that the proposed kill of minke whales in the North Atlantic under the research programme described in SC/40/Mi7 does not satisfy each of the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes in that the proposed research is not structured so as to contribute information essential for rational management of the stock and that the proposed kill will not materially facilitate the Comprehensive Assessment, and further that it has not been established that the proposed research addresses critically important research needs;
REQUESTS the Secretary to inform the Government of Norway accordingly.

2. RESOLUTION ON NORWEGIAN PROPOSAL FOR SPECIAL PERMITS

Rep. Int. Whal. Commn, 40:36, 1990

WHEREAS the International Whaling Commission adopted in 1988 a Resolution on Norwegian Proposal for Special Permits (*Rep. int. Whal. Commn* 39:30);

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC/41/4) concerning the research programmes to be conducted under Special Permits;

WHEREAS the Commission appreciates the effort by Norway in research on whales and investigation of their habitat which do not involve the taking of whales; and also the contribution to the Comprehensive Assessment through sightings surveys which have provided and will continue to provide important information on the distribution and abundance of minke and other whales in the North Atlantic;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking, or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE the Commission

RECOGNISING that the scientific view is not unanimous; but

TAKING INTO ACCOUNT the comments of the Scientific Committee (IWC/41/4);

CONSIDERS that the proposed take of minke whales in the North Atlantic under the research programme described in SC/41/NHMi12 does not satisfy all the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes, particularly in that the proposed research is not adequately structured so as to contribute to or materially facilitate the Comprehensive Assessment; neither has it been established that the proposed research addresses critically important research needs; and accordingly INVITES the Government of Norway to reconsider the proposed take of minke whales in 1989 under Special Permit.

3. RESOLUTION ON NORWEGIAN PROPOSAL FOR SPECIAL PERMITS

Rep. Int. Whal. Commn, 41:47, 1991

WHEREAS the International Whaling Commission adopted in 1988 and 1989 Resolutions on the Norwegian Proposals for Special Permits (*Rep. int. Whal. Commn* 39: 30 and 40: 36);

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC/42/4) concerning the research programmes to be conducted under Special Permits; and notes that the Scientific Committee this year confined its comments to new points raised, while referring the Commission to its detailed discussion on the Norwegian Special Permit proposal at its 41st Annual Meeting;

WHEREAS the Commission appreciates the effort by Norway in research on whales and investigation of their habitat which do not involve the taking of whales; and particularly appreciates the essential contribution to the Comprehensive Assessment provided by the sightings surveys conducted by Norway in 1989;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking, or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

WHEREAS the proposed take in 1990 described in SC/42/NHMi20 is to be limited to five whales, and, according to the Report of the Scientific Committee, is planned mainly to complete studies conducted in 1988-89;

Now, THEREFORE the Commission CONSIDERS; taking into account the comments of the Scientific Committee (IWC/41/4 and IWC/42/4); that the proposed take of minke whales in the North Atlantic under the research programme described in SC/41/NHMi12 and SC/42/NHMi20 does not satisfy all the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes, particularly in that the proposed research is not adequately structured so as to contribute to or materially facilitate the completion of the Comprehensive Assessment; neither has it been established that the proposed research addresses critically important research needs.

INVITES the Government of Norway to reconsider the proposed take of minke whales in 1990 under special permit, in the light of the above conclusions.

4. RESOLUTION ON NORWEGIAN PROPOSAL FOR SPECIAL PERMITS

Rep. Int. Whal. Commn, 43:49, 1993

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking, or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

WHEREAS the Commission notes the past efforts by Norway in research on whales and investigation of their habitat which do not involve the taking of whales;

NOW THEREFORE, the Commission:

CONSIDERS, taking into account the comments of the Scientific Committee (IWC/44/4), that the proposed take of 382 minke whales in the North Atlantic in 1992-94 under the research programme described in SC/44/NAB18 does not satisfy all the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes, particularly in that the proposed research is not adequately structured so as to contribute to or materially facilitate the completion of the Comprehensive Assessment, neither has it been established that the proposed research addresses critically important research needs;

INVITES the Government of Norway to reconsider the proposed take of minke whales in 1992, 1993 and 1994 under special permit, in the light of the above conclusions.

5. RESOLUTION ON NORWEGIAN PROPOSAL FOR SPECIAL PERMITS

Rep. Int. Whal. Commn, 44:33, 1994

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the

Special Permit authorising the killing, taking, or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

WHEREAS the Commission notes the past efforts by Norway in research on whales and investigation of their habitat which do not involve the taking of whales;

Now, THEREFORE, the Commission

CONSIDERS; taking into account the comments of the Scientific Committee (IWC/45/4); that the proposed take of 382 minke whales in the North Atlantic in 1992-94 under the research programme described in SC/44/NHB18 and SC/45/NA5 does not satisfy all the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes, particularly in that the proposed research is not adequately structured so as to contribute to or materially facilitate the completion of the Comprehensive Assessment; neither has it been established that the proposed research addresses critically important research needs.

INVITES the Government of Norway to reconsider the proposed take of minke whales in 1993 and 1994 under special permit, in the light of the above conclusions.

6. RESOLUTION ON SPECIAL PERMIT CATCHES BY NORWAY

Rep. Int. Whal. Commn, 45:48, 1995

WHEREAS the Commission adopted a Resolution on a Norwegian proposal for special permits in 1993, inviting the Government of Norway to reconsider its proposed take of minke whales in 1993 and 1994 under special permit (*Rep. int. Whal. Commn* 44, Appendix 8);

WHEREAS the Commission has considered the Report of the Scientific Committee IWC/46/4 concerning the results of the Norwegian catches of minke whales in the North Atlantic described in SC/46/NA2 and 3, and the proposed catch in 1994 described in SC/46/NA3;

WHEREAS the Commission recognises the past efforts by Norway in research on whales and investigation of their habitat which do not involve the taking of whales;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a Special Permit authorising the killing, taking or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE, the Commission:

CONSIDERS taking into account the comments of the Scientific Committee (IWC/45/4 and IWC/46/4); that the proposed kill of minke whales in the North Atlantic described in SC/46/NA3 and SC/46/NA5 does not fully satisfy the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes, in that the proposed research is not structured so as to contribute information presently required for the management of whaling in these areas for this species;

REITERATES its invitation to the Government of Norway to reconsider the proposed research take of minke whales under special permit in 1994 in the light of the above;

WELCOMES the decision of the Government of Norway not to issue special permits in 1995 and expresses its strong hope that it will be possible for Norway to continue its research programme through non-lethal methods.

(C) ICELAND

1. RESOLUTION ON THE ICELANDIC PROPOSAL FOR SCIENTIFIC CATCHES

Rep. Int. Whal. Commn, 38:28, 1988

WHEREAS the International Whaling Commission adopted in 1986 a Resolution on Special Permits for Scientific Research (IWC/38/28):

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC 39/4) concerning the research programs to be conducted under special permits; and it is recognised that the sighting survey element of the Icelandic research program is acceptable and commendable.

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals

research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

Now, THEREFORE, the Commission

ADOPTS the view that the proposed take of fin, sei, and minke whales under special permit as described in SC/37/O 20 and as modified in SC/38/ProgRep Iceland does not fully satisfy the criteria set forth in the 1986 Resolution on Special Permits for Scientific Research.

RECOMMENDS that the Government of Iceland revoke and refrain from issuing special permits to its nationals for the conduct of the research program described in SC/37/O 20 and as modified SC/38/ProgRep Iceland until the uncertainties identified in the Scientific Committee Report (IWC 39/4) have been resolved to the satisfaction of the Scientific Committee.

REQUESTS the Secretary to notify the Government of Iceland accordingly.

2. RESOLUTION ON THE ICELANDIC PROPOSAL FOR SCIENTIFIC CATCHES

Rep. Int. Whal. Commn, 39:30-31, 1989

WHEREAS the International Whaling Commission adopted in 1986 a Resolution on Special Permits for Scientific Research (IWC/38/28) and in 1987 a Resolution on Scientific Research Programmes (*Rep. int. Whal. Commn* 38: 27);

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC/40/4) concerning the research programmes to be conducted under special permits, and it is recognised that the sighting survey of the Icelandic Research Programme has made an important contribution to knowledge of the distribution and abundance of whales in the North Atlantic;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a special permit authorising the killing, taking or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

WHEREAS at the 1987 meeting the Commission adopted the view that the proposed take of fin, sei and minke whales under special permit did not fully satisfy the criteria set forth in the 1986 Resolution on Special Permits for Scientific Research and recommended that the Government of Iceland revoke and refrain from issuing special permits to its nationals until the uncertainties identified in the Scientific Committee Report (IWC/39/4) had been resolved to the satisfaction of the Scientific Committee;

WHEREAS the Government of Iceland has announced its intention not to issue special permits to take minke whales as described in SC/37/O 20 and as modified in SC/38/ProgRep Iceland;

Now, THEREFORE, the Commission

CONSIDERS; taking into account the comments of the Scientific Committee in 1987, and 1988; that the proposed take of fin and sei whales under special permit as described in SC/37/O 20 and as modified in SC/38/ProgRep Iceland does not satisfy each of the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes;

REQUESTS the Secretary to inform the Government of Iceland accordingly;

INVITES the Government of Iceland to report in writing to the Commission in time for consideration by the Commission at its 41st Annual Meeting.

3. RESOLUTION ON THE ICELANDIC PROPOSAL FOR SCIENTIFIC CATCHES

Rep. Int. Whal. Commn, 40:35, 1990

WHEREAS at the 1987 Commission meeting, the Commission adopted the view that the proposed take of fin, sei and minke whales under Special Permit did not fully satisfy the criteria set forth in the 1986 Resolution on Special Permits for Scientific Research and recommended that the Government of Iceland revoke and refrain from issuing Special Permits to its nationals until the uncertainties identified by the Scientific Committee report (IWC/39/4) had been resolved to the satisfaction of the Scientific Committee;

WHEREAS at the 1988 meeting the Commission considered that the proposed take of fin and sei whales under special permit did not satisfy each of the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and in the 1987 Resolution on Scientific Research Programmes, and invited the Government of Iceland to report in writing to the Commission in time for consideration by the Commission at its 41st Annual Meeting;

WHEREAS the Government of Iceland in 1988 reduced its take of fin whales from 80 to 68 and its take of sei whales from 20 to 10, and modified its programme to improve the component involving the sampling of krill, and to implement the five specific recommendations of the Scientific Committee related to non-lethal aspects as contained in IWC/40/4;

WHEREAS the Government of Iceland has submitted its report (IWC/41/24) as invited by the Commission, and this has been considered;

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC/41/4) concerning the research programmes to be conducted under Special Permits;

WHEREAS, as noted by the Scientific Committee, the Icelandic sightings programme, which is independent of the programme which requires Special Permits, has made an important contribution to the Comprehensive Assessment in terms of knowledge of the distribution and abundance of fin, sei and minke whales in the North Atlantic, and will continue to do so through the 1989 North Atlantic sightings survey;

WHEREAS the Commission recognises that Iceland has undertaken its research programme in a detailed manner;

WHEREAS the Government of Iceland has conveyed its intention not to issue special permits to take minke whales as described in SC/37/O 23 and as modified in SC/38/ProgRep Iceland, and has determined that, in light of the progress of the research conducted to date, the further taking of sei whales in 1989 is not necessary;

WHEREAS the Government of Iceland has also announced in IWC/41/OS Iceland that its research programme has progressed to a stage where Iceland will not take whales for scientific purposes in 1990 nor does it have plans to do so in the years following, and that the Government of Iceland intends to continue only non-lethal aspects of its programme, involving activities which the Scientific Committee and the Commission had encouraged in the past;

Now THEREFORE the Commission:

INVITES the Government of Iceland to reconsider the proposed take of fin whales in 1989 under Special Permit, in the light of the criteria specified in the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes and the comments of the Scientific Committee.

(D) KOREA

1. RESOLUTION ON REPUBLIC OF KOREA'S PROPOSAL FOR SPECIAL PERMITS

Rep. Int. Whal. Commn, 38:28, 1988

WHEREAS the International Whaling Commission adopted in 1986 a Resolution on Special Permits for Scientific Research (IWC/38/28);

WHEREAS the Commission has considered the Report of the Scientific Committee (IWC 39/4) concerning the research programmes to be conducted under special permits;

WHEREAS the Commission takes cognizance of Article VIII of the International Convention for the Regulation of Whaling., under which the granting by any Contracting Government to its nationals of a special permit authorising the killing, taking or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and the freedom of the high seas:

Now, THEREFORE, the Commission

ADOPTS the view that the proposed take of Sea of Japan-Yellow Sea-East China Sea stock of minke whales under scientific permit by the Government of the Republic of Korea, as described in SC/39/O 5, does not satisfy the criteria set forth in the 1986 Resolution on Special Permits for Scientific Research in that it has not contributed information which will answer any significant management questions and the proposed take will not materially facilitate the conduct of the Comprehensive Assessment;

REQUESTS the Secretary to so notify the Government of the Republic of Korea; and

RECOMMENDS to the Government of the Republic of Korea that it refrain from issuing, or revoke, special permits to its nationals for the conduct of the research programme described in SC/39/O 5.

(E) USSR

**RESOLUTION ON USSR PROPOSAL FOR SPECIAL PERMIT CATCHES IN THE
NORTH PACIFIC**

Rep. Int. Whal. Commn, 42:47, 1992

WHEREAS the International Whaling Commission adopted in 1986 a Resolution on Special Permits for Scientific Research (*Rep. int. Whal. Commn 37: 25*) and in 1987 a Resolution on Scientific Research Programmes (*Rep. int. Whal. Commn 27*);

WHEREAS the Commission takes cognisance of Article VIII of the International Convention for the Regulation of Whaling, under which the granting by any Contracting Government to its nationals of a special permit authorising the killing, taking or treatment of whales for purposes of scientific research remains the responsibility of each Contracting Government, exercising its sovereign rights in respect of maritime areas under its jurisdiction and freedom of the high seas;

WHEREAS an assessment of the Western North Pacific stock of minke whales under the Comprehensive Assessment has been undertaken at the 1991 meeting of the Scientific Committee which showed that whales from a Protected Stock, the Sea of Japan, Yellow Sea, East China Sea minke whale stock, might be taken in the Okhotsk sea;

WHEREAS Article VIII of the Convention requires *inter alia* a Contracting Government to report at once to the Commission authorisations of special permits it has granted;

Now, THEREFORE, the Commission

CONSIDERS; taking into account the comments of the Scientific Committee; that the proposed kill of minke whales in the North Pacific described in SC/43/O 11 does not satisfy the criteria specified in both the 1986 Resolution on Special Permits for Scientific Research and the 1987 Resolution on Scientific Research Programmes in that the proposed research is not structured so as to contribute information essential to the rational management of these stocks and that it has not been established that the research addresses important research needs;

REQUESTS the Government of the Union of Soviet Socialist Republics to refrain from proceeding with the proposed kill of minke whales until the proposed research programme is revised in accordance with the criteria specified in the 1986 and 1987 resolutions and the Scientific Committee and Commission have concluded a review of the programme as revised.

APPENDIX 3

ANNEX O REVIEW OF SCIENTIFIC PERMITS

Rep. Int. Whal. Commn, 39:154, 1989

The Proposal: 'A statement as to whether the permit proposal adequately specifies the four sets of information required under paragraph 30 of the Schedule.' (*Rep. int. Whal. Commn* 36: 133).

1. 'Objectives of the research;' (Sched. Para. 30)
2. 'Number, sex, size and stock of the animals to be taken;' (Sched. Para. 30)
3. 'Opportunities for participation in the research by scientists of other nations; and' (Sched. Para. 30)
4. 'Possible effect on conservation of the stock.' (Sched. Para. 30)

Objectives: The objectives of the proposal as specified by the proposer should first be given; the Committee will then comment on the following:

1. 'Comments on the objectives of the research to be carried out under the proposed scientific permit, including in particular how they might relate to research needs identified by the Scientific Committee.' (*Rep. int. Whal. Commn* 36: 133)
2. 'The proposed research is intended, and structured accordingly to contribute information essential for rational management of the stock;' (*Rep. int. Whal. Commn* 37: 25)
3. 'The research addresses a question or questions that should be answered in order to conduct the comprehensive assessment or to meet other critically important research needs;' (*Rep. int. Whal. Commn* 38: 27-28)

Methodology: A brief summary of the methodology as specified by the proposer should first be given, followed by the Committee's comments on:

1. 'Comments on the methodology of the proposed research and an evaluation of the likelihood that the methodology will lead to achievement of the scientific objectives. These comments may also include evaluation of the methodology in terms of current scientific knowledge.' (*Rep. int. Whal. Commn* 36: 133)
2. 'The objectives of the research are not practically and scientifically feasible through non-lethal research techniques;' (*Rep. int. Whal. Commn* 37: 25)
3. 'The research addresses a question or questions that cannot be answered by analysis of existing data and/or use of non-lethal research techniques; and' (*Rep. int. Whal. Commn* 38: 27-28)
4. 'The number, age and sex of whales to be taken are necessary to complete the research and will facilitate the conduct of the comprehensive assessment;' (*Rep. int. Whal. Commn* 37: 25)
5. 'Whales will be killed in a manner consistent with the provisions of Section III of the Schedule, due regard being had to whether there are compelling scientific reasons to the contrary.' (*Rep. int. Whal. Commn* 37: 25)

This was later clarified by the Commission to refer to the use of non-explosive harpoons

(*Rep. int. Whal. Commn* 38: 12)

6. '...that maximum scientific information be obtained from any whales taken under special permits for scientific research.' (*Rep. int. Whal. Commn* 37: 25)
7. 'The research is likely to yield results leading to reliable answers to the question or questions being addressed.' (*Rep. int. Whal. Commn* 38: 27-28)

Effect of catches on the 'stock': A summary of the proposer's view should first be given followed by the Committee's views on:

1. 'A review of the most recent information on the stock or stocks concerned, including information on any exploitation, stock analysis and recommendations by the Scientific Committee to date (including, where appropriate, alternative analyses and conclusions and points of controversy).'*(Rep. int. Whal. Comr*

2. 'An evaluation of the specification in the permit proposal of 'possible effect on conservation of the stock'. As appropriate, the Scientific Committee may carry out its own analysis of the possible effects.
(*Rep. int. Whal. Commn* 36: 133)
3. 'The research can be conducted without adversely affecting the overall status and trends of the stock in question or the success of the comprehensive assessment of such stocks;'
(*Rep. int. Whal. Commn* 38: 27-28)

Research co-operation: A brief summary of the arrangements made by the proposer should first be given followed by the Committee's views on:

1. 'Comments on the adequacy and implications of specified arrangements for participation by scientist of other nations.'
(*Rep. int. Whal. Commn* 36: 133)