Editorial

This issue of the Journal follows the 2002 meeting of the International Whaling Commission held in Shimonoseki, Japan. Details of the Commission meeting will be published in the next *Annual Report of the International Whaling Commission*. The full report of the Scientific Committee will be published in spring 2003 as *J. Cetacean Res. Manage.* 5 (Suppl.). However, it seems timely to provide a short summary of the work of the Scientific Committee that updates the summary provided in Donovan (2002).

REVISED MANAGEMENT PROCEDURE

After the adoption of the moratorium on commercial whaling in 1982, the Committee spent over eight years developing the Revised Management Procedure (RMP) for baleen whales (IWC, 1999b). In brief, the RMP is a generic management procedure designed to estimate safe catch limits for commercial whaling of baleen whales. This was adopted some time ago by the Commission (IWC, 1993). However, the Commission has stated that it will not set catch limits for commercial whaling for any stocks until it has agreed and adopted a complete Revised Management Scheme (RMS). The RMS will also include a number of non-scientific matters, including inspection and enforcement. This is the subject of a considerable amount of discussion within the Commission, which is holding a special meeting of Commissioners to address this issue in October 2002.

Implementation Simulation Trials
Implementation Simulation Trials are trials that are carried out before using the RMP to calculate a catch limit and involve investigating the full range of plausible hypotheses related to a specific species and geographic area.

The process of developing *Implementation Simulation Trials* is not the same as identifying the 'best' assessment for the species/region, but involves considering a set of alternative models to examine a broad range of uncertainties with a view to excluding variants of the RMP that show performance that is not sufficiently robust across the trials. Account needs to be taken of the plausibility of the various trial scenarios when evaluating RMP variants.

The Committee discussed the general question of how best to ensure that the process of carrying out *Implementations* (or *Implementation Reviews*) is efficient and prompt, whilst taking into account the available information. To achieve this it agreed that they should be conducted at discrete intervals, using the data available at one point in time. The process from *'pre-Implementation Assessment'* to initial *Implementation* and *Implementation Reviews* has been formalised and clarified.

North Pacific common minke whales
The Committee has been working on *Implementation Simulation Trials* for this area since 1994; a special workshop was held prior to the Shimonoseki meeting. It is proving to be difficult for a number of reasons, including: (1) harvesting is projected to take place on migration as well as on feeding grounds; (2) there is a seasonally-dependent overlap of management stocks; (3) continual updating of information on relatively complex population structure; (4) issues related to the plausibility of trials, particularly with respect to population structure; (5) complexity and time required to code and run trials; (6) lack of agreement on when to stop 'improving'. An ambitious workplan has been established with the aim of reaching agreement on the appropriate variant of the RMP to apply to common minke whales in the North Pacific at next year's meeting.

North Pacific Bryde's whales
The Committee is in the process of developing initial *Implementation Simulation Trials* for western North Pacific Bryde's whales. In particular, it began a review of the reliability of catch statistics. Intersessional work will continue on this issue so that any uncertainty about such statistics can be incorporated into future trial structure. A full discussion of population structure and abundance-related issues will take place at next year's meeting and the Committee will determine whether the *pre-Implementation* stage of the process has been completed.

North Atlantic common minke whales
The Committee had expected to be in a position to undertake an *Implementation Review* of North Atlantic minke whales at the 2002 meeting. However, due to problems in making all of the data available suitably in advance of the meeting, it was agreed to postpone the review until next year. The review will primarily consider new information on stock structure and abundance.

Bycatches of large whales
The RMP estimates a limit for the number of non-natural removals, not simply a catch limit for commercial whaling. It is therefore important to estimate the numbers of whales removed from the population by indirect means including bycatches in fishing gear and ship strikes, for example.

The Scientific Committee began to consider this issue in some detail last year. It agreed that priority should be given to those areas where the RMP is likely to be implemented – such as the northwestern Pacific and the northeastern Atlantic. Four steps are required: (1) identification of the relevant fisheries; (2) description and categorisation of those fisheries to allow a sampling scheme to be devised; (3) identification of a suitable sampling strategy or strategies; and (4) design and implementation of the sampling scheme to enable estimation of the total bycatch.

The Committee has reviewed general methods for estimating bycatches. These fall under two headings: (1) those based on fisheries data and observer programmes; and (2) those based on genetic data. The former have been used successfully for several small cetacean populations. The Committee agreed that independent observer schemes are generally the most reliable means of estimating bycatch rates in a statistically rigorous manner, but that they may not always be practical and will require careful design.

The latter potentially represents a new way of estimating bycatches. The Committee has agreed that although genetic methods based on market samples may not be the primary approach to estimating bycatch, they could provide useful supplementary data that could not be obtained in another

way. The use of market samples to provide absolute estimates should not be ruled out. However, it will require further developments in sampling design with input from experts with detailed knowledge of market sampling issues. The possibility of holding a workshop on that subject is being considered.

This year, the Committee looked at the bycatches of large whales reported in National Progress Reports (progress reports are available on the IWC website: *http://www.iwcoffice.org/scweb/scprogreps*). Common minke whales were the most frequently reported species (>230) with most records for Japan and eastern Korea. Compulsory reporting schemes exist in both these countries (it was voluntary in Japan prior to 1 July 2001). Possible reasons for the clumping of catches in these two areas was discussed but no clear explanation emerged, although lack of reporting by some countries is probably part of the explanation.

Work to further explore improved bycatch estimation methods for the two approaches noted above is continuing.

A major topic at this year's meeting concerned consideration of ways in which bycatches of large whales (and mortality of entangled whales) can be minimised. A report on this topic will be published in the 2003 *Supplement*.

DEVELOPMENT OF AN ABORIGINAL WHALING MANAGEMENT PROCEDURE

With the completion of the RMP, the Commission asked the Scientific Committee to begin the process of developing a new procedure for the management of aboriginal subsistence whaling. Such a procedure must take into account the different management objectives for such whaling when compared to commercial whaling. This is an iterative and ongoing effort. The Commission will establish an Aboriginal Whaling Scheme that comprises the scientific and logistical (e.g. inspection/observation) aspects of the management of all aboriginal fisheries. Within this, the scientific component might comprise some general aspects common to all fisheries (e.g. guidelines and requirements for surveys and for data c.f. the RMP) and an overall AWMP within which there will be common components and case-specific components.

At the 2002 meeting, the Committee completed its work with respect to the Bering-Chukchi-Beaufort Seas stock of bowhead whales. It agreed a *Strike Limit Algorithm (SLA)* for bowhead whales and the scientific aspects of a Scheme; this was adopted by the Commission. It noted that should the Commission decide, it would be possible to apply the *Bowhead SLA* at the current meeting. Work will continue intersessionally on gray whales and the Committee hopes to be able to present a formal recommendation to the Commission for a *Strike Limit Algorithm* for gray whales at the next meeting. The situation for the Greenlandic fisheries for fin and minke whales is less promising. A considerable amount of research, especially concerning stock identity, is required and to this end, the Committee has developed a research programme in cooperation with Greenlandic scientists.

ASSESSMENT OF STOCKS SUBJECT TO ABORIGINAL SUBSISTENCE WHALING

Aboriginal subsistence whaling is permitted for Denmark (Greenland, fin and minke whales), the Russian Federation (Siberia, gray and bowhead whales), St Vincent and The Grenadines (Bequia, humpback whales) and the USA (Alaska, bowhead and gray whales). It is the responsibility of the Committee to provide scientific advice on safe catch limits for such stocks and until the AWMP is completed then the Committee provides advice on a more *ad hoc* basis, carrying out major reviews according to the needs of the Commission in terms of establishing catch limits and the availability of data. It also carries out brief annual reviews of each stock.

The present catch limits had been set up to the 2002 season and so at the 2002 meeting, the Committee had to provide management advice for all of the stocks considered. The Commission sets catch limits based on the scientific advice and a 'need' statement from the countries involved.

Eastern gray whales
The primary assessment carried out was for the eastern gray whale population (Issue 1 of the present volume of the *Journal* was devoted to gray whale papers). New information on abundance, distribution, catches and ecology was presented. The population is believed to be close to carrying capacity. The Committee agreed that an annual take of up to 463 whales was acceptable; based on the submitted need statement, the Commission set a total for the 2003-6 seasons of 620 with a maximum of 140 in any one year.

Bering-Chukchi-Beaufort Seas stock of bowhead whales
In addition to the work on the *Bowhead SLA*, the Committee also examined the status of the Bering-Chukchi-Beaufort Seas stock of bowhead whales. New information included a preliminary abundance estimate for 2001 of 9,860 (95%CI 7,700 – 12,600) giving a rate of increase between 1978 and 2002 of 3.3% (95%CI 2%, 4.7%). The Committee noted that irrespective of its work on the bowhead *SLA*, the information here suggests that it is very likely that an annual catch of 102 whales will allow the stock to increase. Despite this, a proposal to continue to include provision for such catches (up to 280 bowhead whales to be landed in the period 2003 −2006, with no more than 68 whales struck in any year) failed to reach the necessary three-quarters majority in the Commission. The reason given by some of the 11 countries that voted no was that they believed Japan should also be allocated subsistence whales for four coastal whaling villages. They stressed that they also believed that the peoples of Alaska and Chukotka should also be granted their catch limits.

Minke and fin whales off West Greenland
The Committee received little new information on stocks of minke and fin whales off West Greenland this year. It has never been able to provide satisfactory management advice for these stocks and once again expressed great concern at this state of affairs. It stressed that obtaining adequate information on stock identity and abundance should be seen as of extremely high priority and made a number of research recommendations. Without this information, the Committee will not be able to provide safe management advice in accord with the Commission's management objectives, or develop a reliable *SLA* for many years, with potentially serious consequences for the status of the stocks involved. At the Commission, the same catch limits as previously in force were agreed for the 2003-6 period i.e. West Greenland minke whales – an annual limit of up to 175 strikes; East Greenland minke whales – an annual catch of up to 12 animals; West Greenland fin whales – an annual catch of up to 19 whales.

Humpback whales off St Vincent and the Grenadines
The Committee has been working on an in-depth assessment for North Atlantic humpback whales (see below). Based on the available data, the Committee believes it is most plausible that eastern Caribbean humpbacks are part of the West Indies breeding population (abundance in 1992/93 – 11,570, 95%CI 10,100 – 13,200). However, it recommended further collection of relevant data to confirm this. The Committee agreed that an annual catch of up to four whales was acceptable. After considerable debate in the Commission, a catch of up to 20 whales for the period 2003-7 was agreed (the Scientific Committee must review this in 2005).

STOCK IDENTITY

Of general concern to the assessment of any cetaceans is the question of stock identity and examination of this concept in the context of management plays an important role in much of the Committee's work, whether in the context of the RMP, AWMP or general conservation and management. In recognition of this, the Committee has established a Working Group to review theoretical and practical aspects of the stock concept in a management context. At the 2001 meeting, the Committee considered *inter alia:* terminology; stock structure in humpback whales; a range of analytical and statistical issues; the use of archetypes; and the combination of genetic and non-genetic information on stock identity.

This year, the Committee continued its work. In particular, it recognised the need to work towards an agreed definition of appropriate 'units-to-conserve' in a management context. Implicit in this is recognition that there may be need for case-by-case flexibility, and that it might be appropriate for the Committee to provide options and their implications when providing advice to the Commission. It is intended to have a full discussion of this idea next year. The Committee also examined a number of statistical and genetic issues relevant to this issue. Discussion focussed on use of 'traditional' hypothesis testing methods, a Bayesian approach (see Cui *et al.* in this volume) and a newer, as yet unpublished method (the boundary rank technique). In summary, the Committee noted that it is important, in any application of stock structure methods, to examine the sensitivity of conclusions to different *a priori* decisions about the definition of initial units, and about which population structure hypotheses to examine.

The Committee also recognised the importance of simulation testing to assess the performance of methods to identify population structure and will hold a specialist workshop to examine this in the coming year.

COMPREHENSIVE ASSESSMENT OF WHALE STOCKS

The 'Comprehensive Assessment' of whale stocks
The development of the concept of the 'Comprehensive Assessment' is reviewed in Donovan (1989). It can be considered as an in-depth evaluation of the status of all whale stocks in the light of management objectives and procedures; this would include the examination of current stock size, recent population trends, carrying capacity and productivity. Clearly, it is not possible to 'comprehensively assess' all whale stocks simultaneously, and the Committee

has been working in an objective manner towards this, initially concentrating on stocks that have recently been or are presently subject to either commercial or aboriginal subsistence whaling. Some of these have already been discussed in the sections on the RMP and AWMP.

Antarctic minke whales
The Committee has carried out annual surveys in the Antarctic (south of 60°S) since the late 1970s. The last agreed estimates for each of the six management Areas for minke whales (see Donovan, 1991) were for the period 1982/83 to 1989/90 (IWC, 1991). At the 2000 meeting, the Committee agreed that whilst these represented the best estimates for the years surveyed, they were no longer appropriate as estimates of current abundance. An initial crude analysis of available recent data had suggested that current estimates might be appreciably lower than the previous estimates.

At the 2001 meeting, considerable time was spent considering Antarctic minke whales with a view to obtaining final estimates of abundance and considering any trend in these. This included a review of data sources and analytical methodology. After considering many of the factors affecting abundance estimates, there is still evidence of a decline in the abundance *estimates*, although it is not clear how this reflects any *actual* change in minke abundance. Three hypotheses that might explain these results were identified:

(1) a real change in minke abundance;
(2) changes in the proportion of the population present in the survey region at the time of the survey;
(3) changes in the survey process over time that compromise the comparability of estimates across years.

A considerable amount of work to investigate this further was undertaken at the 2002 meeting and a number of high priority tasks have been identified to be completed before the 2003 meeting.

Southern Hemisphere blue whales
The Committee is beginning the process of reviewing the status of Southern Hemisphere blue whales. An important part of this work is to try to develop methods to identify pygmy blue whales from 'true' blue whales at sea (IWC, 1999a) and progress is being made on this. Work on genetic and acoustic differentiation techniques is continuing and there is considerable progress with morphological methods. The Committee has agreed on a number of issues that need to be resolved before it is in a position to carry out an assessment, which it believes should commence in 2005.

Southern Hemisphere humpback whales
Considerable progress has been made in recent years in working towards an assessment of humpback whales. Attention has focussed both on data from historic whaling operations and on newly acquired photo-identification, biopsy and sightings data. The Committee made a number of research recommendations to further progress towards an assessment. An intersessional group has been established to review progress and determine whether it is feasible to set a deadline for the assessment to be completed.

North Atlantic humpback whales

At the 2001 meeting, priority was given to the Comprehensive Assessment of North Atlantic humpback whales. The Committee recognised the important contribution the international YoNAH (Years of the North Atlantic Humpback) project made to the assessment. This project combined photo-identification and molecular genetic techniques to collect as many photographs and skin biopsies as possible in four sampling periods over a wide geographical range during a period of two years (1992-1993). The principal objectives of the study were to increase understanding of: (a) abundance −both regionally and in total; (b) population genetic structure; (c) population spatial structure including rates of exchange among feeding grounds; and (d) reproductive behaviour and vital rates.

In reviewing population structure, the Committee concluded that North Atlantic humpback whales are characterised by relatively discrete feeding sub-stocks, with strong site fidelity by individuals. This latter factor also influences movement patterns within feeding grounds.

There is clear evidence for at least two breeding stocks in the North Atlantic. Whales from the western North Atlantic breed primarily in the West Indies, as do some whales that feed in the central North Atlantic. However, where other central North Atlantic animals and those from the Barents Sea breed is unknown.

The only breeding ground, other than the West Indies, known from historical and contemporary data is the Cape Verde Islands, but to date there is no direct evidence to support the idea that this is a breeding ground used by central and eastern North Atlantic animals. There may be a separate breeding population in the Norwegian Sea (as suggested in the late 1920s) and the possibility that there are three separate breeding stocks in the North Atlantic cannot be ruled out.

The Committee reviewed a number of population estimates for the feeding and breeding grounds.

This year, the Committee hoped to complete its assessment. It reviewed historical removals and agreed that the catch series was essentially complete for the 20th century although catches prior to then might be substantially underestimated. It also received new estimates of abundance from recent surveys in various parts of the North Atlantic. The Committee agreed that the abundance of the West Indies breeding population was around 10,800 in 1992/93 (see above) and was increasing at some 3% per year, at least between 1979 and 1992, the period for which suitable data are available. Attempts to model the population were unsuccessful (i.e. there was unacceptable model fit to the data) and a number of possible reasons for this were identified.

The Committee identified a number of research items that need to be completed before any further assessment is attempted.

North Atlantic right whales

The Committee has paid particular attention to the status of the North Atlantic right whale in the western North Atlantic in recent years (e.g. see Special Issue 2 of the Journal − *Right whales: worldwide status*). The Committee is extremely concerned about this population, which, whilst probably the only potentially viable population of this species, is in serious danger (*ca* 300 animals). By any management criteria applied by the IWC in terms of either commercial whaling or aboriginal subsistence whaling, there should be no direct anthropogenic removals from this stock.

This year, the Committee once again noted that individuals are continuing to die or become seriously injured as a result of becoming entangled in fishing gear or being struck by ships. It repeated that it is a matter of absolute urgency that every effort be made to reduce anthropogenic mortality in this population to zero. This is perhaps the only way in which its chances of survival can be directly improved. There is no need to wait for further research before implementing any currently available management actions that can reduce anthropogenic mortalities.

The Committee reviewed progress on a number of research and management recommendations concerning this stock.

Western North Pacific gray whales

This is one of the most endangered populations of great whales in the world. It numbers less than 100 animals (see the paper by Weller *et al.* in the last issue of the *Journal*, pp. 7-12) and there are a number of proposed oil and gas-related projects in and near its only known feeding ground. The Committee made a number of research and management recommendations for this population and will hold a Workshop in October to review this further. In conclusion, the Committee strongly reiterated that it is a matter of absolute urgency that every effort is made to reduce anthropogenic mortality (including direct catches) and disturbance to zero to save western North Pacific gray whales from extinction.

EFFECTS OF ENVIRONMENTAL CHANGE ON CETACEANS

There is an increasing awareness that whales should not be considered in isolation but as part of the marine environment; detrimental changes to their habitat may pose a serious threat to whale stocks. The Committee has examined this issue in the context of the RMP and agreed that the RMP adequately addresses such concerns. However, it has also emphasised that the species most vulnerable to environmental threats might well be those reduced to levels at which the RMP, even if applied, would result in zero catches (IWC, 1994). Over a period of several years, the Committee has developed two multi-national, multi-disciplinary research proposals. One of these, POLLUTION 2000+ (Reijnders *et al.*, 1999) has two aims: to determine whether predictive and quantitative relationships exist between biomarkers (of exposure to and/or effect of PCBs) and PCB levels in certain tissues; and to validate/calibrate sampling and analytical techniques. The other, SOWER 2000 (IWC, 2000) is to examine the influence of temporal and spatial variability in the physical and biological Antarctic environment on the distribution, abundance and migration of whales.

At the 2002 meeting, the Committee's primary topic concerned progress on the SOWER 2000 programme (IWC, 2000), particularly with respect to future collaboration with Southern Ocean GLOBEC and with CCAMLR. It also reviewed progress on the POLLUTION 2000+ programme (see Reijnders *et al.*, 1999). There was further discussion of the development of a report for the Commission that would provide an overview of regional environmental concerns and how best this might be achieved. A Workshop to address modelling-related issues related to the interactions between

cetaceans and fisheries was held in July 2002. The report of the Workshop will be published in next year's *Supplement*.

SMALL CETACEANS

Despite disagreement within the Commission over the management responsibilities of the IWC with respect to small cetaceans, it has been agreed that the Scientific Committee can study and provide advice on them. As part of this programme, the Committee has reviewed the biology and status of a number of species and carried out major reviews of significant directed and incidental catches of small cetaceans (Bjørge *et al.*, 1994).

Last year, the Government of Japan had indicated that it would no longer co-operate with the Committee on small cetacean related matters. This year the Committee referred to the great value of the information provided by the Government of Japan on the status of small cetaceans in previous years and respectfully requested that the Government of Japan reconsider its position on this matter and resume the valuable contribution of Japanese scientists to its work on small cetaceans.

At the 2002 meeting, the Committee considered the status of humpback dolphins (genus *Sousa*). The taxonomy of the genus is somewhat confused, with up to five species being cited in various reports. Recognising the need for further taxonomic work, the Committee agreed to continue to recognise only two species at present: *S. teuszii*, the Atlantic humpback dolphin and *S. chinensis*, the Indo-Pacific humpback dolphin. Little information exists on the life history parameters of these essentially coastal species; that which does comes from South Africa and Hong Kong. Similarly, there is little information on abundance and trends. Actual and potential conservation problems are primarily due to habitat degradation and incidental capture in fishing and shark protection gear. Directed capture is relatively rare apart from Madagascar. The Committee concluded that there is insufficient information to assess the status of populations of this genus and it made a number of research recommendations.

The Committee also reviewed progress on previous recommendations it had made, particularly those concerning the critically endangered baiji and vaquita. Unfortunately, no new information was received on the baiji this year and the Committee has requested that information be provided next year. The Committee was informed of a new, integrated framework being developed to implement the recovery plan for the vaquita, and welcomed this new approach. It reiterated its endorsement of the primary conclusion of CIRVA (International Committee for the Recovery of the Vaquita) – that to ensure the future survival of the vaquita it will be necessary to eliminate all bycatches as rapidly as possible.

The Committee reviewed the draft report of the ASCOBANS recovery plan for harbour porpoises in the Baltic. It strongly endorsed the report and made some supplementary recommendations with respect to short-term pinger use.

The Committee also reviewed progress on the development of survey methodology for freshwater cetaceans and further work on the reduction of bycatches in fishing gear. No new information was received on the status of Dall's porpoises. Information on permits for takes of 1,000 white whales (for aboriginal subsistence purposes) and 10 killer whales (live-capture) by the Russian Federation were received. The Committee urged that assessment of the impact of such takes should be undertaken before their enactment.

Finally, the Committee repeated previous requests for all Governments to submit relevant information on direct and incidental catches of small cetaceans in their national progress reports.

SCIENTIFIC ASPECTS OF WHALEWATCHING

In 2000, the Committee had identified a number of areas for further research on possible long-term effects of whalewatching on whales and a number of possible data types that could be collected from whalewatching operations to assist in assessing their impact. The Committee developed this further at the 2002 meeting and will continue to work on data collection issues in the intersessional period.

The Committee also reviewed: information on noise from whalewatching vessels and aircraft, and any potential effects this might have on cetaceans; whalewatching guidelines and regulations; new information on dolphin feeding and 'swim-with' programmes.

REVIEW AND COMMENT ON SCIENTIFIC PERMITS ISSUED FOR SCIENTIFIC RESEARCH

All proposed scientific permits have to be submitted for review by the Scientific Committee following guidelines issued by the Commission. However, in accordance with the Convention the ultimate responsibility for issuing them lies with the member nation.

Most of the discussion at the 2002 meeting centred on reviewing the results of the two-year JARPN II feasibility study and the proposal for a further permit that involves taking 150 common minke whales, 50 Bryde's whales, 50 sei whales and 10 sperm whales each year for an unspecified period. The stated goal was to obtain information to contribute to the conservation and sustainable use of marine living resources in the western North Pacific. It includes sub-projects on: feeding ecology and ecosystems; monitoring of environmental pollutants in cetaceans and the marine ecosystem; further elucidation of stock structure. As for the feasibility study, there was considerable disagreement within the Committee over most aspects of this research programme, including objectives, methodology, sample sizes, likelihood of success, effect on stocks and the amount and quality of data that could be obtained using non-lethal research techniques.

The Committee also briefly considered the continuing programme on Antarctic minke whales that was last extensively reviewed in 1997 (IWC, 1998).

WHALE SANCTUARIES

The Committee had been asked by the Commission to review the Indian Ocean Sanctuary (IOS) and an intersessional working group had developed a proposed framework to carry out the review, in the light of guidelines developed by the Commission last year. The Committee's discussions of sanctuaries in the past have been somewhat inconclusive, with attention being drawn to a number of general arguments both in favour of and against sanctuary proposals. The discussion of the IOS had inevitably been coloured by these overall philosophical views. The Committee noted that lack of consensus in evaluating the scientific aspects of the IOS was not surprising considering that the sanctuary's original proposal did not clearly state its

scientific objectives. It recognised that the review process would benefit from explicitly stated objectives in Sanctuary proposals. However, while there was little consensus in evaluating the IOS, a considerable amount of substantive advice was provided on a number of sanctuary-related scientific issues.

The Committee considered a number of ways to improve the overall review process and priority will be given to this next year.

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Editor

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