Editorial

This issue of the Journal follows the 2001 meeting of the International Whaling Commission held in Hammersmith, London. 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 as *J. Cetacean Res. Manage.* 4 (Suppl.) in spring 2002. However, it seems timely to provide a short summary of the work of the Scientific Committee that updates the summary provided in Donovan (2000).

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. 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 has established an 'Expert Drafting Group' to work on this issue and report back to the Commission at its next Annual Meeting to be held in Shimonoseki, Japan in May 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 whole process should be completed in two consecutive meetings of the Committee.

North Pacific common minke whales

At the 2001 meeting, the Committee's work concentrated on *Implementation Simulation Trials* for North Pacific minke whales. For North Pacific minke whales, the major factors being considered relate to stock identity and levels of anthropogenic removals other than direct whaling, such as bycatches in fishing gear. The Committee received new information on stock structure at the 2001 meeting. It recognised that this and other new information meant that some revision to the trial structure was necessary. The Committee agreed a timetable for its work on this implementation and will aim to recommend to the Commission one variant of the RMP at the 2002 meeting, irrespective of any further data forthcoming in the interim - this will constitute the end of the present *Implementation.* Any new information will be considered at the next *Implementation Review.*

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 agreed that next year it will review the reliability of catch statistics and the need to incorporate any uncertainty about such statistics in the trial structure.

North Atlantic common minke whales

The Committee also began to plan for an *Implementation Review* of North Atlantic minke whales, which will take place at the Shimonoseki meeting in 2002. Amongst the new information to be considered will be new abundance estimates based on surveys carried out since 1995.

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 this 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 reviewed general methods for estimating bycatches. These fall under two headings: those based on fisheries data and observer programmes; and 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 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 but would require further developments in sampling design with input from experts

outside the Committee with detailed knowledge of market sampling issues. The Committee will consider bycatch issues further next year.

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. Given the results so far, the Commission will probably 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 2001 meeting, the Committee made considerable progress with respect to the Bering-Chukchi-Beaufort Seas stock of bowhead whales. It has narrowed down the choice of a *Catch Limit Algorithm* for bowhead whales to two excellent candidates. Work will continue intersessionally on gray whales. If this progress is maintained, the Committee hopes to be able to present a formal recommendation to the Commission on all scientific aspects of a management scheme for bowhead and gray whales at the 2002 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.

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 developed 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.

At the 2002 meeting, the Committee reiterated its previous management advice for all of the stocks considered and made a number of research recommendations. The Committee welcomed the preliminary results of a successful census of bowhead whales carried out in 2001. A full evaluation will be carried out next year. The Committee further considered the 1999-2000 episode of increased gray whale strandings and sightings of emaciated individuals. It agreed that this should be considered as a stochastic event whose magnitude may have been exacerbated by the possibility that the population was at or close to its carrying capacity. Next year, the Committee will be carrying out in-depth assessments of both the Bering-Chuckchi-Beaufort Seas stock of bowhead whales and the eastern stock of gray whales.

A catch of a bowhead whale in August 2000 (by Canada, a non-IWC nation) was reported from the Hudson Bay – Foxe Basin stock. The Committee has expressed concern about the status of this stock (and the Baffin Bay – Davis Strait stock) in the past. Given the low estimated stock size and the lack of information on appropriate methods to manage small populations, the Committee urged caution in the setting of any catch limits for this population and recommended that priority be given to research to: (1) obtain improved abundance estimates; and (2) pursue modelling efforts for use in the management of small populations.

COMPREHENSIVE ASSESSMENT OF WHALE STOCKS

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 may 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 (and see the paper by Branch and Butterworth in this volume). Three hypotheses that might explain these results were identified:

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

Given the management implications of this, the Committee is giving high priority to work on this issue both intersessionally and during the 2002 meeting.

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 or are presently being subject to either commercial or aboriginal subsistence whaling.

Southern Hemisphere blue whales

The Committee is reviewing the current 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, 1999). The Committee agreed on a number of issues that need to be resolved before it is in a position to carry out an assessment.

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.

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 substocks, 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 and agreed on a workplan to complete the Comprehensive Assessment at next year's meeting.

North Atlantic right whales

The Committee has paid particular attention to the status of the North Atlantic right whale in recent years (e.g. see the recently published special issue 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. 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.

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 made a number of research and management recommendations concerning this stock.

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.

Although humpback whale stock structure is complex, some general patterns do emerge. Most humpback whales migrate between low and high latitudes to feed and breed, showing strong site fidelity to individual feeding and breeding grounds. However, humpback whales from a single breeding ground often use various different feeding grounds; and humpbacks on a single feeding ground often come from various different breeding grounds. Good understanding has been reached only through major research effort on both feeding and breeding grounds. Based on the review, the Committee emphasised the need to consider humpback whale management within ocean basins on a case-by-case basis. In particular, consideration should be given to managing on the basis of feeding grounds as well as breeding grounds.

The Committee made considerable progress in discussing the complex issue of the way to define stocks for harvested populations.

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) will 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 2001 meeting, the Committee's primary topic concerned pollutant issues, especially related to POLLUTION 2000+. It also considered progress on the SOWER 2000 programme, particularly with respect to future collaboration with Southern Ocean GLOBEC and preliminary results from last year's collaboration with CCAMLR. There was considerable 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. Plans for intersessional workshops on habitat degradation and competition between cetaceans and fisheries were developed further. The Committee also considered the issues of (1) how to link environmental measures and cetacean demography and (2) health effects from the consumption of cetacean products.

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).

At the 2001 meeting, the Committee considered the status of Dall's porpoises (*Phocoenoides dalli*) off Japan. For reasons documented in the Committee's report, the Government of Japan had decided not to participate in this review.

Dall's porpoises have been subdivided into two subspecies: *P.d. truei* and *P.d. dalli*, primarily on the basis of colour patterns. From a variety of genetic and other evidence, the Committee identified at least eleven stocks. Of these, a *dalli*-type stock that breeds in the northern Okhotsk Sea, a *truei*-type stock that winters off the Pacific coast of Japan and breeds in the central Okhotsk Sea and at least one other stock are taken in the Japanese hand-harpoon fishery. Dall's porpoises are also taken incidentally in a Japanese fishery in the EEZ of the Russian Federation. Large numbers of this species have been taken in other fisheries in these and adjacent waters in the past (e.g. Bjørge *et al.*, 1994) and this may continue. The Committee reviewed available information on the catches up to 1999 in conjunction with looking at the latest population estimates (IWC 1992). The Committee repeated the extreme concern it had previously expressed over these stocks and made a number of research and management-related recommendations.

The Committee also reviewed progress on previous recommendations it had made, particularly those concerning the critically endangered baiji (*Lipotes vexillifer*) and vaquita (*Phocoena sinus*). 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.

Finally, the Committee considered the results of a modelling exercise carried out in response to a recommendation of the joint IWC/ASCOBANS working group on the harbour porpoise. The Committee welcomed the approach and suggested further development work.

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 2001 meeting and will continue to work on data collection issues in the intersessional period.

The Committee also reviewed papers containing information on noise from whalewatching vessels and aircraft, and any potential effects this might have on cetaceans. It recommended that such work continues and new information will be considered at next year's meeting.

The Committee continued to consider national guidelines for whalewatching from a number of countries as well as papers examining their effectiveness. It received new information on dolphin feeding programmes in Australia and the USA and reconfirmed its view that programmes involving the feeding of wild cetaceans should be prohibited. Similarly, the Committee agreed that there are potential problems with 'swim-with' programmes for wild cetaceans and it will consider this issue further.

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.

Much discussion at the 2000 meeting had centred on a proposal for a new programme (JARPN II) that involves taking 100 common minke whales, 50 Bryde's whales and 10 sperm whales each year. 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; stock structure; and environmental effects on cetaceans and the marine ecosystem. There had been 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. This year, the Committee received preliminary results from the first year of the programme but again there was considerable disagreement over the value of the programme.

The Committee also briefly considered the continuing programme on Antarctic minke whales that was last extensively reviewed in 1997 (IWC, 1998). Discussions on how best to assess the effects of scientific permit catches on stocks are continuing.

WHALE SANCTUARIES

The Committee had been asked to comment on the scientific aspects of the proposal submitted by Brazil to the Commission last year to create a Sanctuary for great whales in the South Atlantic.

The Committee referred to a number of general arguments both in favour of and against sanctuary proposals but was unable to reach a consensus view on the need for a Sanctuary in this region.

G.P. Donovan
Editor

REFERENCES

Bjørge, A., Brownell, R.L.J., Donovan, G.P. and Perrin, W.F. 1994. Significant direct and incidental catches of small cetaceans. A report by the Scientific Committee of the International Whaling Commission to the United Nations Conference on Environment and Development (UNCED). Appendix 2. List of small cetacean species. *Rep. int. Whal. Commn* (special issue) 15:127.

Donovan, G.P. 1989. Preface [to the volume *The Comprehensive Assessment of Whale Stocks*]. *Rep. int. Whal. Commn* (special issue) 11:iii-v.

Donovan, G.P. 1991. A review of IWC stock boundaries. *Rep. int. Whal. Commn* (special issue) 13:39-68.

Donovan, G.P. 2000. Editorial. *J. Cetacean Res. Manage.* 2(2):iii-vi.

International Whaling Commission. 1991. Report of the Scientific Committee. *Rep. int. Whal. Commn* 41:51-89.

International Whaling Commission. 1992. Report of the Scientific Committee, Annex G. Report of the sub-committee on small cetaceans. *Rep. int. Whal. Commn* 42:178-234.

International Whaling Commission. 1993. Chairman's Report of the Forty-Fourth Meeting, Appendix 3. Resolution on the Revised Management Scheme. *Rep. int. Whal. Commn* 43:40.

International Whaling Commission. 1994. Report of the Scientific Committee, Annex D. Report of the sub-committee on management procedures. *Rep. int. Whal. Commn* 44:74-92.

International Whaling Commission. 1998. Report of the Intersessional Working Group to Review Data and Results from Special Permit Research on Minke Whales in the Antarctic, Tokyo, 12-16 May 1997. *Rep. int. Whal. Commn* 48:377-412.

International Whaling Commission. 1999a. Report of the Scientific Committee. *J. Cetacean Res. Manage. (Suppl.)* 1:1-52.

International Whaling Commission. 1999b. Report of the Scientific Committee. Annex N. The Revised Management Procedure (RMP) for Baleen Whales. *J. Cetacean Res. Manage. (Suppl.)* 1:251-8.

International Whaling Commission. 2000. Report of the SOWER 2000 Workshop. *J. Cetacean Res. Manage. (Suppl.)* 2:319-46.

Reijnders, P.J.H., Aguilar, A. and Donovan, G.P. (eds.). 1999. *Chemical Pollutants and Cetaceans (Special Issue) 1*. G.P. Donovan (series ed.) International Whaling Commission, Cambridge, UK. v-viii + 273pp.