

Annex N

Report of the Working Group to Review Sanctuaries and Sanctuary Proposals

Members: Zerbini (Chair), Baba (I), Baldwin, Bannister, Berggren, Best, Bjørge, Brownell, Butterworth, Childerhouse, Clapham, Collins, DeMaster, Diake, Donovan, Fujise, Funahashi, Garrigue, Goodman, Goto, Grønvik, Guiste, Hakamada, Haug, Hatanaka, Hung, Iñiguez, Ishikawa, Kanda, Kawachi, Kawahara, Kell, Kock, Kim, Last, Lawrence, Leaper, Manzanilla, Mattila, Minton, Morishita, Nagahata, Ohsumi, Oosthuizen, Palazzo, Parsons, Pastene, Rambally, Read, Reeves, Rennie, Rose, Rosenbaum, Sakamoto, Santa Maria, Shimada, Simmonds, J., Simmonds, M., Tamura, Thiele, Tomita (I), Tynan, Van Waerebeek, Walløe, Walters, Weinrich, Williams, Yamamura, Yoshida.

1. OPENING REMARKS

The Chair welcomed the participants to the meeting. He noted that at the 53rd Scientific Committee meeting in London, the Chair of the Committee had appointed an intersessional Steering Group to review IWC sanctuaries and sanctuary proposals. The Terms of Reference of this group were to develop:

- (1) a process by which the Committee will complete a review; and
- (2) evaluation criteria for the reviews, taking into account the Commission's previous comments and any further advice that might be offered by the Commission.

The Chair of the Working Group introduced a document developed by the intersessional Steering Group as a proposed framework to evaluate the Indian Ocean Sanctuary (IOS) this year (Appendix 3). This framework included the Instructions for Reviews of Sanctuaries and Sanctuary Proposals developed by the Commission last year. The Working Group should also provide comments and recommendations to improve the process and/or the Instructions during the meeting as the framework was being used on a trial basis by the Committee and the Commission, and if necessary, would be modified and improved in order to review the Southern Ocean Sanctuary (SOS) in 2004.

The Chair of the Working Group noted that the Commission directed the Scientific Committee to restrict their discussion to scientific aspects of the IOS, rather than any economic, social, cultural or political issues. He also noted that, following consultation with the Chair of the Scientific Committee, the Working Group should also concentrate its efforts on reviewing the effectiveness of the IOS in the context of protecting large whale stocks rather than small cetaceans.

There was some discussion of this latter point.

Palazzo noted some objections to the instructions given by the Chair of the Scientific Committee to direct the focus of the review to large whales. He stated that: (1) the exclusion of information related to small cetaceans prevented the discussion of important aspects of the Sanctuary; (2) in 1982, the Scientific Committee itself determined that appropriate research in the IOS should encompass small cetaceans; and (3) the instructions prejudged the position of several Contracting Governments regarding IWC competence. The Working Group noted the objections, which are stated in Appendix 2 under the names of the authors. Some members made reference to the Report of the 1982 Scientific Committee, which clearly referred to both small and large cetaceans (IWC, 1982c, p.132).

Rosenbaum commented that much recent research in the IOS has been conducted on small cetaceans, and has been presented to other sub-committees at this meeting. Sakamoto responded that discussion of small cetaceans was outside the competence of the IWC and stated the position of the Japanese Delegation regarding small cetaceans (see Annex R2).

The Working Group noted that the rationale for concentrating on stocks of large whales reflects the fact that the only management measure IWC sanctuaries [can] impose is the prohibition of whaling on large whales (it is well known that there is no consensus within the IWC on its competence to manage small cetaceans). It was also noted that almost all of the research items proposed by the sub-committee addressing this issue in 1982 (IWC, 1982c, pp.132-5) concerned large whales. Given this, it was noted that for the purposes of this review, references to research on small cetaceans would be restricted to that which was also of relevance to large whales. However, the Working Group recognised that many species and populations of small cetaceans are found within the boundaries of the IOS, that they face a number of actual and potential conservation threats (including *inter alia* incidental capture in fisheries, habitat degradation, pollution, climate change) and that a number of research projects on small cetaceans are underway (e.g. see SC/54/O5). It was noted that a thorough review of all small cetacean populations occurring within the boundaries of the IOS would represent a major task.

2. APPOINTMENT OF RAPPORTEURS

Last and Williams acted as rapporteurs.

3. REVIEW OF AVAILABLE DOCUMENTS

Documents relevant to the Working Group were SC/54/O5, O11, O20, O25 and IWC/54/16.

4. ADOPTION OF AGENDA

The adopted Agenda is given as Appendix 1.

5. REVIEW OF THE INDIAN OCEAN SANCTUARY

5.1 Review of documents

SC/54/O5 summarised the status of populations and present and potential threats to cetaceans and their habitats, including, *inter alia*, directed takes, bycatch, offshore mineral exploitation, shipping, whalewatching, climate change, pollution and other forms of habitat degradation. Highlights of the extensive review document relating to each region were provided.

(1) Southwestern Indian Ocean

In the 1990s, UNEP sponsored two training workshops on marine mammal biology and conservation and small-scale pilot surveys in Africa. In addition, the Western Indian Ocean Marine Science Association (WIOMSA) was established in 1991 to help facilitate marine research. Since 1996, Rosenbaum and colleagues have been conducting research on humpback whales and other marine mammals in Madagascar. In April 2001 a regional planning workshop was held in Cape Town bringing together delegates from eight African countries and Oman. There is limited evidence that the IOS has played a role in stimulating research on cetaceans to date, although this should be seen in the context of the predominantly developing nations involved.

(2) The Maldives

There has been relatively little research on cetaceans in Maldivian waters. However, during the last decade, several papers have reported on strandings and sightings and the Maldives are potentially important for long-term monitoring and conservation of cetaceans, because of their high cetacean abundance and diversity.

(3) Amsterdam and Saint-Paul Islands

A possible connection between the right whales seen in Madagascar with those found in Crozet is suggested, although the Crozet animals could also represent long-range migrants from South Atlantic populations.

(4) Arabian and Red Seas, Gulf of Oman and Persian Gulf

Despite the general lack of research in some parts of the Arabian region, significant data are now available for countries such as Oman, Saudi Arabia and UAE. In all of these countries, and in Kuwait, research is ongoing. The existence of the IOS has been noted as an important element in cetacean research in Oman at least. In spite of serious potential pollution problems, incidental takes may now be the most serious threats for cetaceans of this region.

(5) Northeast IOS

Marine mammals of Southeast Asia were considered in Kyoto in 1993 (IWC, 1994). In 1995, another marine mammal conference was held by the Silliman University, Philippines, in collaboration with UNEP. The Second International Conference on the Marine Mammals of Southeast Asia (which will focus on bycatch), will be held in Dumaguete, Philippines (22-26 July 2002).

(6) Australia

The Australian EEZ is a sanctuary. The federal government has supported long-term humpback, right and blue whale research off Western Australia. One of the main objectives of future cetacean research is to begin the process of utilising appropriate 'platform of opportunity' (POP) vessels to conduct standardised sightings.

(7) Sub-Antarctic waters of the Southern IOS

Most information on cetaceans has been reported from sub-Antarctic islands and from research vessels underway to Antarctica. The authors of SC/54/O5 highlighted the opportunities for further research based on these islands and the need for further observational cetacean research at sea, where research vessels focussed on other investigations may offer suitable POPs.

(8) Central IOS

The cetacean fauna of the central Indian Ocean has not been extensively studied, although a series of surveys have been conducted in recognition of the importance of the IOS. The many merchant vessels that cross the Sanctuary could be investigated as possible POPs for sightings.

Simmonds thanked the many contributors to the review. He noted that the IOS encompasses a large area predominantly surrounded by developing countries and that this can be expected to have a significant effect on research in the region. In the opinion of the authors of the paper, the existence of the IOS has helped to generate research and conservation initiatives, although this is clearly limited by economic considerations in some parts of the Sanctuary. However, the continued existence of the IOS is expected to continue to help in the development of: (1) management strategies and plans for the conservation of cetaceans; (2) further research; and (3) further regional-level initiatives, the need for which is highlighted in the paper.

Butterworth informed the Working Group that some of the concerns raised in SC/54/O5 about perceived threats to whale stocks in the IOS due to fisheries interactions are addressed in the South African region by fisheries management strategies that seek to ensure adequate escapement levels for pelagic populations upon which predators such as inshore Bryde's whales feed. In response to a query regarding the lack of some Australian data in the paper, Simmonds noted that the document was intended to be comprehensive, but it could not practically be exhaustive and he noted new information in other papers presented to the Scientific Committee. Morishita queried whether the authors had considered 'trans-regional collaborative research efforts' within the IOS. He further identified research on the interactions between cetaceans and fisheries in the IOS as an important, but understudied field. He noted that the Indian Ocean Tuna Commission is looking at these interactions, and that their initiatives should be included.

During discussion, Rosenbaum noted that proposals were being developed to act on previous recommendations to build a collaborative research programme on humpback whales throughout the entire Indo-South Atlantic region; SC/54/H4 looks at movements of individually recognisable humpback whales between the Southern Ocean and Oman providing an example of 'trans-regional collaborative research efforts'. He also noted that work on variation in humpback genetics between the IOS and other ocean basins would not be possible without international collaboration. Thiele added that IOS and SOS researchers have formed

collaborations. Proposals to study humpback and sperm whales in the IOS with both IWC member and non-member countries were also reported.

SC/54/O25 described some developments since the Scientific Committee last reviewed the IOS in 1992. At that time the discussion largely focussed on two topics, the value of sanctuaries as a management tool, and the value of sanctuaries for research. On both issues, much of the debate was referred back to previous discussions. Subsequent to these discussions the Commission agreed by consensus to an amendment to the Schedule that extended the IOS indefinitely with a review in 2002. Since then, considerable attention has been given to general issues related to marine reserves in other *fora*, particularly in the context of fisheries management. Some scientific developments since 1992 of relevance to discussions of the scientific aspects of the Sanctuary include: new techniques for studying cetaceans; an increased awareness of climate change and improved understanding of large-scale oceanographic processes; the development of whalewatching in several Indian Ocean coastal states; the revelations of previously unreported pelagic whale catches by the former Soviet Union (e.g. Yablokov, 1994); and initiatives related to cetaceans by other intergovernmental organisations in the region. An important consideration for the Indian Ocean north of the equator is the expectation of a poleward movement of ecosystem components with climate warming. Poleward movement may not be possible for many stocks in the northern Indian Ocean because of the land barrier. Whalewatching within the IOS has grown considerably since 1992, particularly in terms of the geographic spread across a number of countries. Whalewatching has implications due to the possible effects of the operations on whales and also because of the potential opportunities for research. Previously unreported catches were taken from stocks of blue, Bryde's, humpback, right and sperm whales (Yablokov, 1994). Some of these catches were from stocks believed to be confined to the northern Indian Ocean. Other intergovernmental organisations that have recently initiated programmes that relate to cetaceans include CCAMLR and IOTC. The adoption of the SOS by the IWC also provided a sanctuary area contiguous with the southern border of the IOS.

Before presenting SC/54/O20, Morishita recommended that the IOS be reviewed in light of the current conservation situation of the area, rather than when the IOS was established in 1979. The paper provided a response to each item of the Instructions from the Commission concerning review of sanctuaries. It reported that the Sanctuary applies irrespective of the conservation status of different species and stocks even when scientific evidence does not advise protection for them. The paper stated that the Sanctuary is a redundant measure because the commercial whaling moratorium is currently effective and when the moratorium is lifted, the risk-averse Revised Management Procedure (RMP) will provide full protection to whales. The authors believed that the Sanctuary is an inappropriate management strategy because it does not provide additional or necessary protection to whales nor does it improve protection of whale habitat. The paper further reported that: management of large whale stocks is essentially identical inside and outside the IOS boundaries; the IOS fails to address issues of critical versus non-critical habitat, since there are no internal boundaries; and that while research cited to date may have been done *in* the IOS, there is no evidence that it happened *because* of it. SC/54/O20 concluded that the Sanctuary is contrary to Article V of the International Convention for the

Regulation of Whaling, which requires that regulations be based on scientific findings, and should be abolished for these reasons.

Ishikawa expressed support for many of the views expressed in SC/54/O20, commenting that current circumstances render the IOS unnecessary. He also believed that it hindered rather than enhanced research effort directed at assessing the status of large whales and concluded that continuation of the IOS was scientifically unjustifiable.

Several members commented that they did not believe that the current moratorium on whaling and the future implementation of the risk-averse RMP will guarantee stocks adequate protection, and thereby remove the need for sanctuaries. They suggested that establishment of an appropriately designed system of sanctuaries adopts the precautionary approach against the possible failure of the RMP by protecting some stocks in part of their ranges and others in the entirety of their ranges. They noted that considerable uncertainty exists in the RMP inputs and operation and considerable complexity exists in baleen whale population structure and dynamics. They believed that a separate precautionary mechanism, such as a spatially and temporally appropriate sanctuary in addition to the RMP, should be established to protect whale stocks.

Minton presented an update on large whale stocks in the northern Indian Ocean. She highlighted the unique oceanographic features of this area that allow some whale populations to both feed and breed here. Minton cited data from historical observations, Soviet whaling, and recent research that indicate that there are discrete populations of pygmy blue, Bryde's, humpback and sperm whales resident in the northern Indian Ocean. Further research will allow us to better understand their stock structure and relationships to neighbouring populations in the southern Indian Ocean.

Best pointed out that the context and circumstances in which the IOS had been created were very different from those that now prevailed, and that the scientific value of the IOS as a control region had been largely eroded by the adoption of the moratorium and the RMP. He suggested that the boundaries of the Sanctuary should now be re-cast to recognise the unique nature of the whale populations that occur in the northern Indian Ocean, several of which apparently do not make the annual migrations to a high latitude feeding ground typical of most baleen whales. He believed this would create a whale sanctuary that was both biologically relevant and scientifically justifiable.

Tynan summarised significant relationships in climate connectivity between Antarctic sea ice and extrapolar climate, such as that in the Indian Ocean. Sea ice edge anomaly in the Antarctic is highly correlated with sea surface temperature in the tropical Indian Ocean. Non-migratory or less-migratory whale populations in the IOS would experience the effects of climate forcing, such as El Niño – Southern Oscillation (ENSO) on the ecosystem, as well as forcing from linked climatological forcing between the Antarctic and tropics. Migratory whales would experience ecological consequences to climate forcing (e.g. ENSO) that transcend both the IOS and SOS. Yuan and Martinson (2000) report that 34% of the variance in sea ice edge anomaly in the Antarctic is linearly related to ENSO. In addition, the Antarctic Semi Annual Oscillation (ASO) has documented climate linkages to the extratropics, especially in the Indian Ocean.

Ishikawa commented that marine sanctuaries can be defined as useful conservation tools to provide protection of critical habitat or refuges for utilised resources as part of a sustainable management regime. They must be defined by

ecologically appropriate boundaries, applied to species subject to management and utilisation, and its duration must reflect conservation needs. He believed that sanctuaries fail to meet this definition if they are totally prohibitive over a large area when the status of stocks allows for sustainable utilisation, or if a management regime in effect is sufficiently precautionary. He noted that the boundaries are not ecologically appropriate since they neither cover the entire range of large whale stocks that migrate through or into the area nor are they limited to critical habitats for these species. He referred to the duration of the IOS as inappropriate, since there have probably been changes to the perceived conditions concerning the status of whale stocks and the need for a prohibition on whaling over a large area since the establishment of the Sanctuary more than 20 years ago. Although such changes have not been assessed, none of the species that occur in the area are in fact present candidates for commercial catch quotas. Nor will they become candidates until they have been assessed, sustainable catch limits established, and quotas set under the RMS. Ishikawa concluded by stating that for these reasons, there is no scientific justification for maintaining the IOS, the SOS, the proposed sanctuaries for the South Pacific and the South Atlantic, or the concept of a global sanctuary.

Many of the points raised in this initially general discussion are revisited in more detail in the following sections.

5.2 Review of the objectives of the Sanctuary

An overview of the history of scientific aspects and objectives of the IOS is given in Appendix 3. The following objectives were developed by Leatherwood and Donovan (1991) based on the original Sanctuary Proposal by the Government of Seychelles (Anon., 1979) and discussion of the Sanctuary during annual meetings of the IWC (e.g. IWC, 1979a; b; 1980a; b; 1981a; b; 1982a; b; 1983a; b; 1984; 1986).

- (1) The Sanctuary should provide an ecologically coherent area where whale populations are protected from whaling for a specified period, avoiding the possibility of stocks being alternately exploited and protected in the short term as a result of small changes in assessments.
- (2) In terms of appropriate research, the IWC Scientific Committee (IWC, 1982c) stated that:
 - (a) it should provide sufficient information to assess stocks of large whales and small cetaceans;
 - (b) it should permit direct comparison of the status of species and/or populations protected by the Sanctuary provision and exploited or unexploited stocks of the same species in other areas;
 - (c) the opportunity should be taken to carry out relevant investigation of certain kinds, which would be impossible or more difficult to undertake in areas where whaling continues.

5.2.1 Objectives of the IOS – Evaluation criteria

The Working Group reviewed the IOS objectives using the following evaluation criteria agreed by the intersessional Steering Group (Appendix 3, item 1):

(1) EVALUATE WHETHER WHALES WERE AND ARE EFFECTIVELY PROTECTED FROM WHALING WITHIN THE SANCTUARY

It was suggested that the Group interpret this question in terms of whether whaling had ever occurred or currently occurs within the IOS. Since whaling occurred in the area

before the establishment of the IOS, it was agreed that since its formation whales have been effectively protected; no evidence exists of research, illegal or commercial whaling within its boundaries (see Item 5.4, Section 4, sub-group C). Sakamoto noted that the IOS does not apply to research whaling. It was noted that the current moratorium prohibits commercial whaling both inside and outside the IOS, however the moratorium does not apply to non-member states.

(2) EVALUATE WHETHER THE BOUNDARIES OF THE SANCTUARY WERE APPROPRIATELY ESTABLISHED

In discussion of this evaluation criterion, the Working Group noted that the Instructions from the Commission gave no definition of the term 'appropriate.' It was noted that it is difficult to define ecologically relevant boundaries for the protection of several species simultaneously. Sakamoto expressed that the boundaries were designed to define a large, rather than biologically relevant area. Sakamoto noted that the boundaries are not scientifically relevant, in that the moratorium prevents commercial whaling inside and outside the Sanctuary. It was noted however that there are climatologically relevant connections between sea ice in the Antarctic and extra-polar climate, such as that in the Indian Ocean (e.g. ENSO) that would be relevant to the consideration of boundary definition. Numerous climate studies on these complex connections have been published and are ongoing. The importance of distinguishing between partial protection on breeding and feeding grounds was noted, and that protection of a stock's entire range might be justification for extending the boundaries.

(3) EVALUATE IF THE IOS HAS PROVIDED 'SUFFICIENT' INFORMATION TO RELIABLY ASSESS STOCKS OF LARGE WHALES

Table 1 provides available information relating to the current abundance, stock boundaries and occurrence of the large whale species in the IOS. In regard to the information available for large whale stocks in the IOS, the Working Group agreed that:

- (a) progress has been made on some stocks of large whales, namely right whales and humpback whales off South Africa and western Australia, but that this is insufficient for a comprehensive assessment of stocks in the entire IOS;
- (b) studies are underway on some of the other stocks;
- (c) some species, especially Bryde's whales, are hardly studied; and
- (d) not all of the research that has occurred in the IOS can be definitively attributed to the formation of the IOS. Some felt that there was a strong link between the formation of the IOS and their own research, while others asserted that their own research would have occurred regardless of the formation of the IOS.

(4) EVALUATE IF THE IOS HAS PERMITTED DIRECT COMPARISON OF SPECIES/STOCKS WITHIN THE SANCTUARY WITH (i) EXPLOITED AND (ii) UNEXPLOITED STOCKS OUTSIDE THE SANCTUARY

Continued series of abundance estimates of West Australian humpback and South African right whale populations may allow for comparative studies with similarly unexploited populations of these species outside the IOS. However, the absence of exploitation outside the Sanctuary following the declaration of the moratorium has precluded comparative studies with exploited stocks.

Table 1
Large whale species and stocks inhabiting the Indian Ocean Sanctuary.

Species	Stocks affected	Stock boundaries	Seasonal occurrence	Trends in abundance (period)	Most current population estimate	Comments and references
Blue whale, <i>B. musculus intermedia</i>	Part of Area III	Area III (0-70°E)	Winter and spring	n.a	n.a	
	Area IV	Area IV (70-130°E)	Winter and spring	n.a	n.a	
Pygmy blue whale <i>B. m. brevicauda</i>	Northern Indian Ocean	Indian Ocean north of Equator	Year round	n.a	n.a	Rice (1998)
	Part of Area III	Area III (0-70°E)	Winter and spring	n.a	478 (CV = 0.48) ¹	Best <i>et al.</i> (2003)
Fin whale, <i>B. physalus</i>	Area IV	Area IV (70-130°E)	Winter and spring	n.a	n.a	
	Part of Area III	Area III (0-70°E)	Winter and spring	n.a	n.a	
Sei whale, <i>B. borealis</i>	Part of Area III	Area III (0-70°E)	Year round	n.a	n.a	
	Area IV	Area IV (70-130°E)	Year round	n.a	n.a	
Bryde's whale, <i>B. edeni</i>	Northern Indian Ocean	Indian Ocean north of Equator	Year round	n.a	n.a	
	Southern Indian Ocean	20-130°E	Year round	n.a	534±184	Best <i>et al.</i> (1984)
	Part of South African Inshore	South African coast, west of 27°E until to the 200m isobath	Year round	n.a	n.a	
Antarctic minke whale, <i>B. bonaerensis</i>	Part of Area III	Area III (0-70°E)	Winter and spring	Under review	57,000 (CV=0.2) ²	Branch and Butterworth (2001)
	Area IV	Area IV (70-130°E)	Winter and spring	Under review	6,600 (CV=0.34) ²	Burt and Stahl (2001)
Common minke whale, <i>B. acutorostrata</i>	Part of Area III	Area III (0-70°E)	Winter and spring	n.a	n.a	
	Area IV	Area IV (70-130°E)	Winter and spring	n.a	n.a	
Humpback whale, <i>Megaptera novaenaglie</i>	Northern Indian Ocean	Indian Ocean north of Equator	Year round	n.a	n.a	n.a
	Breeding stock C	East coast of Africa	Winter and spring	n.a	Natal/Mozambique: 1,800 (1990)	Findlay and Best (1996)
				n.a	South Madagascar: 2,500 (1994)	Best <i>et al.</i> (1996)
				n.a	North Madagascar: 1,746	Rosenbaum <i>et al.</i> (2000)
Breeding stock D	West coast of Australia	Winter and spring	10.15±4.6% (1982-1991)	8,207-13,640 (1999)	Bannister and Hedley (2001)	
Right whale, <i>Eubalaena australis</i>	South African breeding stock	Southern Africa	Winter and spring	+7.2%/yr (1982-1996)	3,104	Best <i>et al.</i> (2001), IWC (2001)
	Australian breeding stock	Southern Australia	Winter and spring	+(7.1-13.5%)/yr (1983/86 – 1997)	1,897	Bannister (2001) and pers. comm.
Sperm whale, <i>Physeter macrocephalus</i>	Northern Indian Ocean		n.a	n.a	n.a	
	Division 3	20-60°E	Females and juveniles year round, males winter and spring	n.a	n.a	
	Division 4	60-90°E		n.a	n.a	
	Division 5	90-130°E		n.a	n.a	

¹This estimate refers to approximately a third of the stock distribution area.

²This estimate was obtained in the Antarctic, outside the IOS. The Area IV estimate quoted must be viewed in the context of discussions recorded in the report of the IA sub-committee.

n.a = not available.

(5) IDENTIFY WHAT KINDS OF INVESTIGATIONS WERE CARRIED OUT IN THE SANCTUARY, WHICH WERE MORE DIFFICULT TO UNDERTAKE IN AREAS WHERE WHALING CONTINUED

Some members believed that this criterion was irrelevant due to the cessation of whaling under the current moratorium. Other members noted that research could be conducted

within the IOS that could be compared with stocks that are subject to non-commercial exploitation. The Working Group was not aware of any such studies that had been conducted, however reference was made to one study that opined that their biopsy research was assisted by working with an undisturbed stock (SC/54/O5).

5.3 Review of large whale research developed in the IOS and its implications for the work of the Scientific Committee and the Comprehensive Assessment of Whale Stocks (CAWS)

A workshop held in Zeist, Netherlands, in 1981 prepared a list of research objectives within the IOS, some of which would satisfy the SC needs in obtaining information for assessment-related matters. These objectives, listed below, were used to develop the evaluation criteria for reviewing research in the IOS:

- (i) to satisfy the needs of the IWC Scientific Committee particularly in obtaining adequate information about the distribution and abundance of whales, their reproductive behaviour and related matters relevant to assessment of stocks;
- (ii) to obtain scientific information pertinent to assessing and realising the economic, cultural and scientific values of living cetaceans;
- (iii) to enhance the understanding of the ecological roles of cetaceans in marine biological systems and to permit assessment of the impact of human activities on recovering and unexploited populations;
- (iv) to focus attention on the development and application of benign research techniques;
- (v) to foster investigations on the frontiers of research on living cetaceans, such as communication, navigation, behaviour and physiology of diving;
- (vi) to ensure the establishment of centres of research on cetaceans in the Indian Ocean and to further communication about research among Indian Ocean coastal states and between them and others involved in such research.

The Zeist Workshop also recognised one research area that required attention: the establishment of a stranding network. The meeting noted the value of such networks in areas where the knowledge of cetaceans is very limited. A sub-group was set up to discuss practical ways of implementing such networks.

5.3.1 Research in the IOS – Evaluation criteria

The Working Group reviewed research in the IOS using the following evaluation criteria agreed by the intersessional Steering Group (Appendix 3, item 2).

- (1) The objectives listed above could be addressed with or without the existence of a sanctuary. The SC should evaluate the extent to which the establishment of the IOS furthered the achievement of these objectives.
- (2) Briefly assess the past and present status and results of the 24 projects identified by the Zeist Workshop and how they contributed to the research needs of the SC.
- (3) List other projects developed within the IOS and how they contributed to meet the research needs of the SC.
- (4) Evaluate the progress in implementing stranding networks in the IOS.

Table 2 summarises the status of the research projects identified at the Zeist Workshop that were expected to contribute to meeting the six objectives from the Zeist Workshop.

During discussion it was noted that, in general, progress has been made towards meeting the above objectives of the IOS (SC/54/O5) but that it is difficult to determine conclusively what the effect was of establishing the Sanctuary on this progress. Much of the research conducted on stocks before the establishment of the IOS was obtained from whaling operations. Three well-known longitudinal

studies that began before the establishment of the IOS were cited: right whales off South Africa (e.g. Best *et al.*, 2001) and western Australia (e.g. Bannister, 2001); and humpbacks off western Australia (e.g. Bannister and Hedley, 2001). At least three studies were initiated in direct response to the IOS (Gordon, 1991; Ballance and Pitman, 1998; Ballance *et al.*, 2001), and numerous studies began after the establishment of the IOS occurred.

5.3.2 The IOS and the Comprehensive Assessment of Whale Stocks – Evaluation criteria

The Working Group reviewed the IOS and its implication for the Comprehensive Assessment of Whale Stocks using the following evaluation criteria agreed by the intersessional Steering Group (Appendix 3, item 3).

(1) EVALUATE PAST AND CURRENT DATA ON ABUNDANCE ESTIMATES AND TRENDS FOR WHALE STOCKS WITHIN THE IOS

Table 1 provides an update of abundance estimates for large whale species and stocks inhabiting the IOS. During discussion, the Working Group acknowledged that considerable information exists for right and humpback whale stocks. Studies on pygmy blue whales in western Australia and Bryde's whales in the northern Indian Ocean are ongoing and information is forthcoming.

(2) EVALUATE PROGRESS IN STOCK IDENTIFICATION SINCE THE IOS WAS CREATED

Progress on stock identity for humpback and right whales using genetic data from the southwest Indian Ocean was noted. Reference was also made to ongoing research that uses new genetic techniques to establish links between feeding and breeding grounds. Links between Indo-Atlantic and South Pacific samples will allow a much better understanding of stock identification. There is some on-going research on stock identification of blue whales from western Australia. No information was presented on progress in stock identification for any of the other large whales. The progress on stock definition in areas outside the IOS was noted.

The Working Group agreed that considerable advances have been made for some stocks (humpbacks and right whales in some portions of the IOS, and some information on pygmy blue whales), but for the others, no information is currently available.

(3) EVALUATE PROGRESS IN ESTIMATION OF DEMOGRAPHIC PARAMETERS AND VITAL RATES SINCE THE IOS WAS CREATED

The Working Group came to a similar conclusion as above. Some information exists on trends for right and humpback whales in portions of the IOS (with additional research ongoing), but no information is currently available for other stocks. The Working Group noted that in terms of assessing whether the existing research allows us to reliably assess stocks of large whales, what has been done so far is limited.

(4) LIST AND EVALUATE THE RESULTS OF PROJECTS FOCUSED ON THE DEVELOPMENT OF CALIBRATION AND ASSESSMENT METHODS

Attention was drawn to SC/54/O25, which provides examples of research techniques that have evolved directly from research initiated in response to the adoption of the Sanctuary.

The Working Group regarded that the information provided under (3) to summarise the status of knowledge on the stocks present in the IOS is also relevant here.

Table 2

Status of the 24 projects identified at the Zeist Workshop as contributions to meet the research objectives of the IOS.

No.	Project	Status in 1987	Status in 2002
1	Review of available data on Indian Ocean cetaceans	Unfunded but initiated	See paper SC/54/O5
2	Study of historical materials relating to 19th Century whaling in the western Indian Ocean	Not funded and not implemented	In prep. (Reeves and Rosenbaum) Wray and Martin (1983)
3	Analysis of logbook records from the eastern Indian Ocean	Partially implemented	Partially implemented Bannister <i>et al.</i> (1981)
4	To promote and coordinate use of platforms of opportunity	Not funded but partially implemented	Partially implemented (e.g. Corbett, 1994; Ballance and Pitman, 1998; De Boer, 2001; Baldwin, pers. comm.; Tynan, 1996, 1997)
5	Conduct a series of field trips to locate possible sites for long-term studies involving close encounters with whales	Not implemented as envisioned but some work was carried out	Various surveys carried out
6	Investigate the presence of sperm whales in the waters around Mauritius	Not implemented	Corbett (1994), continued by a local NGO
7	Identify optimal sampling strategies for estimating the mean density of a given whale target in a given region over a given interval	Partially implemented, most work carried out outside the IOS	Findlay and Best (1996) and planned 2002
8	Sub-surface observation (diving and submersibles), particularly of sperm whales	Partially implemented	No information available
9	To determine to what extent the blue whales seen in the Sanctuary are 'normal' blue, pygmy or both	Partially implemented	Best (1998), IDCR surveys, Japanese surveys
10	Conduct a long-term study of Bryde's whales in south-western Indian Ocean	Not implemented but a cruise was carried out	To be implemented
11	To detail the existence of killer whale populations within the Sanctuary and the feasibility of conducting assessment studies by applying techniques of photographic and acoustic identification developed elsewhere	Not funded but initiated	Not implemented (sightings available in several publications)
12	Investigation of transequatorial links among humpback whales	Not implemented	Being implemented SC/54/H4
13	Photo identification of humpbacks off Western Australia	Partially implemented	Jenner and Jenner (1994), Burton and Bannister, ongoing
14	Estimates of relative abundance of sperm whales off recently closed land stations	Not implemented	Not implemented
15	Survey of sperm whales and other cetaceans in the Seychelles area	One aerial survey carried out	Robineau (1991)
16	Behaviour of sperm whales in the Indian Ocean	Funded	About to begin as part of ISAHWN
17	Status of cetaceans in the waters of Oman	Partially accomplished	Kasuya and Wada (1991), Baldwin (1998) Baldwin (1997)
18	Identification of minke whales	Not implemented	Ongoing SC/54/SM6, 34 SC/54/H3, H4, O4
19	Photogrammetric aerial surveys of inshore delphinids off Natal and Transkei and offshore Delphinus delphis in the same area	Partially implemented	Not implemented
20	Aerial and shore inventory of cetacean species east and west of southern Madagascar	To be initiated	Completed (see Cockcroft <i>et al.</i> 1990, 1991, 1992).
21	Placement of observers on <i>R.V. Marion Dufresne</i> , sailing between France and Terres Australes et Antartiques Françaises	Implemented	Implemented and ongoing SC/54/H18, H20
22	Obtain biological information and continuing statistics regarding subsistence whaling in Indonesia	Implemented	See paper SC/54/O5
23	To study cetaceans in the Sanctuary	Not implemented	Barnes (1991)
24	Data collection and administration	?	Partially implemented
			?

(5) EVALUATE THE EFFECTIVENESS OF WHALE STOCK MONITORING PROGRAMMES AND HOW THEY CONTRIBUTED TO COMPREHENSIVE ASSESSMENT OF WHALE STOCKS (CAWS)

The surveys cited above on southern right, humpback and pygmy blue whales have contributed data to the Comprehensive Assessment of stocks of the first two species. No additional data are available from other large whale stocks in the IOS, however studies are underway on Bryde's whales in the northern Indian Ocean.

5.4 Review of the IOS based on the Instructions provided by the Commission in 2001

The Chair noted that the lack of consensus in earlier discussions suggested that there may be insufficient time to complete the full Agenda unless an alternative mechanism for arriving at detailed statements incorporating all

viewpoints was established. Given the general tenor of previous discussions he proposed establishing three working groups that broadly encompassed the range of views expressed. Their terms of reference were to:

- (1) evaluate the effectiveness of the IOS according to the Commission's Instructions (IWC, 2002a);
- (2) make recommendations to any aspect of the IOS the sub-group thought might be appropriate to improve it (Appendix 3, item 5); and
- (3) make recommendations for the Commission's Instructions for Reviews of Sanctuaries and Sanctuary Proposals.

The Chair noted his reluctance to establish this procedure but believed it represented the only viable solution.

Each sub-group was assigned a convenor and was named in the order in which the rapporteurs received summaries from the conveners (sub-groups A, B and C).

After producing sub-group evaluations of the effectiveness of the IOS according to the Instructions of the Commission, the Working Group reconvened and attempted to assess whether there was any consensus under each Instruction. The following section contains a compilation of the views expressed by the three sub-groups followed by a Working Group evaluation for each Instruction. Full sub-group reports A-C are given as Appendices 4-6 respectively.

(1) Give attention to assessing how well the scientific aspects of the agreed objectives of the Sanctuary have been met, and how well they might be met if the Sanctuary continues.

SUB-GROUP A

There are no agreed objectives for the IOS so it is difficult to respond directly to the question. However, it can be noted that the IOS serves no scientific or conservation purpose primarily for the following reasons: (1) it has been made redundant by the moratorium; (2) research in the IOS has not provided sufficient information to assess stocks of large whales; (3) even if the moratorium is lifted, the RMP provides more than adequate conservation measures; and (4) its boundaries are ecologically inappropriate. Continuation of the Sanctuary will not resolve these issues. For these reasons the Sanctuary should be abolished.

SUB-GROUP B

The IOS effectively provides direct protection from commercial whaling to the breeding stocks of all large whales in the Indian Ocean although the precise locations of some of these breeding areas are still unknown. Much of the research in the Sanctuary is aimed at the identification and assessment of other threats. A difficulty in evaluating the Sanctuary is determining which of the research and other activities in the Sanctuary have taken place as a direct or indirect consequence of the Sanctuary designation, and which may have occurred anyway. It is also becoming increasingly apparent that the time period required to reach an adequate assessment of something such as the effectiveness of a sanctuary is likely to be much longer than might have been anticipated.

SUB-GROUP C

The objectives have been met in part, but not to any great extent. The major contributions have been continuation of South African right whale and West Australian humpback and right whale surveys, though these would likely have continued with or without the IOS. Some work on humpbacks and blue whales in the western Indian Ocean has taken place. However, there has been an absence of the major pelagic surveys necessary were the IOS to have played its intended role as a control region. In particular, there is no such work on pelagic Bryde's whales, the primary concern of the IOS when motivated. More resources need to be committed if the IOS is to play this intended control role. The IOS may, however, serve to assist to promote some fundraising efforts for research, although this should not be a function of a sanctuary.

WORKING GROUP EVALUATION

There was no consensus among the three sub-groups on how well the scientific aspects of the agreed objectives of the Sanctuary have been met, or on how well they might be met

if the Sanctuary continues. Details regarding areas where opinions differed are presented in the sub-groups' full reports in Appendices 4-6.

(2) Provide advice on the status and trends of whale stocks in the Sanctuary in so far as these are known.

SUB-GROUP A

Meaningful advice cannot be provided on the status and trends of whale stocks in the Sanctuary because neither systematic sighting survey (except for some work on humpback and right whales) nor commercial whaling have been conducted in the Sanctuary since the establishment of the IOS.

SUB-GROUP B

The status of stocks in the Sanctuary is summarised in Table 1. The Sanctuary contains examples of: (1) populations which are depleted but known to be recovering; (2) populations which are depleted where the current trend is unknown; (3) populations such as minke whales, which are probably not depleted, but the current trend is under assessment by the Scientific Committee; and (4) populations which are probably not depleted but whose current trend is unknown.

SUB-GROUP C

See all of Appendix 6.

WORKING GROUP EVALUATION

It was **agreed** that sufficient information exists to review the status and trends of humpback and right whale stocks in western Australia and southern Africa. There is insufficient information available to review the status and trends of other large whale stocks in the Sanctuary.

(3) Assess whether the Sanctuary distinguishes between species and stocks that are depleted and apparently slow to recover, those that are increasing rapidly, and those that are abundant and not threatened.

SUB-GROUP A

The IOS does not distinguish between species and stocks. The prohibition on commercial whaling applies to all species and stocks irrespective of the status of stocks. This is one of the major arguments against the Sanctuary in that it provides protection for stocks even when scientific advice demonstrates that such protection is not required for conservation reasons.

SUB-GROUP B

The Sanctuary gives complete protection from commercial whaling to populations in all of the four categories listed above, but distinction between the categories can still be made for research and conservation purposes.

SUB-GROUP C

The IOS does not distinguish between such species and stocks.

WORKING GROUP EVALUATION

It was **agreed** that the Sanctuary provision does not distinguish between species and stocks that are depleted and apparently slow to recover, those that are increasing rapidly, and those that are abundant and not threatened.

(4) Assess the present and potential threats to whale stocks and their habitats in the area of the Sanctuary and how the Sanctuary addresses these. Such factors may include inter alia: whaling; fishing; oil and gas exploitation including seismic surveys; shipping; whalewatching; climate change; other environmental factors.

SUB-GROUP A

No information is available to assess the threats to whale stocks and their habitats. The IOS addresses only commercial whaling. Commercial whaling is not a potential threat because any resumption of whaling would only occur under the risk-averse RMP. It does not address aboriginal/subsistence whaling, fishing, oil and gas exploration, whalewatching, climate change or other environmental factors.

SUB-GROUP B

Although the Sanctuary currently only provides direct protection to whales from commercial whaling, much of the research in the Sanctuary is aimed at the identification and assessment of other threats. The results of the research have importance for the development of national protective measures, and for the development of future regional and international measures.

SUB-GROUP C

There is at present an aboriginal sperm whale fishery in Indonesia. Potential for unregulated whaling is always present. Known fisheries considerations include: drift and gillnet entanglements off Oman (humpback, Bryde's), Zanzibar, and in shark nets off South Africa (humpback, right whale); pot line entanglements off Australia; and potential ship strikes in all areas. The group was not aware of any areas where diminished prey due to fishing was affecting whale populations. Oil and gas explorations are taking place and may have detrimental effects near South Africa, Mozambique, Oman, the Straits of Hormuz and Arabian Gulf, and Australia. Whalewatching should be covered by domestic regulations as for example in Australia and South Africa. There is, however, no such coverage in some areas, for example Madagascar. Northern Indian Ocean stocks may be vulnerable to climate change as they are without the option to move to polar grounds. Coastal habitat degradation and shipping, for example, may be concerns around Arabia.

WORKING GROUP EVALUATION

It was **agreed** that currently the IOS protects whales only from commercial whaling. It was also **agreed** that additional threats may be occurring, but that these have not been rigorously assessed.

(5) Consider the relationship of the Sanctuary with other existing measures to protect whales from anthropogenic and environmental factors.

SUB-GROUP A

The Sanctuary does not improve protection of whales. It simply duplicates the unnecessary protection afforded by the moratorium on commercial whaling. Neither does it improve the conservation of breeding sites, migratory routes and/or feeding grounds. The Sanctuary does not complement the Commission's current management regime (the moratorium) nor will it complement the proposed regime of the RMP/RMS, because safe quotas will only be adopted for abundant stocks to ensure whaling is sustainable.

SUB-GROUP B

The Commission's Revised Management Scheme is still under development but it is envisaged that the RMS and sanctuaries would represent mutually complementary management measures.

SUB-GROUP C

See Group C's comment on Items 6.1-6.3 below.

WORKING GROUP EVALUATION

There was no consensus on the relationship of the Sanctuary with other existing whale protection measures from anthropogenic and environmental factors.

(6) Assess the anticipated effects of the proposed sanctuary in terms of: (6.1) improving protection of whales, in breeding areas, feeding grounds and/or migratory routes; (6.2) improving the conservation of breeding sites, migratory routes and/or feeding ground; and (6.3) complementing existing or potential protection including the Commission's management regime and regional and international agreements concerning biodiversity and conservation of nature.

SUB-GROUP A

(6.1) The Sanctuary does not improve protection of whales. It simply duplicates the unnecessary protection afforded by the moratorium on commercial whaling.

(6.2) Neither does it improve the conservation of breeding sites, migratory routes and/or feeding grounds.

(6.3) The Sanctuary does not complement the Commission's current management regime (the moratorium) nor will it complement the proposed regime of the RMP/RMS, because safe quotas will only be adopted for abundant stocks to ensure whaling is sustainable.

SUB-GROUP B

(6.1) The Sanctuary provides protection for the breeding stocks of all Indian Ocean baleen whales. The boundary at 55°S confers protection to feeding grounds of Bryde's and sei whales, the main feeding grounds for southern right whales, and part of the feeding grounds of Southern Hemisphere fin whales. Southern Hemisphere blue and humpback whales and Antarctic minke whales migrate outside the IOS. Female and juvenile sperm whales are protected throughout their range.

(6.2) The issues of habitat protection have only recently been considered by the IWC and to date no international measures have been taken. Whale habitat is specifically included in some national marine protected areas in the Indian Ocean.

(6.3) CCAMLR requires that the fisheries management take into account the needs of dependent species. The IOS provides protection to those dependent species during the part of the year for which they are outside the CCAMLR area.

SUB-GROUP C

(6.1) The IOS offers no such further protection given the moratorium. Furthermore, were the moratorium lifted, species migrating beyond its borders would not enjoy full protection.

(6.2) The IOS does not improve the conservation of any of these.

(6.3) The IOS could provide a control area, should the RMP be applied globally. However, it may be more appropriate to consider different areas within the Southern Hemisphere for different species.

WORKING GROUP EVALUATION

There was no consensus on the role of the IOS in terms of: improving protection of whales in breeding areas, feeding grounds and/or migratory routes; improving the conservation of breeding sites, migratory routes and/or feeding ground; or complementing existing or potential protection including the Commission's management regime and regional and international agreements concerning biodiversity and conservation of nature.

(7) Provide advice on whether the boundaries of the Sanctuary are ecologically appropriate.

SUB-GROUP A

Boundaries of the IOS were established simply to cover as wide an area as possible without regard to ecological principles or specific conservation needs for whale stocks. The boundaries of the IOS neither cover the entire range of large whale stocks that migrate through or into the area nor are they limited to critical habitats for the species. For this reason, the IOS boundaries are not ecologically appropriate and are not consistent with the common concept of a sanctuary.

SUB-GROUP B

The current boundaries are simply defined in terms of latitude and longitude and include an ecologically coherent area with land boundaries forming the majority of the eastern, western and northern boundaries. Most previous discussions regarding the boundary largely concentrated on the southern boundary. The original proposal was for the entire Indian Ocean including the Southern Ocean sector, but for operational reasons this was revised to 55°S while recognising that this had only limited ecological significance. The current Sanctuary boundaries provide opportunities for comparison of the potentially unique (in terms of genetics, behaviour and physiology) northern Indian Ocean whale stocks with southern Indian Ocean stocks across the same ocean basin.

SUB-GROUP C

For many species, the boundaries do not encompass their full distributional range, and so are not appropriate. Other options considered to be superior to the IOS include: (1) extending the IOS southward to the ice-edge, together with possible east-west broadening to encompass the assessed range of biological stocks; (2) limiting the IOS to a northern part of the area, given the unique situation there of whales precluded from polar migration; and (3) selecting a longitudinal slice of the Southern Hemisphere to serve as a control region, with the choice based upon simulation studies to assess optimality. This choice may be species-specific.

WORKING GROUP EVALUATION

There was no consensus on whether the boundaries of the Sanctuary are ecologically appropriate.

(8) Provide advice on whether the Sanctuary addresses the issue of critical habitat and non-critical whale habitat.

SUB-GROUP A

The Sanctuary does not address any habitat issues. It is simply a blanket prohibition on commercial whaling in the area. The issue of critical habitat is, however, addressed by the RMP, which does not provide quotas in breeding areas.

SUB-GROUP B

Since the competence of the IWC to include habitat protection measures in its Schedule has not yet been established, the Sanctuary provision *per se* contains no measures for habitat protection. However, the Sanctuary is of sufficient size to encompass the complete habitat for some populations.

SUB-GROUP C

Not in general, but a sanctuary restricted to the northern part of the area could more defensively be argued to do so.

WORKING GROUP EVALUATION

It was **agreed** that the Sanctuary does not currently address the issue of critical and non-critical whale habitat.

(9) Evaluate whether the Sanctuary may contribute to or impede the conduct of scientific research useful for meeting the IWC objectives and facilitate coordinated and integrated research and monitoring programmes.

SUB-GROUP A

While initially the establishment of the Sanctuary is reported to have resulted in an increase in research funding from NGOs and some research on sperm whales reported to be useful for meeting the IWC objectives, it also resulted in a decrease in national research funding in the area, except for Sri Lanka. Although a number of long-term research projects have been suggested, very few such projects have been initiated. The Sanctuary has therefore impeded the conduct of scientific research useful for meeting the IWC objectives. This is confirmed by the absence of any recent reports of such research in the list of bibliographic references prepared for the IWC Sanctuary Review Steering Group.

SUB-GROUP B

An important consideration when considering the level of research in the Sanctuary is that the coastal states are predominantly developing countries. The increase in research effort since 1992 is partly a reflection of the increase in cetacean research worldwide, but some of the projects have been initiated in response to the Sanctuary designation. One of the difficulties in evaluating the Sanctuary is knowing which activities are a direct result of the Sanctuary and which would have happened without it. In the case of research, the sub-group mainly relied on whether the reports of the research indicated that the existence of the Sanctuary had been of benefit. Indirect benefits that were referred to included: a focus on regional initiatives and cooperation; a greater awareness of cetaceans in coastal states; facilitation of the initial phase of integrated research between Indian Ocean and Southern Ocean; additional sources of funding.

SUB-GROUP C

The current combination of the IOS and the SOS impedes research, as the associated inability to compare stocks both under exploitation and unexploited in a control area detracts from capabilities to estimate demographic parameters relevant to the IWC objective of sound management on a scientific basis. Species-specific sanctuaries in parts of the Southern Hemisphere could, however, play some useful role towards that end.

WORKING GROUP EVALUATION

There was no consensus on whether the Sanctuary may contribute to or impede conduct of scientific research useful for meeting IWC objectives or facilitating coordinated and integrated research and monitoring programmes.

(10) Provide advice on whether the Sanctuary is consistent with the precautionary approach.

SUB-GROUP A

No widely accepted or pragmatic definition of the precautionary approach provides for the implementation of measures for the total protection of whales irrespective of their conservation status. Further, no such definition recommends unnecessary or duplicative measures such as the IOS. By contrast, although the RMP is unnecessarily precautionary and wasteful of resources, its implementation would be consistent with broadly accepted definitions of the precautionary approach.

SUB-GROUP B

The central tenet of the precautionary approach is that lack of information shall not delay potentially necessary conservation measures. The adoption of the IOS in 1979 at a time when relatively little was known about the whale populations in the region was a precautionary measure adopted by the IWC. While the RMP is designed to be more precautionary than its predecessors, the establishment of an appropriately designed system of sanctuaries can be regarded as a precautionary safeguard to mitigate the effects of possible failure of the RMP to adequately protect whale stocks after the current moratorium ends.

SUB-GROUP C

Superficially, a positive answer would seem obvious. However, the precautionary approach, taken to extremes, implies no utilisation of any natural resources. A pragmatic and balanced interpretation is necessary, taking account of the precautionary nature of the RMP, and the fact that the data contrast provided by limited exploitation is a necessary component of input to the development of a sound scientific basis for management. In this context, the precautionary approach should be seen as consistent with a set of species-specific sanctuaries of limited scope only.

WORKING GROUP EVALUATION

There was no consensus on whether the Sanctuary is consistent with the precautionary approach.

5.5 Recommendations for the IOS

Each sub-group was asked to provide recommendations for the IOS. These are given below.

Sub-group A

The IOS has been made redundant by the moratorium on commercial whaling and unnecessary by the RMP, both of which were adopted after the Sanctuary. The Sanctuary is an inappropriate management strategy that does not provide additional or necessary protection to whales, nor does it improve protection of whale habitat. Further, it does not address other anthropogenic or environmental factors. The Sanctuary impedes the conduct of scientific research and is inconsistent with the precautionary approach. Finally, the Sanctuary does not meet the requirement of the Convention that regulations be based on scientific findings. For these reasons, the IOS should be abolished.

Sub-group B

The sub-group recommended that the IOS continue in its current form, based on the available data. However, should the SOS provisions be changed in the future it may be considered prudent to extend the southern boundary of the IOS to the Antarctic continent. The sub-group considered

that there were insufficient data to define a smaller area (such as the Indian Ocean north of the equator) that would achieve the Sanctuary objectives. In addition, current boundaries provide opportunities for comparison of behaviour, physiology and the effects of climate change on unique northern Indian Ocean stocks with southern Indian Ocean stocks afforded the same protection across an ocean basin. The sub-group recommends that the Commission and the Scientific Committee encourage regional research cooperation and provide advice to coastal states on ways to address threats to large and small cetaceans in their waters.

Sub-group C

The sub-group considered that sanctuaries should be motivated on a species-by-species basis and as an integral part of an overall management plan, such that maximum scientific value can be achieved. In particular, in the IOS context, it sees merit in reformulating this to apply only to the northern part of that area, given the unique situation there of whale populations precluded from polar migration, although other options are also put forward in response to Instruction (7) above.

6. COMMENTS/RECOMMENDATIONS CONCERNING THE INSTRUCTIONS FROM THE COMMISSION FOR THE REVIEWS OF SANCTUARIES AND SANCTUARY PROPOSALS

Each sub-group was asked to make comments and recommendations concerning the Instructions from the Commission. Specific recommendations were incorporated in the evaluation of each Instruction below, while more general recommendations are listed under 'General Comments and Recommendations'.

Sakamoto asked that it be noted that existing sanctuaries have no scientific basis and that sanctuaries are not necessary as a conservation measure even when the moratorium is lifted because of the precautionary nature of the RMP. Sakamoto suggested that the Scientific Committee does not need guidelines for the review of sanctuaries, since there should be no sanctuaries to review. This includes the SOS to be reviewed in 2004. The Chair noted that sanctuaries are currently in place, that additional sanctuary proposals are forthcoming, and that the Commission expects the Scientific Committee to review each of these sanctuaries and sanctuary proposals. Sakamoto noted that his comments mean that he is unable to agree with the Working Group's evaluation of the Instructions.

The following section contains the Working Group's evaluation of each Instruction from the Commission.

(1) Give attention to assessing how well the scientific aspects of the agreed objectives of the Sanctuary have been met and how well they might be met if the Sanctuary continues

It was **agreed** that this aspect of the review would benefit from explicitly stated scientific objectives in sanctuary proposals.

(2) Provide advice on the status and trends of whale stocks in the Sanctuary

It was **agreed** that this item is clear.

(3) Assess whether the Sanctuary distinguishes between species and stocks depleted and apparently slow to recover, those rapidly recovering and those abundant and not threatened

It was **agreed** that this item is not clearly worded, and needs to define how the Sanctuary provision is intended to distinguish among such species and stocks.

(4) Assess present and potential threats to whale stocks and their habitats in the area of the Sanctuary, including: whaling; fishing (including bycatch); oil and gas exploration (including seismic surveys); shipping; whalewatching; climate change; and other environmental factors

It was noted that it is unclear how to interpret the Instruction to assess various non-whaling threats, since the Commission does not currently adopt management measures that directly address these threats. It was **agreed** that this Instruction requires clearer linkage between IWC sanctuaries and assessing non-whaling activities.

(5) Consider relationship of the Sanctuary with other existing whale protecting measures from anthropogenic and environmental factors

It was **agreed** that this instruction was clear.

(6) Assess the anticipated effects of the proposed sanctuary in terms of: (i) Improving protection of whales, in the breeding areas, feeding grounds and/or migratory routes; (ii) Improving the conservation of breeding sites, migratory routes and/or feeding grounds; and (iii) Complementing existing or potential protection including the Commission's current management regime and regional and international agreements concerning biodiversity and conservation of nature

It was **agreed** that clarification is needed to define a link between the act of establishing an IWC sanctuary and additional present and potential threats. In particular, the sense in which responses to (ii) are intended to address this needs to be expanded.

(7) Provide advice on whether the boundaries of the Sanctuary are ecologically appropriate

It was **agreed** that this question can be easily interpreted so long as the scientific objectives of the Sanctuary are well defined.

(8) Provide advice on whether the Sanctuary addresses the issues of critical and non-critical whale habitat

It was **agreed** that definition of 'critical and non-critical whale habitat' is required, and that linkages, as suggested in the response above to (6), would be helpful.

(9) Evaluate whether the Sanctuary may contribute to or impede the conduct of scientific research useful for meeting IWC objectives and facilitate coordinated and integrated research and monitoring programmes

It was noted that this Instruction poses scientific and non-scientific questions simultaneously, and would benefit from clarification. Members disagreed on whether the SC is able to address whether IWC sanctuaries facilitate

coordinated and integrated research and monitoring programmes. It was agreed that this Instruction requires objective criteria for evaluation.

(10) Provide advice on whether the Sanctuary is consistent with the precautionary approach

It was **agreed** that the term 'the Precautionary Approach' must be clearly defined.

General comments and recommendations

Some members provided additional general comments and recommendations concerning reviews of sanctuaries and sanctuary proposals. These are presented below for information only, and were not discussed by the Working Group.

- (1) It is unclear how the Commission's questions as to how a sanctuary addresses various non-whaling threats are intended to be interpreted. The Commission knows that it does not currently adopt management measures that directly tackle these threats, and presumably it is not asking the SC whether it does. These questions were interpreted in terms of how the Sanctuary may encourage cooperation in the region to research and address these threats.
- (2) Guidelines for sanctuary reviews should include an evaluation of the appropriateness of the timing of reviews and this should take into account the long life span of whale species and the time frames over which the necessary scientific work needs to be conducted. The review criteria need to take into account any changes to the objectives of the Sanctuary as these evolve. The SC also needs to be kept up to date with evolving objectives of a sanctuary so that it can prioritise accordingly.
- (3) The SC could contribute more effectively to the realisation of the objectives of a sanctuary if it were given a mandate to develop a framework for the facilitation of collaborative research in the region. An essential component of this is to assist the involvement of scientists from developing countries within or bordering the Sanctuary.
- (4) If one of the objectives of a sanctuary proposal is to promote scientific research, then the Commission should increase budgetary resources towards this end.
- (5) The question about the status and trends of whale stocks within a sanctuary could be more effectively answered if the SC were given a mandate to conduct an assessment of the current state of knowledge of the conservation status of whale populations in the Sanctuary, with respect to the cumulative impact of the threats mentioned in the Commission's guidelines, namely whaling, bycatch, shipping, etc. Such an assessment could be conducted as part of the review of a proposed sanctuary or following its adoption with a view to designing a suitable programme of research for the Sanctuary.

7. SOUTH PACIFIC SANCTUARY PROPOSAL

Paper IWC/54/16 introduced a proposal for a South Pacific whale sanctuary submitted by Australia and New Zealand. It was noted that the content was the same as last year, but that it had been reformatted in accordance with the Instructions from the Commission. A record of the discussion of this document is given in last year's report (IWC, 2002b, p.67) and hence there was no need for further discussion.

8. OTHER SANCTUARIES

SC/54/O11 reported on the declaration of a whale sanctuary by the Government of the Cook Islands. The Cook Islands Whale Sanctuary (CIWS) was declared on 19 September 2001; it covers an area of approximately one million n.miles². Although there was little commercial whaling in the Cook Islands *per se*, local populations of humpback and sperm whales were heavily exploited (including by illegal catches) in other portions of their range; as in other areas of Oceania, recovery of these populations in the Cook Islands appears to have been slow. Cetacean species known to occur in the CIWS include four baleen whales and ten odontocetes; the occurrence in the region of an additional two mysticetes and nine odontocetes is considered likely. Humpback and sperm whales are the two most commonly observed large whales, and the former have been the subject of much research in recent years. Humpback whales (probably from the Area VI stock) are present in the CIWS during the austral winter; they appear to use the region as a calving and mating ground. A long-term study of this species is aimed at estimating abundance, documenting habitat use, assessing the degree of exchange with other areas of the South Pacific, and collecting biopsy samples for analyses of the genetic structure of South Pacific humpbacks. Other research in the CIWS is focused on beaked whales (*Ziphius cavirostris* and *Mesoplodon densirostris*), and on documentation of cetacean diversity in the region through surveys. Research in the CIWS is coordinated with work in other portions of Oceania through the South Pacific Whale Research Consortium (SC/54/O14). Regulations enacted to accompany the CIWS forbid the killing, injuring or harassing of cetaceans within sanctuary waters.

It was noted that a proposal for a South Atlantic Sanctuary would be resubmitted to the Commission this year and that its supporting document remains the same as that presented to the Scientific Committee last year (Government of Brazil, 2001).

The Working Group was informed that in November 2000, the Tristan da Cunha Island Council officially adopted the Tristan da Cunha Whale Sanctuary, which includes the 12 n.mile territorial waters of the Islands of Tristan, Inaccessible, Nightingale and Gough. The Sanctuary is designed to protect all cetacean species inhabiting or using these waters and is in place for an indefinite period of time.

9. FUTURE WORK

The Working Group outlined the following items to be addressed in the future:

- (1) Further develop generic criteria for reviewing sanctuaries (e.g. based on the criteria used in the IOS review), given feedback and clarification from the Commission.
- (2) Initiate the Review of the SOS based on instructions from the Commission, by beginning to collate the information required to follow the Instructions.
- (3) Discuss a mechanism for reviewing IWC Sanctuaries in combination, where biologically relevant.
- (4) Discuss a mechanism for introducing Marine Protected Areas (MPA) scientific concepts, such as critical habitat, into the IWC Sanctuaries and Sanctuary Proposals. In addition, consideration should be given to cooperating with appropriate international organisations to consider ways to evaluate non-whaling threats to cetaceans included within appropriate sanctuary/MPA boundaries.

This might best be achieved by creating linkages to international organisations that have the expertise to address non-whaling threats to cetaceans in the area covered by the Sanctuary.

- (5) Discuss a mechanism, such as a standard form to proposals, through which the Commission could assist Member Countries in developing Sanctuary Proposals, if the Commission would welcome such a mechanism. This mechanism would in particular include identifying the objectives of the sanctuary and establishing a scientific monitoring programme that allows evaluation of these objectives.

It was **agreed** that an intersessional Steering Group be formed to make progress on the above tasks before the meeting in 2003, giving priority to items 1 and 2. It was **agreed** that the Steering Group would comprise Zerbini (Convener), Bjørge, Butterworth, Childerhouse, Donovan, Kell, Koch, Leaper, Manzanilla, Morishita and Thiele.

10. ADOPTION OF THE REPORT

The meeting thanked the Chair, the rapporteurs and the conveners of the sub-groups. The report was adopted at 19:45 on 7 May 2002.

REFERENCES

- Anonymous. 1979. The Seychelles Initiative. Paper IWC/31/6 presented to the International Whaling Commission, July 1979 (unpublished). [Paper available from the Office of this Journal].
- Baldwin, R.M. 1997. *Whales and Dolphins of Oman*. Ministry of Regional Municipalities and Environment, PO Box 323, Muscat 113, Sultanate of Oman. 34pp.
- Baldwin, R. 1998. A note on sightings of sperm whales off the coasts of the Sultanate of Oman and the United Arab Emirates, October 1994-October 1997. Paper SC/50/CAWS22 presented to the IWC Scientific Committee, April 1998 (unpublished). [Paper available from the Office of this Journal].
- Ballance, L.T. and Pitman, R.L. 1998. Cetaceans of the Western Tropical Indian Ocean: distribution, relative abundance, and comparisons with cetacean communities of two other tropical ecosystems. *Mar. Mammal Sci.* 14(3):429-59.
- Ballance, L.T., Anderson, R.C., Pitman, R.L., Stafford, K., Shaan, A., Waheed, Z. and Brownell, R.L. 2001. Cetacean sightings around the Republic of the Maldives, April 2001. *J. Cetacean Res. Manage.* 3(2):213-8.
- Bannister, J. 2001. Status of southern right whales (*Eubalaena australis*) off Australia. *J. Cetacean Res. Manage.* (special issue) 2:103-10.
- Bannister, J.L. and Hedley, S.L. 2001. Southern Hemisphere group IV humpback whales: their status from recent aerial survey. *Mem. Queensl. Mus.* 47(2):587-98.
- Bannister, J.L., Taylor, S. and Sutherland, H. 1981. Logbook records of 19th Century American sperm whaling: a report on the 12 month project, 1978-79. *Rep. int. Whal. Commn* 31:821-35.
- Barnes, R.H. 1991. Indigenous whaling and porpoise hunting in Indonesia. pp. 99-106. *In: S. Leatherwood and G.P. Donovan (eds.) Marine Mammal Technical Report. 3. Cetaceans and Cetacean Research in the Indian Ocean Sanctuary*. United Nations Environment Programme, Nairobi, Kenya. viii+287.
- Best, P. 1998. Blue whales off Namibia – a possible wintering ground for the Antarctic population. Paper SC/50/CAWS14 presented to the IWC Scientific Committee, April 1998 (unpublished). [Paper available from the Office of this Journal].
- Best, P.B., Butterworth, D.S. and Rickett, L.H. 1984. An assessment cruise for the South African inshore stock of Bryde's whales (*Balaenoptera edeni*). *Rep. int. Whal. Commn* 34:403-23.
- Best, P.B., Sekiguchi, K., Rakotonirina, B. and Rossouw, A. 1996. The distribution and abundance of humpback whales off southern Madagascar, August-September 1994. *Rep. int. Whal. Commn* 46:323-31.

- Best, P.B., Brandão, A. and Butterworth, D.S. 2001. Demographic parameters of southern right whales off South Africa. *J. Cetacean Res. Manage.* (special issue) 2:161-9.
- Best, P.B., Rademeyer, R.A., Burton, C., Ljungblad, D., Sekiguchi, K., Shimada, H., Thiele, D., Reeb, D. and Butterworth, D.S. 2003. The abundance of blue whales on the Madagascar Plateau, December 1996. *J. Cetacean Res. Manage.* [Accepted].
- Branch, T.A. and Butterworth, D.S. 2001. Southern Hemisphere minke whales: standardised abundance estimates from the 1978/79 to 1997/98 IDCR-SOWER surveys. *J. Cetacean Res. Manage.* 3(2):143-74.
- Burt, M.L. and Stahl, D. 2001. Minke whale abundance estimation from the 1998/99 IWC-SOWER Antarctic Cruise in Area IV. Paper SC/53/IA3 presented to the IWC Scientific Committee, July 2001, London (unpublished). [Paper available from the Office of this Journal]. [Plus 10pp. Errata].
- Cockcroft, V.G., Ross, G.J.B. and Peddemors, V.M. 1990. Bottlenose dolphin *Tursiops truncatus* distribution in Natal's coastal waters. *S. Afr. J. mar. Sci.* 9:1-10.
- Cockcroft, V.G., Ross, G.J.B. and Peddemors, V.M. 1991. Distribution and status of bottlenose dolphin *Tursiops truncatus* on the south coast of Natal, South Africa. *S. Afr. J. mar. Sci.* 11:203-9.
- Cockcroft, V.G., Ross, G.J.B., Peddemors, V.M. and Borchers, D. 1992. Estimates of density and undercounting of bottlenose dolphins off northern Natal, South Africa. *S. Afr. J. Wildl. Res.* 22:102-9.
- Corbett, H.D. 1994. The occurrence of cetaceans off Mauritius and in adjacent waters. *Rep. int. Whal. Commn* 44:393-8.
- De Boer, M.N., Eyre, L., Jenner, M.-N.M., Keith, S.G., McCabe, K.A., Parsons, E.C.M., Rosenbaum, H.C., Rudolph, P. and Simmonds, M. 2001. Cetaceans in the Indian Ocean: a preliminary review. Paper SC/53/O6 presented to the IWC Scientific Committee, July 2001, London (unpublished). [Paper available from the Office of this Journal].
- Findlay, K.P. and Best, P.B. 1996. Estimates of the numbers of humpback whales observed migrating past Cape Vidal, South Africa, 1988-1991. *Mar. Mammal Sci.* 12(3):354-70.
- Gordon, J.C.D. 1991. The World Wildlife Fund's Indian Ocean sperm whale project: an example of cetacean research within the Indian Ocean Sanctuary. *UNEP Mar. Mamm. Tech. Rep.* 3:219-39.
- Government of Brazil. 2001. A South Atlantic whale sanctuary. Paper IWC/53/7 presented to the IWC 53rd Annual Meeting, July 2001, London (unpublished). [Paper available from the Office of this Journal].
- International Whaling Commission. 1979a. Chairman's Report of the Thirtieth Annual Meeting. *Rep. int. Whal. Commn* 29:21-37.
- International Whaling Commission. 1979b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 29:38-105.
- International Whaling Commission. 1980a. Chairman's Report of the Thirty-First Annual Meeting. *Rep. int. Whal. Commn* 30:25-41.
- International Whaling Commission. 1980b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 30:42-137.
- International Whaling Commission. 1981a. Chairman's Report of the Thirty-Second Annual Meeting. *Rep. int. Whal. Commn* 31:17-40.
- International Whaling Commission. 1981b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 31:51-165.
- International Whaling Commission. 1982a. Chairman's Report of the Thirty-Third Annual Meeting. *Rep. int. Whal. Commn* 32:17-42.
- International Whaling Commission. 1982b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 32:43-149.
- International Whaling Commission. 1982c. Report of the Scientific Committee. Annex L. Report of the sub-committee on research on cetaceans in the Indian Ocean sanctuary. *Rep. int. Whal. Commn* 32:132-5.
- International Whaling Commission. 1983a. Chairman's Report of the Thirty-Fourth Annual Meeting. *Rep. int. Whal. Commn* 33:20-42.
- International Whaling Commission. 1983b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 33:43-190.
- International Whaling Commission. 1984. Report of the Scientific Committee. *Rep. int. Whal. Commn* 34:35-181.
- International Whaling Commission. 1986. Report of the Scientific Committee. *Rep. int. Whal. Commn* 36:30-140.
- International Whaling Commission. 1994. Report of the Scientific Committee, Annex F. Report of the sub-committee on small cetaceans. *Rep. int. Whal. Commn* 44:108-19.
- International Whaling Commission. 2001. Report of the Workshop on the Comprehensive Assessment of Right Whales: A worldwide comparison. *J. Cetacean Res. Manage.* (special issue) 2:1-60.
- International Whaling Commission. 2002a. Chair's Report of the 53rd Annual Meeting. Annex E. Instructions from the Commission to Scientific Committee for Reviews of Sanctuaries. *Ann. Rep. Int. Whaling Comm.* 2001:65.
- International Whaling Commission. 2002b. Report of the Scientific Committee. *J. Cetacean Res. Manage.* (Suppl.) 4:1-78.
- Jenner, K.C.S. and Jenner, M.-N. 1994. A preliminary population estimate of the group IV breeding stock of humpback whales off western Australia. *Rep. int. Whal. Commn* 44:303-8.
- Kasuya, T. and Wada, S. 1991. Distribution of large cetaceans in the Indian Ocean: data from Japanese sightings records, November-March. *UNEP Mar. Mamm. Tech. Rep.* 3:139-70.
- Leatherwood, S. and Donovan, G.P. (eds.). 1991. *Marine Mammal Technical Report. No. 3. Cetaceans and Cetacean Research in the Indian Ocean Sanctuary.* 1st Edn. UN Environment Programme, Nairobi. vii+287pp.
- Rice, D.W. 1998. *Marine Mammals of the World. Systematics and Distribution.* Special Publication No. 4. The Society for Marine Mammology, Lawrence, Kansas. 231pp.
- Robineau, D. 1991. Balaenopterid sightings in the western tropical Indian Ocean (Seychelles area), 1982-1986. pp. 171-8. In: S. Leatherwood and G.P. Donovan (eds.) *Marine Mammal Technical Report 3. Cetaceans and Cetacean Research in the Indian Ocean Sanctuary.* United Nations Environment Programme, Nairobi, Kenya. viii+287pp.
- Rosenbaum, H.C., Razafindrakoto, Y., Ersts, P. and Ventresca, G. 2000. A preliminary population estimate for humpback whales from the Antongil Bay, Madagascar wintering ground in the southwestern Indian Ocean. Paper SC/52/IA10 presented to the IWC Scientific Committee, June 2000, Adelaide, Australia (unpublished). [Paper available from the Office of this Journal].
- Tynan, C. 1996. Characterization of oceanographic habitat of cetaceans in the southern Indian Ocean between 82°-115°E: cruise report from World Ocean Circulation Experiment (WOCE) 18S and 19S. NOAA Technical Memorandum NMFS-AFSC-64. US Department of Commerce, Seattle, WA. 53pp.
- Tynan, C. 1997. Cetacean distributions and oceanographic features near the Kerguelan Plateau. *Geophys. Res. Lett.* 24(22):2793-6.
- Wray, P. and Martin, K.R. 1983. Historical whaling records from the western Indian Ocean. *Rep. int. Whal. Commn* (special issue) 5:213-41.
- Yablokov, A.V. 1994. Validity of whaling data. *Nature, Lond.* 367(6459):108.
- Yuan, X. and Martinson, D.G. 2000. Antarctic sea ice extent variability and its global connectivity. *Journal of Climate* 13:1697-717.

Appendix 1

AGENDA

1. Opening remarks
2. Appointment of the rapporteurs
3. Review of available documents
4. Adoption of the agenda
5. Review of the IOS
 - 5.1 Review of documents
 - 5.2 Review of the objectives of the Sanctuary

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| <p>5.2.1 Objectives of the IOS – Evaluation criteria</p> <p>5.3 Review of large whale research developed in the IOS and its implications for the work of the Scientific Committee and the Comprehensive Assessment of Whale Stocks (CAWS)</p> <p>5.3.1 Research in the IOS – Evaluation criteria</p> <p>5.3.2 The IOS and the Comprehensive Assessment of Whale Stocks – Evaluation criteria</p> <p>5.4 Review of the IOS based on the Instructions provided by the Commission in 2001</p> | <p>5.5 Recommendations for the IOS</p> <p>6. Comments/recommendations concerning the Instructions from the Commission for Reviews of Sanctuaries and Sanctuary Proposals</p> <p>7. South Pacific Sanctuary Proposal</p> <p>8. Other sanctuaries</p> <p>9. Future work</p> <p>10. Adoption of the report</p> |
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Appendix 2

A NOTE ON THE DECISION NOT TO CONSIDER SMALL CETACEAN DATA RELATED TO THE INDIAN OCEAN SANCTUARY REVIEW

R. Brownell, S. Childerhouse, P. Deimer, M. Iniguez, H. Oosthuizen, J. Palazzo, V. Peddemors, M. Simmonds and K. Van Waerebeek

The IOS Working Group was advised by its Chair that, according to instructions given by the Chair of the Scientific Committee, focus should be directed to ‘large whales’, while reviewing the IOS.

We respectfully disagree and regard this decision as unfortunate. There are many issues related to ‘small cetaceans’ and their environment that apply equally to the species arbitrarily defined as ‘large whales’; the exclusion of such information from a scientific review prevents the discussion of important aspects of the Sanctuary and its proper assessment.

Moreover, the Scientific Committee itself, in addressing the issue of appropriate research related to the IOS, stated *inter alia* that ‘it should provide sufficient information to assess stocks of large whales and small cetaceans’ (IWC, 1982, p.132).

We are also concerned that the instructions regarding this matter prejudice the position of several Contracting Governments regarding the taxonomic coverage of the IWC regulatory mandate, and this unnecessarily imports a political debate into the Committee. The Committee has in the past agreed that ‘small cetaceans’ can be discussed and reviewed in a science-only basis and we would welcome the continuation of this interpretation in the future.

REFERENCE

International Whaling Commission. 1982. Report of the Scientific Committee. Annex L. Report of the sub-committee on research on cetaceans in the Indian Ocean sanctuary. *Rep. int. Whal. Commn* 32:132-5.

Appendix 3

PROPOSED PROCEDURES TO REVIEW THE INDIAN OCEAN SANCTUARY

Members: Zerbini (Chair), Bjørge, Butterworth, Childerhouse, Donovan, Kell, Kock, Morishita and Thiele

INTRODUCTION

This paper is presented in order to provide the IWC SC with proposed criteria to evaluate the scientific objectives of the Indian Ocean Sanctuary (IOS) both in their content and whether they have been addressed and/or achieved. The review should focus primarily on the large whales stocks¹ inhabiting the Indian Ocean.

History

The IOS (Fig. 1) was proposed by the Government of

Seychelles (Anon., 1979) and adopted by the IWC in 1979 (IWC, 1980a, p.27)

in accordance with Article V(1) (c) of the Convention, commercial whaling, whether by pelagic operations or from land stations, is prohibited in a region designated as the Indian Ocean Sanctuary. This comprises the waters of the Northern Hemisphere from the coast of Africa to 100° East, including the Red and Arabian Seas and the Gulf of Oman and the waters of the Southern Hemisphere in the sector from 20° East to 130° East, with the Southern boundary set at 55° South. This prohibition applies irrespective of the classifications of baleen or toothed whale stocks in the sanctuary, as may from time to time be determined by the Commission. This prohibition will apply for ten years, with the provision for a general review after five years, unless the Commission decides otherwise.

From 1981 to 1985, three meetings were held to consider research relevant to the IOS. A workshop was convened in Zeist, Netherlands, in September/October 1981 to plan a Programme of Scientific Research on Cetaceans in the IOS. The workshop agreed on a series of objectives for a research programme in the Sanctuary (see below). The workshop also identified 24 projects that would contribute to meet these objectives (Leatherwood and Donovan, 1991, pp.22-24). At that time, some were already implemented or partially

¹ In this document, the term ‘stock’ refers to the management areas and divisions as classified in the Schedule of the International Convention for the Regulation of Whaling.

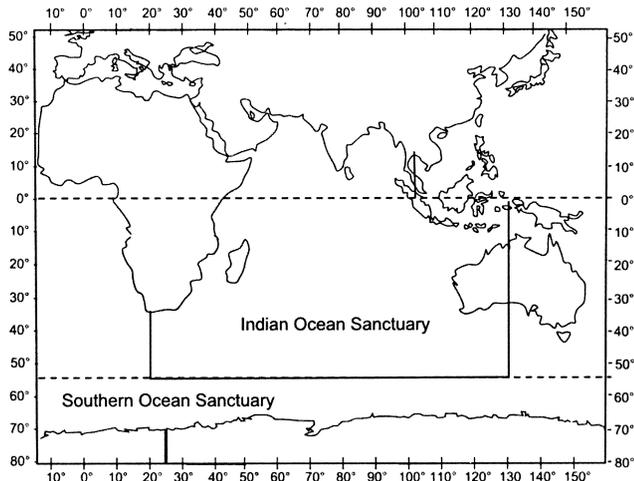


Fig. 1. Boundaries of the Indian Ocean Sanctuary.

implemented and others were waiting for funding to become available.

An International Conference on Conservation and Management of Marine Mammals was held in Colombo, Sri Lanka, in February 1983. Many recommendations were related to some of the proposals of the Zeist Workshop and were thought to be feasible for many Indian Ocean coastal states. Another meeting, a Symposium on Endangered Marine Animals and Marine Parks was held in Cochin, India, from 12-16 January 1985. No recommendations were made, although papers relevant to scientific work in the IOS were presented (Leatherwood and Donovan, 1991).

From 24-28 February 1987, a meeting was held in Anse aux Pins, Seychelles to review the IOS, in particular the scientific component of the review process. The report of this meeting was published by the United Nations Environment Programme (UNEP) as a Technical Report (Leatherwood and Donovan, 1991). Relevant aspects of this meeting were:

- (1) a review of past research and its main results;
- (2) an evaluation of the impact of the existence of the Sanctuary on research;
- (3) a discussion of the scientific aspects of the effectiveness of the Sanctuary in meeting the objectives of the Commission;
- (4) a discussion of the scientific contribution of the sanctuary to the comprehensive assessment of whale stocks and the cetacean component of the (UNEP) global action plan for marine mammals;
- (5) an evaluation of the present boundaries of the IOS and suggestions for change;
- (6) the identification of possible sub-areas within the IOS for special purposes;
- (7) future research and management actions in the IOS.

In 1989 the IOS was extended for three years (IWC, 1990, pp.21-22), and for a further ten years in 1992, when the IWC agreed that it should be reviewed by the Commission at its Annual Meeting in 2002 (IWC, 1993, p.27).

The current Schedule text states,

In accordance with Article V(1)(c) of the Convention, commercial whaling, whether by pelagic operations or from land stations, is prohibited in a region designated as the Indian Ocean Sanctuary. This comprises the waters of the Northern Hemisphere from the coast of Africa to 100°E, including the Red and Arabian Seas and the Gulf of Oman; and the waters of the Southern Hemisphere in the sector from 20°E to 130°E, with the Southern boundary set at 55°S. The

prohibition applies irrespective of such catch limits for baleen or toothed whales as may from time to time be determined by the Commission. This prohibition shall be reviewed by the Commission at its Annual Meeting in 2002.

Species and stocks affected by the IOS

Large whales from a total of 25 stocks inhabit the IOS. Stocks of migratory species (blue, fin, sei, Antarctic minke, common minke, humpback and right whales) are present in the IOS during their breeding season. The Southern Ocean Sanctuary (SOS) provides additional protection of some stocks in the feeding grounds. A substantial component of the sei and right whale stocks are believed also to feed within the IOS boundaries, although some animals may be found further south. The geographic boundaries of the Indian Ocean stock of Bryde's whales overlaps with the IOS limits, while just part of the South African coastal stock range is found within the IOS. Finally, three sperm whale stocks (divisions) are found in the Sanctuary. Juveniles and females occur in tropical and sub-tropical waters while mature males migrate in and out the IOS, towards higher latitudes.

Annex N, table 1 summarises stocks totally or partially encompassed by the IOS and provides information on the seasonal occurrence of each stock, population size estimates and trends in abundance, if available. Figs 2-5 illustrate the geographic distribution of each stock in the Indian Ocean.

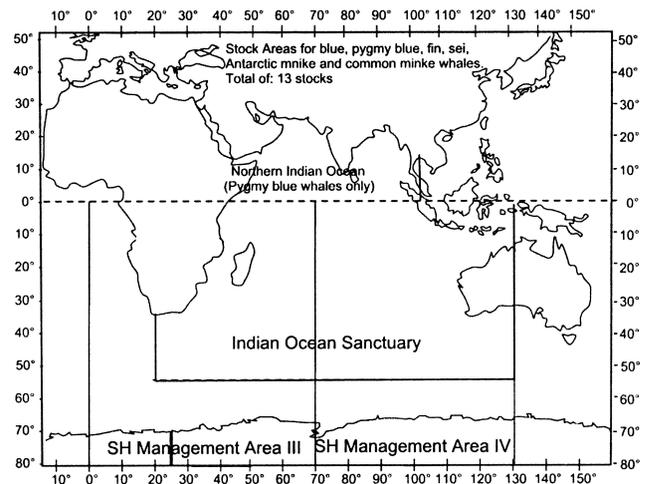


Fig. 2. IWC Management Areas for migratory *Balaenoptera* whales in the Indian Ocean.

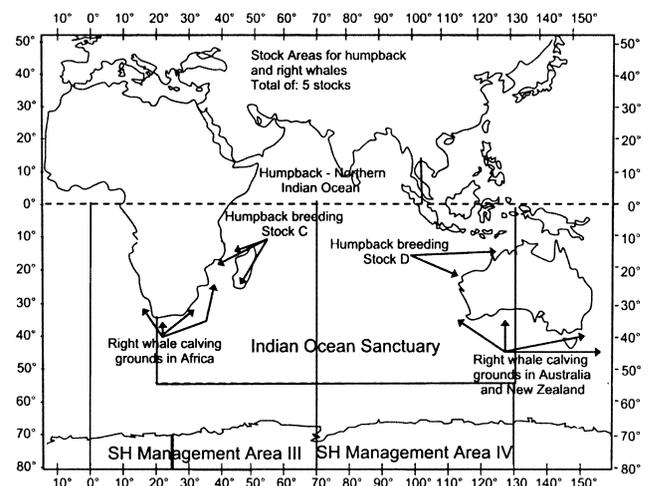


Fig. 3. IWC Management Areas and breeding stocks of humpback and right whales in the Indian Ocean.

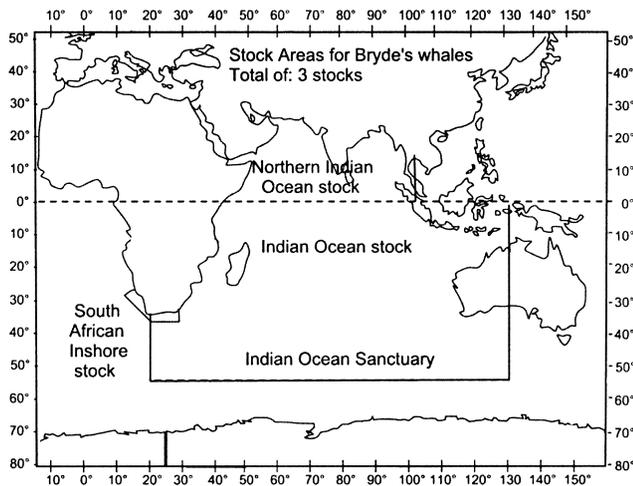


Fig. 4. IWC Management Areas for Bryde's whales in the Indian Ocean.

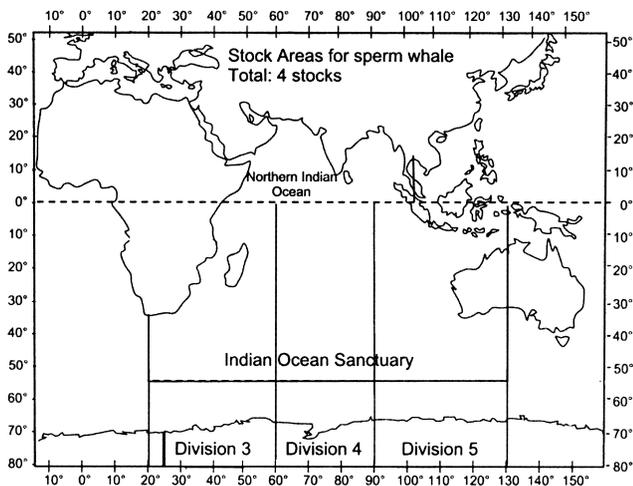


Fig. 5. IWC Management Divisions for sperm whales in the Indian Ocean.

EVALUATION CRITERIA AND REVIEW PROCESS

In order to evaluate whether the scientific objectives of the IOS were achieved, this document proposes that the following aspects be considered.

(1) Objectives of the IOS

While the IOS was established in 1979, the IWC did not agree on a list of objectives for the Sanctuary. In 1987, a workshop was held in Anse aux Pins, Seychelles, with the purpose of reviewing the IOS, in particular the scientific components of the review process (Leatherwood and Donovan, 1991). Several 'objectives' were listed based on the document provided by the Government of Seychelles (Anon., 1979) and discussion of the Sanctuary as reflected in the Chairman's and in the IWC Scientific Committee reports (IWC, 1979a; b; 1980a; b; 1981a; b; 1982a; b; 1983a; b; 1984; 1986). These were (Leatherwood and Donovan, 1991)²:

- (1) The Sanctuary should provide an ecologically coherent area where whale populations are protected from whaling for a specified period, avoiding the possibility

² The IWC did not comment on the scientific objectives derived at the Seychelles meeting.

- of stocks being alternately exploited and protected in the short term as a result of small changes in assessments.
- (2) In terms of appropriate research, the IWC Scientific Committee (IWC, 1982c) stated that:
 - (a) it should provide sufficient information to assess stocks of large whales and small cetaceans;
 - (b) it should permit direct comparison of the status of species and/or populations protected by the Sanctuary provision and exploited or unexploited stocks of the same species in other areas;
 - (c) the opportunity should be taken to carry out relevant investigation of certain kinds, which would be impossible or more difficult to undertake in areas where whaling continues.

Evaluation criteria

- (1) Evaluate whether whales were and are effectively protected from whaling within the Sanctuary.
- (2) Evaluate whether the boundaries of the Sanctuary were appropriately established.
- (3) Evaluate if the IOS has provided 'sufficient' information to reliably assess³ stocks of large whales.
- (4) Evaluate if the IOS has permitted direct comparison of species/stocks within the Sanctuary with (i) exploited and (ii) unexploited stocks outside the Sanctuary.
- (5) Identify what kind of investigations were carried out in the Sanctuary, which were more difficult to undertake in areas where whaling continued.

(2) Research in the IOS

Research in the IOS was reviewed by the SC, which considered three main headings in which research could be implemented in the Sanctuary: open ocean research on large whales; research on large whales by coastal states; and examination of other sources of information. Although the SC was not able to formulate specific proposals within those headings, it identified sources of relevant information: incidental takes, strandings, systematic sightings, historical records, observations of whales from platforms of opportunity, research catches and captive animals.

During the workshop convened in Zeist in September/October 1981⁴, the SC proposals were reviewed and three main conclusions were reached (Leatherwood and Donovan, 1991): a proposed five-year time constraint for estimating population sizes was unrealistic; research within the IOS should be coordinated with research in adjacent areas; the IWC's ability to identify and assess whale populations' status, ecological roles and vulnerability to human activities would be enhanced by information obtained from research carried out in the area (undisturbed by whaling for a substantial period of time). The Zeist workshop prepared its own list of research objectives within the IOS, some of which would satisfy the SC needs in obtaining information for assessment-related matters.

The Zeist workshop objectives were:

- (1) to satisfy the needs of the IWC Scientific Committee particularly in obtaining adequate information about the distribution and abundance of whales, their reproductive behaviour and related matters relevant to assessment of stocks;
- (2) to obtain scientific information pertinent to assessing and realising the economic, cultural and scientific values of living cetaceans;

³ The term 'assess' refers to such matters as stock identity, abundance (and trends in abundance), status and production.

⁴ The Zeist workshop was sponsored by the Governments of Seychelles and the Netherlands with support from the IWC, IUCN and WWF.

- (3) to enhance the understanding of the ecological roles of cetaceans in marine biological systems and to permit assessment of the impact of human activities on recovering and unexploited populations;
- (4) to focus attention on the development and application of benign research techniques;
- (5) to foster investigations on the frontiers of research on living cetaceans, such as communication, navigation, behaviour and physiology of diving;
- (6) to ensure the establishment of centres of research on cetaceans in the Indian Ocean and to further communication about cetacean research among Indian Ocean coastal states and between them and others involved in such research.

In addition, the workshop identified 24 projects that were expected to contribute to meet these objectives (Leatherwood and Donovan, 1991, pp.22-24). Some were already implemented or partially implemented and others were waiting for funding to become available. The Seychelles meeting agreed that this list of projects constituted a research framework within which many of the SC (and the Commission) research needs could have been met.

Evaluation criteria

- (1) The objectives listed above could be addressed with or without the existence of a sanctuary. The SC should evaluate the extent to which the establishment of the IOS furthered the achievement of these objectives.
- (2) Briefly assess the past and present status and results of the 24 projects identified by the Zeist workshop and how they contributed to the research needs of the SC.
- (3) List other projects developed within the IOS and how they contributed to meet the research needs of the SC.

The Zeist workshop also recognised that one research area that required attention had not been implemented: the establishment of a stranding network. The meeting noted the value of such networks and the usefulness in stimulating public and scientific interest in areas where the knowledge of cetaceans is very limited. A sub-group was set up to discuss practical ways of implementing such networks.

- (4) Evaluate the progress in implementing the stranding network in the IOS.

(3) The IOS and the Comprehensive Assessment of Whale Stocks

The Seychelles meeting noted that many of the projects focusing on large whales listed in by the Zeist workshop would be of direct relevance for the Comprehensive Assessment of Whale Stocks (CAWS). The meeting also recognised that a long-term sanctuary has a unique and essential scientific role in managing whale stocks for sustainable exploitation, under the assumption that whaling will resume sometime in the future outside the sanctuary.

Evaluation criteria

- (1) Evaluate past and current data on abundance estimates and trends for whale stocks within the IOS.
- (2) Evaluate progress in stock identification since the IOS was created.
- (3) Evaluate progress in the estimation of demographic parameters and vital rates since the IOS was created.
- (4) List and evaluate the results of projects focused on the development of calibration and assessment methods.
- (5) Evaluate the effectiveness of whale stock monitoring programmes and how they contributed to the CAWS.

(4) Instructions from the Commission for Reviewing Sanctuaries and Sanctuary Proposals

During the 53rd Meeting of the IWC, the Commission prepared instructions for reviewing sanctuaries and sanctuary proposals. Both general and specific instructions were provided and the current review of the IOS should take these into account (IWC, 2002).

As a general recommendation to review existing Sanctuaries the Commission proposed:

- (1) Give attention to assessing how well the scientific aspects of the agreed objectives of the Sanctuary have been met and how well they might be met if the Sanctuary continues.

As specific instructions the Commission listed:

- (2) Provide advice on the status and trends of whale stocks in the Sanctuary.
- (3) Assess whether the Sanctuary distinguishes between species and stocks depleted and apparently slow to recover, those rapidly recovering and those abundant and not threatened.
- (4) Assess present and potential threats to whale stocks and their habitats in the area of the Sanctuary, including: whaling; fishing (including bycatch); oil and gas exploration (including seismic surveys); shipping; whalewatching; climate change; other environmental factors.
- (5) Consider the relationship of the Sanctuary with other existing measures to protect whales from anthropogenic and environmental factors.
- (6) Assess the anticipated effects of the proposed sanctuary in terms of:
 - (a) improving protection of whales, in the breeding areas, feeding grounds and/or migratory routes;
 - (b) improving the conservation of breeding sites, migratory routes and/or feeding grounds; and
 - (c) complementing existing or potential protection including the Commission's current management regime and regional and international agreements concerning biodiversity and conservation of nature.
- (7) Provide advice on whether the boundaries of the sanctuary are ecologically appropriate.
- (8) Provide advice on whether the sanctuary addresses the issues of critical and non-critical whale habitat.
- (9) Evaluate whether a sanctuary may contribute to or impede the conduct of scientific research useful for meeting IWC objectives and facilitate coordinated and integrated research and monitoring programmes.
- (10) Provide advice on whether a sanctuary is consistent with the precautionary approach.

(5) Conclusions and Recommendations

The implications of the IOS to the conservation and sustainable use of whales depends on the management regime adopted by the Commission in the years to come. Future decisions on the RMP/moratorium may require a re-evaluation of the role of the sanctuaries in the Commission's management strategy. In addition to its review of the IOS at this meeting the Working Group may also wish to prepare a list of recommendations to the Commission. This might include consideration of: (1) an

adaptive management experiment; and (2) an agreed research plan on stock identity, abundance, trends in abundance for the large whales stocks.

REFERENCES

- Anonymous. 1979. The Seychelles Initiative. Paper IWC/31/6 presented to the International Whaling Commission, July 1979 (unpublished). [Paper available from the Office of this Journal.]
- International Whaling Commission. 1979a. Chairman's Report of the Thirtieth Annual Meeting. *Rep. int. Whal. Commn* 29:21-37.
- International Whaling Commission. 1979b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 29:38-105.
- International Whaling Commission. 1980a. Chairman's Report of the Thirty-First Annual Meeting. *Rep. int. Whal. Commn* 30:25-41.
- International Whaling Commission. 1980b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 30:42-137.
- International Whaling Commission. 1981a. Chairman's Report of the Thirty-Second Annual Meeting. *Rep. int. Whal. Commn* 31:17-40.
- International Whaling Commission. 1981b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 31:51-165.
- International Whaling Commission. 1982a. Chairman's Report of the Thirty-Third Annual Meeting. *Rep. int. Whal. Commn* 32:17-42.
- International Whaling Commission. 1982b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 32:43-149.
- International Whaling Commission. 1982c. Report of the Scientific Committee. Annex L. Report of the sub-committee on research on cetaceans in the Indian Ocean sanctuary. *Rep. int. Whal. Commn* 32:132-5.
- International Whaling Commission. 1983a. Chairman's Report of the Thirty-Fourth Annual Meeting. *Rep. int. Whal. Commn* 33:20-42.
- International Whaling Commission. 1983b. Report of the Scientific Committee. *Rep. int. Whal. Commn* 33:43-190.
- International Whaling Commission. 1984. Report of the Scientific Committee. *Rep. int. Whal. Commn* 34:35-181.
- International Whaling Commission. 1986. Report of the Scientific Committee. *Rep. int. Whal. Commn* 36:30-140.
- International Whaling Commission. 1990. Chairman's Report of the Forty-First Annual Meeting. *Rep. int. Whal. Commn* 40:11-37.
- International Whaling Commission. 1993. Chairman's Report of the Forty-Fourth Annual Meeting. *Rep. int. Whal. Commn* 43:11-53.
- International Whaling Commission. 2002. Chair's Report of the 53rd Annual Meeting. Annex E. Instructions from the Commission to Scientific Committee for Reviews of Sanctuaries. *Ann. Rep. Int. Whaling Comm.* 2001:65.
- Leatherwood, S. and Donovan, G.P. (eds.). 1991. *Marine Mammal Technical Report*. No. 3. *Cetaceans and Cetacean Research in the Indian Ocean Sanctuary*. 1st Edn. UN Environment Programme, Nairobi. vii+287pp.

Appendix 4

REPORT OF SUB-GROUP A

INTRODUCTION

It is generally acknowledged that sanctuaries or marine protected areas can serve a useful conservation purpose by providing protection of critical habitat or a refuge for utilised resources as part of a sustainable management regime. For this purpose however it is important that a sanctuary be defined by ecologically appropriate boundaries, that it apply to species subject to management and utilisation and that its duration reflects conservation needs.

In the context of the conservation and management of living resources, a sanctuary means a limited land or sea area where harvesting activities of the resource is prohibited in order to achieve sustainable utilisation of the resource outside the area. This area is expected to provide a 'refuge' for a certain part of the migration, distribution, and/or life stage of the resource so that the resource is not over-harvested. In the context of utilised resources, conservation measures that are totally prohibitive over a large area when the status of stocks allows for sustainable utilisation or when a management regime in effect is sufficiently precautionary can not be scientifically justified and negate the principle of sustainable utilisation. This is in fact the situation with the IOS.

APPROPRIATENESS OF IOS BOUNDARIES

Boundaries of the IOS were established simply to cover as wide an area as possible without regard to ecological principles or specific conservation needs for whale stocks. The boundaries of the IOS neither cover the entire range of large whale stocks that migrate through or into the area nor are they limited to critical habitats for these species. For this reason, the IOS boundaries are not ecologically appropriate and are not consistent with the common concept of a sanctuary.

DURATION OF THE IOS

It has now been more than 20 years since the establishment of the IOS and the prohibition of commercial whaling within its boundaries. Since that time, the perceived conditions concerning status of whale stocks and the need for a prohibition on whaling over a large area that were used to justify its establishment are likely to have changed significantly. Although such changes have not been assessed, none of the species that occur in the area are in fact present candidates for commercial catch quotas. Nor will they become candidates until they have been assessed, sustainable catch limits established, and quotas set under the RMS. Under these conditions, scientific justification does not exist for maintaining the IOS.

DOES THE IOS MEET THE STATED OBJECTIVES AND IS IT A USEFUL CONSERVATION MEASURE?

In the Instructions from the Commission to the Scientific Committee for Reviews of Sanctuaries and Sanctuary Proposals (IWC, 2002), the SC was requested to 'give primary attention to assessing how well the scientific aspects of the agreed objectives of the sanctuary have been met'.

Because the original IOS proposal did not specify its objectives and the Commission itself has not formally agreed on objectives for the IOS, the following scientific objectives have been gleaned by some from IWC documents. Our evaluation of how the IOS meets or does not meet these objectives also follows.

- (1) The Sanctuary should provide an ecologically coherent area where whale populations are protected from whaling for a specified period, avoiding the possibility of stocks being alternately exploited and protected in the short term as a result of small changes in assessments.

This 'objective' can be interpreted in many different ways. However, under any interpretation, the current IOS is irrelevant as a conservation measure because the moratorium for commercial whaling has been in place worldwide since 1986. Since the moratorium applies to all waters where whaling is conducted, an 'ecologically coherent area' has no meaning. Similarly, a 'specified period' is losing its meaning in the context of the moratorium. Consequently, the IOS is playing no conservation role and is not required to 'avoid the possibility of stocks being alternately exploited and protected ...'.

(2) In terms of appropriate research, the Scientific Committee (IWC, 1982) stated that:

- (a) It should provide sufficient information to assess stocks of large whales and small cetaceans. Research in the IOS has not provided sufficient information to assess stocks of large whales. No extensive sighting survey, for example, has been conducted in the area since the establishment of the IOS. In fact, the establishment of the IOS has removed any incentive for such research.
- (b) It should permit direct comparison of the status of species and/or populations protected by the Sanctuary provision and exploited or unexploited stocks of the same species in other areas. It is impossible to conduct a comparison of stock status between inside and outside of the IOS because of the presence of the moratorium. Protection status of a whale species does not change across the boundary of the IOS.

- (c) The opportunity should be taken to carry out relevant investigation of certain kinds which would be impossible or more difficult to undertake in areas where whaling continues.

Again, under the moratorium on commercial whaling, 'investigation of certain kinds which would be impossible or more difficult to undertake in areas where whaling continues', is meaningless.

Evaluation of the IOS also requires consideration of whether or not it serves as a useful conservation measure irrespective of its objectives. In this regard and as noted above, the IOS was adopted before the moratorium on commercial whaling which has made the IOS redundant. In addition, the IOS was adopted prior to the development of the risk averse RMP so that even when the moratorium is no longer in place, there will be no threat to whale stocks from commercial whaling. This fact makes the IOS twice redundant meaning that it clearly does not serve a useful or necessary conservation measure.

In conclusion, from a scientific point of view, continuation of the IOS cannot be justified.

REFERENCES

- International Whaling Commission. 1982. Report of the Scientific Committee. Annex L. Report of the sub-committee on research on cetaceans in the Indian Ocean sanctuary. *Rep. int. Whal. Comm* 32:132-5.
- International Whaling Commission. 2002. Chair's Report of the 53rd Annual Meeting. Annex E. Instructions from the Commission to Scientific Committee for Reviews of Sanctuaries. *Rep. int. Whal. Comm* 2001:65.

Appendix 5

REPORT OF SUB-GROUP B

The sub-group considered its term of reference to be to evaluate the existing Indian Ocean Sanctuary under the guidelines provided by the Commission (IWC, 2002), focussing in each case on the scientific dimension of the questions posed by the Commission in its guidelines. These include consideration of the appropriate boundaries as well as other issues.

GENERAL

Although the Sanctuary currently only provides direct protection to whales from commercial whaling, much of the research in the Sanctuary is aimed at the identification and assessment of other threats. The results of the research have importance for the development of national protective measures, and for the development of future regional and international measures (see section 4).

In evaluating the effect of the Sanctuary, a recurring difficulty is determining which of the research and other activities in the Sanctuary have taken place as a direct or indirect consequence of the Sanctuary designation, and which may have occurred regardless. However, many of the research activities in the region have been specifically conceived, funded or conducted in response to the Sanctuary

designation or regional initiatives arising therefrom (SC/54/O5 and see section 5).

The IOS coastal states are predominantly developing countries. Many of these countries face pressing problems resulting in cetacean research being given low priority. However, some countries are now coming into a position where there is potential for developing research projects.

One aspect that is worth noting is the increased attention being given to more general issues surrounding Marine Protected Areas. Not only are these becoming increasingly recognised as a valuable management tool in other fora, including fisheries management, but attention is also being given to quantitative assessment of their effectiveness. However, in relation to the life-history time-scale of the species it is designed to protect, the IOS is relatively young compared to many Marine Protected Areas, despite having been in place for over twenty years. In the context of marine protected areas there is considerable support for measures on the spatial scale of an ocean basin (e.g. Allison *et al.*, 1998).

It is also becoming increasingly apparent in all the endeavours of the SC that the time period required to reach an adequate assessment of something such as the effectiveness of a sanctuary is likely to be much longer than might have been anticipated a decade ago. As well as

reviewing how the scientific aspects of the objectives of the Sanctuary have been met, the SC is also tasked with reviewing how well these might be met if the Sanctuary continues. An alternative approach may be consideration of what opportunities might be lost from a scientific point of view if the Sanctuary was not continued. This needs to be done across a realistic time frame in relation to the longevity of the species protected, and the practicalities of marine research. This is difficult to predict but it is worth noting that the zero catch limit for whales in the Indian Ocean provides the longest time period (with no commercial whaling for seven years prior to the moratorium) to evaluate the effect of no commercial catches across an ocean basin.

It has been suggested (SC/54/O20) that the adoption of the moratorium has made the Sanctuary redundant, but the appropriate duration of a sanctuary of this kind depends on factors other than those determining the short-term management policy of the Commission. The moratorium is a temporary measure pending the adoption of a more satisfactory management procedure, whereas a sanctuary is a measure that applies independently of management in other areas. Temporary overlap in management measures does not invalidate the long-term scientific and conservation value of the Sanctuary.

SPECIFIC

(1) Provide advice on the status and trends of whale stocks in the (proposed) sanctuary in so far as these are known. Assess whether the sanctuary distinguishes between species and stocks that are depleted and apparently slow to recover, those that are increasing rapidly, and those that are abundant and not threatened

The status of stocks in the Sanctuary is summarised in table 1 of Annex N. The Sanctuary contains examples of:

- (a) populations which are depleted but known to be recovering;
- (b) populations which are depleted where the current trend is unknown;
- (c) populations such as minke whales, which are probably not depleted, but the current trend is under assessment by the Scientific Committee; and
- (d) populations which are probably not depleted but whose current trend is unknown.

The Sanctuary gives complete protection from commercial whaling to populations in all of the four categories listed above, but distinction between the categories can still be made for research and conservation purposes.

Assess the present and potential threats to whale stocks and their habitats in the area of the (proposed) sanctuary and how the (proposed) sanctuary addresses these. Such factors may include, inter alia:

(a) Whaling

Important considerations with regards to whaling are the revelations of the unreported Soviet catches in the Indian Ocean which occurred prior to the adoption of the Sanctuary but have been revealed since the Sanctuary was last reviewed in 1992. These catches are of particular concern because of the likelihood that some of these were taken from small isolated stocks and may have depleted these stocks substantially. In addition to catches within the Sanctuary area, unreported catches have also been revealed in the Southern Ocean from populations that are believed to

migrate into the Sanctuary. The SC has received new information on unreported catches each year but these still require further investigation and consideration of the implications.

Directed takes of large whales for subsistence purposes still occur from two communities, Lamalera and Lamakera, on the Indonesian islands of Lembata and Solor respectively.

(b) Fishing, including bycatch

Cetacean bycatch is known to occur in many fisheries in the Indian Ocean and is established as a significant concern for some stocks. Incidental takes are known to occur in coastal and high-seas fisheries and also expanding aquaculture facilities (e.g. interactions between humpback and right whales with pearl/oyster farms on the west coast of Australia). Although limited schemes to monitor bycatch exist in some countries, there are no estimates of bycatch for most Indian Ocean fisheries. However, for the southern areas of the Sanctuary that lie within the CCAMLR boundary a bycatch reporting scheme has been in place since 1984 and data on other operational interactions between cetaceans and fishing gear are collected. These include operational interactions between sperm whales and killer whales with long-line fisheries in the southern Indian Ocean (CCAMLR areas 58.6, 58.7, 58.5, 58.4.4). The Indian Ocean Tuna Commission has also initiated a research programme to study interactions between cetaceans and long-line fisheries.

(c) Oil and gas exploitation, including seismic surveys

Hydrocarbon exploration and production are known to have impacts on whales. These activities occur in many areas of the Indian Ocean with concentrated activity in areas such as NW Shelf of Australia, South Africa, Indonesia and Oman. A specific concern for stocks with a limited geographic range is the possibility of displacement for long periods of time during important feeding periods, as has been reported for some species. Since 1997, the Government of Oman has required that all seismic survey vessels off Oman have dedicated cetacean observers on board. A transregional feasibility study is currently underway to evaluate potential health effects due to exposure to hydrocarbon development using exposed and non-exposed populations of humpback whales in the Indian Ocean.

(d) Shipping

Collisions with vessels are an unmeasured cause of mortality but in areas of high shipping activity where areas of whale concentration and migration routes overlap (such as East Coast of US, Europe and Mediterranean) strandings records suggest that collisions form a substantial proportion of mortality in populations of several whale species. There are heavy shipping traffic lanes in many parts of the Indian Ocean (e.g. east coast South Africa, Indonesia, Oman), but levels of shipping vary considerably in the Indian Ocean. The average speed of large commercial vessels has increased in recent years and there is evidence that faster vessels may pose a higher risk. Increased military activity in the northern Indian Ocean may pose additional threats from shipping.

(e) Whalewatching

Responsible whalewatching can bring tremendous benefits to coastal communities and should not, if carefully designed, necessarily be considered a threat. The scientific issues related to whalewatching in the sanctuary include potential impacts on whales and the potential for research from

whalewatching platforms. Whalewatching is an important activity in several coastal states around the Indian Ocean. There is also potential for development in other areas that has not yet been realised.

(f) Climatic change

There are significant relationships in global climatological effects. For example, changes in sea ice in the Antarctic are highly correlated with sea surface temperatures in the tropical Indian Ocean. Populations of whales in the Indian Ocean will thus experience ecological consequences of climate forcing (e.g. ENSO) that transcend the Sanctuary boundaries. Whales north of the equator in the Indian Ocean may be more vulnerable to climate change than those in other regions because they have a limited distributional range and have no possibilities to shift to higher latitudes, e.g. Arabian Sea stocks of humpback and sperm whales.

(2) Assess the anticipated effects of the proposed sanctuary in terms of:

- (a) improving protection of whales, in breeding areas, feeding grounds and/or migratory routes;**
- (b) improving the conservation of breeding sites, migratory routes and/or feeding grounds; and**
- (c) complementing existing or potential protection including the Commission's current management regime and regional and international agreements concerning biodiversity and conservation of nature**

The Sanctuary provides protection for the breeding stocks of all Indian Ocean baleen whales although the precise locations of some of these breeding areas are still unknown. Available data suggest that some stocks of humpback whales and possibly blue, Bryde's and sperm whales are both feeding and breeding in the northern Indian Ocean. Because of the boundary at 55°S, feeding grounds of Bryde's and sei and part of the feeding grounds of Southern Hemisphere fin whales are protected. The main feeding grounds of southern right whales are believed to be within the Sanctuary. Southern Hemisphere blue whales, Antarctic minke whales and Southern Hemisphere humpback whales migrate outside the IOS area. Female and juvenile sperm whales are protected throughout their range. Some whales breeding outside the Sanctuary may move into the Sanctuary to feed, such as right whales off the west coast of South Africa. The issues of habitat protection have only recently been considered by the IWC and to date no international measures have been taken although whale habitat is specifically included in some national marine protected areas in the Indian Ocean.

Other international agreements that affect the conservation of whales include CCAMLR which requires that the management of fishing takes into account the needs of dependent species. The IOS provides protection to those dependent species during the part of the year for which they are outside the CCAMLR area. The Commission's Revised Management Scheme is still under development but it is envisaged that the RMS and sanctuaries would represent mutually complementary management measures.

(3) Provide advice on whether the proposed boundaries of the Sanctuary are ecologically appropriate

The current boundaries are simply defined in terms of latitude and longitude and include an ecologically coherent area with a land boundary, or island chain forming the majority of the eastern, western and northern boundaries. The majority of previous discussions regarding the boundary largely concentrated on the southern boundary. The original

proposal was for the entire Indian Ocean including the Southern Ocean sector, but for operational reasons this was revised to 55°S while recognising that this had only limited ecological significance. However, this is now contiguous with the northern boundary of the Southern Ocean Sanctuary (SOS) hence the southern boundary question is not critical at this time. However, it was agreed at the 1987 meeting in the Seychelles that extending the sanctuary to the Antarctic would enhance its ecological coherence and should the SOS provisions be changed in the future, it may be considered prudent to extend the southern boundary of the IOS to the Antarctic continent.

The current sanctuary boundaries provide opportunities for comparison of the potentially unique (in terms of genetics, behaviour and physiology) northern Indian Ocean whale stocks with southern Indian Ocean stocks across the same ocean basin.

Genetic, acoustic and satellite tagging studies are in progress to explore movements and stock structure for several species within the Indian Ocean (e.g. studies of humpback whales in SC/54/H4; SC/54/H20; Rosenbaum *et al.*, 2000).

(4) Provide advice on whether the sanctuary addresses the issue of critical habitat and non-critical whale habitat

Since the competence of the IWC to include habitat protection measures in its Schedule has not yet been established, the sanctuary provision *per se* contains no measures for habitat protection. Current understanding of critical habitat for whales is not sufficient to be confident that a substantially smaller area would include the critical habitat for all populations. In particular, many species are known to undertake long migrations. However, the Sanctuary is of sufficient size to encompass the complete habitat for some populations. Many research projects within the Sanctuary identify important areas of whale habitat, e.g. breeding and feeding grounds. Some areas have been identified which provide what is probably critical habitat for some stocks, e.g. the area of upwelling in the Arabian Sea, and the Antongil Bay, Madagascar breeding and calving ground (Rosenbaum *et al.*, 1997) which are probably critical habitat for humpback whales.

The Sanctuary is complemented by national measures protecting cetaceans, for example marine reserves in Australia, Indonesia, Oman and South Africa.

(5) Evaluate whether the Sanctuary may contribute to or impede the conduct of scientific research useful for meeting IWC objectives and facilitate coordinated and integrated research and monitoring programmes

SC/54/O5 summarised some of what is currently known about cetaceans in the IOS. Most of this information has come from data collected since the Sanctuary was adopted, especially since the 1992 review. An important consideration when considering the level of research in the Sanctuary is that the coastal states are predominantly developing countries. The increase in research effort since 1992 is partly a reflection of the increase in cetacean research world-wide but some of projects have been initiated in response to the Sanctuary designation. SC/54/O25 also describes research techniques that have evolved directly from projects initiated as a result of the Sanctuary.

One of the difficulties in evaluating the Sanctuary is knowing which activities are a direct result of the Sanctuary and which would have happened without it. In the case of research, the sub-group mainly relied on whether the reports

of the research indicated that the existence of the Sanctuary had been of benefit. Indirect benefits included: a focus on regional initiatives and cooperation (including international workshops such as those held in Colombo, Sri Lanka in 1983 and Cochin, India, 1985); facilitation of the initial phase of integrated research between Indian Ocean and Southern Ocean; a greater awareness of cetaceans in coastal states; and additional sources of funding.

In assessing population structure, whaling on Indian Ocean stocks will affect the interpretation of genetic data. Potentially selective removal of individuals without *a priori* knowledge of their genetic 'type' with respect to overall stock structure may confound ability to discriminate stocks.

(6) Provide advice on whether the Sanctuary is consistent with the precautionary approach

The central tenet of the precautionary approach is that lack of information shall not be a reason to delay potentially necessary conservation oriented management action. The adoption of the IOS in 1979 at a time when relatively little was known about the whale populations in the region was one of the first precautionary measures adopted by the IWC. (In fact there was one provision in the then current New Management Procedure that was precautionary, namely the requirement that an abundance estimate be available before exploitation commences on initial management stocks. Bryde's whales in the Indian Ocean were protected by this provision for several years.)

While the RMP is designed to be more precautionary than its predecessors, the establishment of an appropriately designed system of sanctuaries can be regarded as a precautionary safeguard to mitigate the effects of possible failure of the RMP to adequately protect whale stocks after the current moratorium ends.

The complex nature of baleen whale population structure, and its interaction with potential harvesting regimes, continue to impede progress on implementation of the RMP, which was originally designed to manage the exploitation of baleen whales on high-latitude feeding grounds (IWC, 1999, p.254). In the North Pacific, there is continuing difficulty with the management of breeding stocks which are being harvested on both migration routes and feeding grounds where mixing in space and time may occur in varying proportion with other stocks. The extended debate regarding these and other factors within the Committee highlights the considerable uncertainty associated with RMP inputs and operation. Whilst the Committee continues to work towards resolving these issues, any management system that must accommodate such complexity inevitably risks some chance of performance failure. A precautionary response to these problems would be to protect, where possible, baleen whales outside of high latitude feeding grounds, through the designation of appropriate sanctuary areas, such as the IOS. Retention of the IOS would seem especially prudent while the difficulties of RMP implementation in the North Pacific are still being resolved.

CONCLUSIONS AND SUGGESTIONS

According to instructions from the Chair, the sub-group did not include any information on small cetaceans in this review. However, the group noted that the omission of

information on small cetaceans resulted in a wide body of research being omitted that could have made a substantial contribution to the Sanctuary review.

The sub-group noted that many of the considerations related to the research efforts in the Sanctuary were unique to the Indian Ocean, where the coastal states are predominantly developing countries. The sub-group noted the increased attention now given by the IWC to building cetacean research capacity in these countries. In addition, there are increasing opportunities for affordable cetacean research from platforms of opportunity in the Indian Ocean, including multi-disciplinary research cruises and whalewatching. Unlike the Southern Ocean, it is only recently that the significance of the Indian Ocean to physical oceanographic and climatological processes has been realised. This has resulted in new ocean-basin scale marine research projects providing potential for the type of multi-disciplinary research already underway in the Southern Ocean. The IOS provides a focus for encouraging regional research cooperation and the sub-group recommended that these opportunities be encouraged. The sub-group also recommended that because the Indian Ocean has been recognised as a special area, the Commission and the SC provide advice to the coastal states on ways to address threats to cetaceans in their waters.

The sub-group found that based on available data there was no basis for changing the current Sanctuary provisions. In particular, the sub-group considered that there were insufficient data to define a smaller area (such as the Indian Ocean north of the equator) that would achieve the sanctuary objectives. In addition, current boundaries provide opportunities for comparison of behaviour, physiology and the effects of climate change on unique northern Indian Ocean stocks with southern Indian Ocean stocks afforded the same protection across an ocean basin. However, should the SOS provisions be changed in the future, it may be considered prudent to extend the southern boundary of the IOS to the Antarctic continent. In the meantime, the sub-group recommended that the IOS should continue in its current form.

REFERENCES

- Allison, G.W., Lubchenko, J. and Carr, M.H. 1998. Marine reserves are necessary but not sufficient for marine conservation. *Ecol. Appl.* 8(1):79-92.
- International Whaling Commission. 1999. 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. 2002. Chair's Report of the 53rd Annual Meeting. Annex E. Instructions from the Commission to Scientific Committee for Reviews of Sanctuaries. *Rep. int. Whal. Commn* 2001:65.
- Rosenbaum, H.C., Walsh, P.D., Razafindrakoto, Y., Vely, M. and DeSalle, R. 1997. First description of a humpback whale breeding ground in Baie d'Antongil, Madagascar. *Conserv. Biol.* 11(2):312-4.
- Rosenbaum, H.C., Best, P.B., Findlay, K.P., Engel, M.H., Pomilla, C., Razafindrakoto, Y., Morete, M.E., Vely, M., Freitas, A.C., Baker, C.S., Jenner, C., Jenner, M.-N. and Bannister, J. 2000. Mitochondrial DNA variation among humpback whales from the wintering grounds in the South Atlantic and southwestern Indian Oceans. Paper SC/52/IA11 presented to the IWC Scientific Committee, June 2000, in Adelaide, Australia (unpublished). [Paper available from the Office of this Journal].

Appendix 6

REPORT OF SUB-GROUP C

The view of this sub-group is that the IOS has some value but that some modifications are needed.

- (1) The IOS was conceived in a very different era, before the introduction of the moratorium or the development of the RMP, and against a background of special scientific catches of Bryde's whales in the Indian Ocean (despite a long-standing ban on the use of factory ships north of 40°S for taking baleen whales other than minke). To the extent that no further exploitation of Bryde's whales occurred in the region, the Sanctuary can be said to have been successful. However the intention that the Sanctuary would also serve as a control area, in which the behaviour of populations undisturbed by whaling could be studied, was largely overtaken by events.
 - (2) In 1983 the worldwide moratorium on commercial whaling was adopted, so that in effect all the world's oceans became 'sanctuaries'. Furthermore, in 1993 the Commission accepted in principle the Revised Management Procedure, so that if commercial whaling was to be allowed to resume, it would be on such a conservative basis that a sanctuary would seem redundant. Nevertheless, there is no reason why the Commission should not also decide to establish a suitable sanctuary as a 'belt-and-braces' approach to the RMP, but presumably the location of such a protected area would be best decided on a species by species basis, and not necessarily always in the same ocean basin.
 - (3) The opinion of this sub-group is that it is impossible to judge objectively whether the creation of the IOS was responsible for an upsurge in scientific research in the region or not, as this would require an assumption about the level of research that would have occurred in the absence of a sanctuary (which would be pure speculation). Certainly the Sanctuary Journal (in which the results of such research were to be published) never appeared, and systematic surveys of whale populations in the region have generally been too widely separated in time and space to monitor the effects of the Sanctuary. This is not surprising, as at the time of the original sanctuary debate, it was pointed out that the region was surrounded largely by developing nations who would be unlikely to be able to provide sufficient financial support for such programmes. In any case, this group believes that the promotion of whale research should be at most a secondary rather than the primary objective of a sanctuary.
 - (4) With the loss of its unique status as a large ocean area where whaling is prohibited, it is entirely appropriate at the time of this review to question whether the IOS as such still has a role in whale conservation, or whether it should be re-formulated. The contention of this group is that the current Sanctuary is too large and non-specific, with boundaries that are not biologically meaningful for all species, for it to be an effective management tool under current circumstances. The validity of the Sanctuary would be greatly improved if it could be made more focussed and biologically appropriate.
 - (5) Over the last few years, evidence has been gathering that the northern Indian Ocean may contain populations of humpback, blue, Bryde's and maybe other species of large whale that are on Northern Hemisphere reproductive schedules, and which may therefore never make the extensive latitudinal migrations typical of large baleen whales in general. To this extent, the northern Indian Ocean is unique, as no such situation exists in the Atlantic or Pacific Oceans. Such isolated populations that have no access to polar feeding grounds also provide opportunities for the study of possible climate change effects. Redrawing the Sanctuary's boundaries such that they form a more compact, self-contained region in the northern Indian Ocean would create a whale sanctuary that is both biologically relevant and scientifically justified.
 - (6) Other possible re-formulations include ensuring boundaries compatible with the migratory ranges of stocks, and optimal choice of area in the Southern Hemisphere (conceivably outside the Indian Ocean) to serve as a control area.
 - (7) In conclusion, the group is not opposed in principle to proposals for whale sanctuaries, but feels strongly that these should be motivated on a species-by-species basis and as an integral part of an overall management plan, such that their maximum scientific value can be achieved.
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