Report of the Intersessional Meeting to Review the Southern Ocean Sanctuary

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1. OPENING REMARKS

The meeting was held 28-29 June 2004 at the Hilton Sorrento Palace Hotel, Sorrento, Italy. The Chair welcomed the participants to the meeting. He noted that at the 55th Meeting of the Scientific Committee (SC) in Berlin, the Working Group to Review Sanctuaries and Sanctuary Proposals agreed that a two-day pre-meeting would be scheduled prior to the 56th SC meeting, in order to review the Southern Ocean Sanctuary (SOS). The Working Group had also suggested that non-IWC-affiliated scientists with acknowledged international expertise on developing, managing and conducting research in sanctuaries or Marine Protected Areas (MPAs) be invited to attend the pre-meeting to assist with the SOS review process (IWC, 2004b, p.370).

An Intersessional Steering Group had selected three invited external reviewers and gave them the following tasks:

(1) to evaluate the SOS, given its objectives and the criteria developed by the Scientific Committee and approved by the Commission; and
(2) to provide advice on how to introduce MPA scientific concepts into IWC Sanctuaries and Sanctuary Proposals, and on establishing monitoring programmes.

The Chair introduced the three independent external reviewers (IER): Drs Gerber, Hyrenbach and Zacharias.

2. ELECTION OF THE CHAIR

Zerbini was elected Chair.

3. APPOINTMENT OF THE RAPPORTEURS

Williams was appointed rapporteur.

4. ADOPTION OF THE AGENDA

The adopted Agenda is given as Appendix 1.

[1] Presented to the meeting as SC/56/Rep2.

5. REVIEW OF THE SOUTHERN OCEAN SANCTUARY (SOS)

5.1 Review of available documents

Documents relevant to the Working Group were SC/56/SOS1-SOS7.

SC/56/SOS1 provided information on odontocetes in the Southern Ocean. It was noted that the majority of the 27 species discussed in the paper are small cetaceans, and it was accepted that the discussions would only focus on great whales during the review of the SOS.

SC/56/SOS2 provided a brief review of sanctuary theory applied to the review of the SOS and observed patterns in great whale populations in the Southern Ocean. The authors provided a brief overview of the relevant theory and concluded the following:

(1) When measured against the objectives of the SOS and the review criteria established by the Commission, the 10 years that have elapsed since the Sanctuary was established is far too short a timeframe to have expected the status of whale stocks to have altered substantially.
(2) While some whale stocks have increased in size over the past 10 years, their status remains uncertain, or at an early stage of recovery.
(3) Knowledge of the abundance and trends of populations of pelagic whales remains poor, with evidence of possible large-scale declines in abundance of Antarctic minke whales.
(4) Determination of current and historic whale abundance levels remains problematic, particularly for non-coastal species, causing great uncertainty when assessing the relative recovery of stocks following the moratorium and the establishment of the SOS.
(5) Knowledge of current stock structure and boundaries in Southern Ocean whales remains poor.
(6) Substantial feeding grounds of some species of Southern Ocean whales lie outside the current boundaries of the SOS.
(7) Whales within the SOS remain vulnerable to whaling under special permit and, given the uncertain status of these stocks, the effects of this continued harvest are not known.
(8) All whales that feed in the SOS are potentially vulnerable to whaling when in waters to the north of the Sanctuary.
(9) The potential magnitude and effects of other threatening processes (climate change in particular) to the recovery of the heavily depleted Southern Ocean whales remains even more relevant at the time of this review than it was when the SOS was established.

The authors of document SC/56/SOS2 stated that the original objective of the SOS was to assist recovery of great whale stocks by protecting them on their feeding grounds (IWC, 1993, pp.41-48). The authors suggested that a period

of at least 'several decades' would be required for heavily exploited whale stocks to return to an equilibrium level (at which point population parameters would be representative of an unexploited population).

One member responded that a strong motivation for the founding of the SOS had been to extend protection for whale stocks breeding in the Indian Ocean, and the objective of promoting recovery of depleted stocks was redundant, as they had all been given total protection prior to the imposition of the SOS.

It was noted that the term 'recovery', used repeatedly in discussions, has not been defined precisely. To some members of the Working Group, the term related to the call for recovery at the World Summit on Sustainable Development, which amounted to increasing abundance of depleted stocks to an effective MSY; to others it referred to a level at which harvests could be safely resumed; to yet others, the term meant increasing abundance of depleted stocks to pre-exploitation levels (K). It was **agreed** that this ambiguity requires clarification.

In response to point (1) above, some members of the Working Group pointed to increase rates estimated for Antarctic blue, humpback and southern right whales, some of which reflected doubling (or more) within a decade, and believed that this indicated that the status of several stocks could have changed substantially since the SOS was established. The authors of SC/56/SOS2 responded that, while some stocks had doubled, most were still at early stages of recovery.

Some members of the Working Group identified other concerns with some aspects of SC/56/SOS2. It was felt that the management scenarios outlined in the document, such as lifting of the moratorium, are hypothetical, and consequently, the conclusions reached seemed similarly academic, and did not reflect the current status of the SOS. Other members noted that there is considerable uncertainty related to the estimation of abundance, stock structure and ecology for many whale species in the SOS. For example, after 20 years and three circumpolar surveys for minke whales, the SC is still left with no agreed estimates of recent abundance or detailed knowledge of stock structure for the species. However, in response to this concern, some members of the Working Group felt that uncertainty *per se* cannot be used in a scientific forum to justify inaction. These members suggested an alternative interpretation to SC/56/SOS2, namely that if the apparent decline in Antarctic minkes were real, this might suggest that the SOS is not meeting its management objective. They pointed out that harvest for scientific purposes of less than 1% of current abundance over 18 years cannot explain an apparent decline in Antarctic minkes of up to 50% in the population. They stressed that assessing the Sanctuary's effectiveness hinges entirely on knowing the scientific objectives of the SOS, which are unclear.

One of the authors of SC/56/SOS2 responded to the concerns raised. He noted that, while advances have been made to identify stock structure in Antarctic minkes and other Southern Hemisphere baleen whales, considerable uncertainty remains in the results and the application of the results. Similarly, he expressed the view that the whales taken under special permit for JARPA have been taken predominantly from one area, and that a lack of understanding of the stock structure here make it impossible to assess the impact of this on the level of the stock. He stressed that he was not suggesting the possibility that the halving of minke whale numbers was a result of scientific whaling.

One member of the Working Group noted that the heavy emphasis on scientific uncertainty in SC/56/SOS2 ignored the recent advances made in designing feedback control management systems (e.g. RMP, AWMP). Simulation modelling had found such methods to perform well at providing a basis for management of living marine resources in a manner that took due account of concerns about uncertainty such as those raised in SC/56/SOS2.

After further discussion, the Working Group **agreed** that: (1) whales are not effectively protected from whaling in the SOS, because such Sanctuaries apply only to commercial whaling, and because (apart from stocks that migrate to the IOS) whales also migrate outside of the SOS boundaries; (2) the boundaries of the SOS were appropriately established for some, but not for all stocks; and (3) while it is open to debate whether the current information available to assess stocks is due to the presence of the SOS, *per se*, it was **agreed** that there is insufficient information available to assess the stocks of most species of great whales in the Southern Ocean reliably. However, it was noted that rates of increase and population size are available for a number of stocks, but these have resulted either from studies outside the SOS, and/or beginning before the SOS was established.

SC/56/SOS4 reported on the College of the Atlantic's Antarctic Humpback Whale Catalogue (AHWC), established in 1987. The paper presented summaries of the regional distribution of the 1,649 photographic images and the resightings between regions, which documented movement between seasonal habitats and migratory destinations of individuals from the Antarctic. Individuals from the Antarctic Peninsula were identified off western South and Central America, ranging from Ecuador to Costa Rica. Matches to Costa Rica set a new migratory record. The Catalogue provides a powerful, non-lethal tool for investigating stock structure and migration routes, and is a valuable tool for the facilitation of international collaboration on humpback whale research in the SOS.

SC/56/SOS7 provided a simulation modelling example to show the potential utility of such an approach to address questions about the efficacy of different management options including ones involving Sanctuaries. Two populations were simulated with neither, only one, or both subject to harvest (i.e. a sanctuary, a partial sanctuary, or no sanctuary). A variety of possible real intrinsic growth rates, initial population depletion levels and harvesting intensities were investigated, and the simulations included the possibility of habitat degradation over time. Generally the partial sanctuary option performed the best in terms of estimating intrinsic growth rate, which relates closely to *MSYR*, in terms of root mean square error of estimation.

In discussion, it was noted that these results were based on the use of sightings survey data to estimate population growth rate. For some species that feed in the SOS, estimates of population growth rates with lower variance have already been obtained by other methods. In response, one of the authors noted that the simulations in SC/56/SOS7 had been selected to illustrate the case of less aggregated species such as the minke whale, which are difficult to study by other methods such as photo-identification and near-shore counts.

An objective of the SOS (IWC, 1999, pp.42-43) is to contribute to a better understanding of the effects of environmental change on whale stocks. SC/56/SOS6 compared a 30-year time series of annual breeding success estimates of southern right whales from photo-identification

studies from Peninsula Valdés, Argentina with sea surface temperature (SST) anomalies from the island of South Georgia in the South Atlantic sector of the SOS. The choice of SST anomaly data was based on previous studies (Trathan *et al*., 2004), which indicated that these data were an indication of large-scale oceanographic processes such as inter-annual variation in the Antarctic Circumpolar Current which is thought to play an important role in the transport of krill to South Georgia. Trathan *et al*. (2004) had also shown relationships between these SST anomalies and breeding success of Antarctic fur seals and gentoo penguins. The results of SC/56/SOS6 showed a strong relationship between right whale calving output and SST anomalies in the autumn of the previous year (15-18 months prior to calving), demonstrating the sensitivity of southern right whale calving output to environmental variables even at low population levels. Although this was only one study of a single species in a limited area, there is potential for a similar approach elsewhere within the SOS. There is also considerable scope for further analyses to improve the understanding of the effects of climate change on cetaceans and this study showed the value of considering data on whales in the context of both physical oceanography and biological data from other, krill-dependent, higher predators. The results also demonstrated the value of long time-series of data (nearly 20 years of satellite data) to avoid relationships being confounded by periodic fluctuations in environmental conditions.

In discussion, it was noted that the results of this study would have been confounded had whaling occurred on this species, as was the case until 1970. Even if catches had been recorded accurately, it is likely that more than one population mixes on the feeding grounds and it would be difficult to assign catch to the correct population. This is important as calving output data were collected on the breeding grounds. Thus, the model-based estimates of calving output would be confounded by an uncertain level of take per breeding population. Others responded that as this species would not have been subject to whaling under the RMP for decades to come, this argument was irrelevant. Regarding the potential for a similar approach elsewhere in the SOS, it was noted that although the data on sightings and oceanographic variables used in SC/56/SOS6 came from within the SOS, the actual monitoring of calf production took place outside the SOS, and it was questioned by some whether such estimates of annual calf production would be possible on the feeding grounds.

5.1.1 Independent External Review of the SOS

SC/56/SOS5 was presented by the Independent External Reviewers (IER) as a response to the Scientific Committee's request for an independent review of the SOS and an introduction to MPA concepts. The paper focused on the incorporation of the science of marine reserves into IWC Sanctuaries with specific reference to the SOS.

The IER responded to three sets of criteria given to them by the intersessional Working Group on reviewing Sanctuaries and Sanctuary proposals:

(1) agreed Sanctuary review criteria;
(2) some Scientific Committee perspectives on the value of Sanctuaries; and
(3) questions specific to MPA concepts.

The following sections contain the questions posed, the responses of the IER, and the subsequent Working Group discussion.

5.1.1.1 SOS EVALUATION CRITERIA

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

IER evaluation

Given that the moratorium on commercial whaling was instituted prior to the establishment of the SOS, this question – while relevant to the IOS review – cannot be answered with any certainty due to the lack of the necessary empirical evidence. However, the statement that whales were and are protected from whaling within the SOS is correct; but this protection appears to be redundant as long as the global moratorium continues to be in place. If commercial whaling were to resume under the RMP, the SOS would likely protect certain species and stocks from whaling. This assumption is based on the protection afforded to Indian Ocean whale stocks by the IOS, and on the general principles of conservation reserve design within the SOS.

Working Group discussion

It was noted that the current regulatory framework in place in the SOS has been in terms of a complete, no-take zone, but it was **agreed** that the discussion of the Working Group need not be limited to no-take areas. It was noted that the SOS does not exclude the possibility of scientific whaling, as in practice, whales are only protected from commercial whaling in IWC Sanctuaries.

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

IER evaluation

The IER **agreed** that, while some aspects of the SOS boundaries were appropriately established, not all were. On the positive side, the SOS boundaries: (a) meet with the Indian Ocean Sanctuary (IOS) to preserve a contiguous marine area; (b) the 40°S latitude boundary is roughly consistent with a zone of transition between warm-water and cold-water temperate regions; and (c) the boundaries meet the criteria that a single, large reserve has generally been found to be more beneficial than several small reserves. On the other hand, the boundaries: (a) provide a poor degree of representativity; (b) do not contour to a particular oceanographic or physiographic characteristic; (c) exclude waters around landmasses; (d) do not address temporal variability (seasons); (e) have several migratory species crossing them; and (f) 'edge effects' penalise square corners.

Working Group discussion

The IER had noted that, in terms of MPA design, there are two general approaches. One approach is a productivity/biomass approach that protects areas that are important for foraging, or areas of high density of individual predators, irrespective of species. This may afford greater protection to species that are most abundant. The other approach is a biodiversity one, where areas of high species diversity are protected. This weights all species equally. It was noted that in other MPA design discussions, multi-species protection has proved problematic. It was **agreed** that the objective of the SOS must be clearer, in order to discriminate among designs that would, *inter alia*: protect whales; protect whale species diversity; facilitate the increase of whaling yields outside the SOS. It was noted that the boundaries of the SOS do not entirely contain the feeding grounds of all Southern Ocean whales (except for those in the Indian Ocean).

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

IER evaluation

Given that the moratorium on commercial whaling was instituted prior to the establishment of the SOS, the IER **agreed** that this question cannot be answered with any certainty, as there is no empirical evidence from which to evaluate the statement. It was the consensus of the IER that insufficient time has elapsed to evaluate the efficacy of the SOS.

Working Group discussion

Some noted that the ability to detect the benefit of the SOS to whales will require decades, unlike the 5-10 years required to detect benefit to shorter-lived fish and invertebrate populations, but others disputed this claim, saying that some populations had shown intrinsic rates of increase that resulted in a doubling of size within 10 years or less. One member suggested that the no-take nature of the SOS makes research inherently more costly than in other MPA frameworks, where the sale of products from exploited species subsidises the research. Although many examples were given of research in the SOS that had been initiated since 1994, it is problematic to assess whether the creation of the SOS had actually triggered this research. The IER searched for published literature on the Thompson's ISI Web of Science database but it was noted that some relevant sources were not listed in ISI and that due to the time period since the establishment of the SOS, the results of many studies were still awaiting publication. It was also noted that, for logistic reasons, studies of whales protected by the SOS are often conducted outside of the SOS on breeding grounds.

(4) EVALUATE IF THE SANCTUARY HAS PERMITTED DIRECT COMPARISONS OF SPECIES/STOCKS WITHIN THE SANCTUARY WITH (I) EXPLOITED AND (II) UNEXPLOITED STOCKS OUTSIDE THE SANCTUARY.

IER evaluation

Given that the moratorium on commercial whaling was instituted prior to the establishment of the SOS, the IER **agreed** that this question cannot be answered with any certainty, as there is no empirical evidence from which to evaluate this statement.

Working Group discussion

The IER were asked for examples of other sanctuaries that were designed specifically to assess the impact of harvest on species/stocks with exploited and unexploited stocks outside of the sanctuary. They responded that this was common in the terrestrial environment, but rarer in MPAs, largely due to the relative newness of MPAs. In the Great Barrier Reef Marine Park Authority, fished and non-fished areas are moved periodically to assess the effect of fishing on marine communities. In Alaska, experimental trawling around Steller sea lion rookeries has been used to assess are impact of prey density on sea lion populations. In the Bahamas and the Gulf of California, researchers are using adaptive management areas to identify high-diversity hotspots and to decide whether to protect them using decision-theory approaches. In most fish and invertebrate MPA experiences, protection has increased diversity and abundance both inside and outside protected areas. It was noted that for some species (blue, humpback and right whales), increases have occurred since the establishment of the SOS and an increase in the winter range of some of these populations has been observed, but it was pointed out that all such species had been protected (and had started increasing) decades before the SOS was formed. It would be useful to see how some of these populations respond as they approach historical carrying capacity.

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

IER evaluation

Overall, the IER felt that the number of investigations carried out in the SOS was limited. There were some cooperative studies between CCAMLR and Southern Ocean GLOBEC.

Working Group discussion

Some members suggested that many of the international, collaborative research projects would not have been funded had they been conducted in conjunction with a whaling program. However, much of the multidisciplinary research that has been conducted in the SOS has been regional, and focussed on areas thought to be of particular significance for oceanographic or biological processes within the Southern Ocean ecosystem. One member suggested that the overlap between SOWER and JARPA illustrates one kind of investigation that is more difficult to carry out in areas where whaling occurred, commenting that animals that had been chased by a scientific whaling vessel might be more likely to respond to a sightings survey vessel, or to be more difficult to biopsy than whales had not been chased. However, other members remarked that such responses would have to occur outside of the range of the sightings vessels if they were to affect abundance estimates. Similarly, potential conflict between SOWER and JARPA during 2003/04 was avoided by an agreement to allow sightings vessels to precede the whaling vessels through the area. It was also noted that the IDCR/SOWER surveys had started in 1978/79, when commercial whaling still occurred and it had always been possible to avoid conflict between the two programs through coordinated scheduling. It was noted by some that fishery-dependent and fishery-independent datasets in combination could be more powerful than either dataset on its own. On the other hand, it was noted that some research is hindered by exploitation: photo-identification estimates of natural mortality rates, for example, could be confounded by harvest. The potential for a no-take Sanctuary to serve as an experimental control is unambiguous, but the geographic and temporal scales of the protection are open for debate. Again, the critical problem is clarification of the objective(s) of the SOS.

IER overall conclusion

The consensus of the IER was that the SOS lacks clear, quantitative objectives and evaluation targets.

5.1.1.2 SCIENTIFIC COMMITTEE PERSPECTIVES ON THE VALUE OF SANCTUARIES

The Working Group noted that the membership of the Scientific Committee is highly varied in terms of perspectives. Some members expressed the view that, without access to much of the unpublished work on the SOS, the task of the IER was more difficult. The Working Group **agreed** that the involvement of the Independent External Reviewers was largely positive, and suggested that this partnership be used as a model for future Sanctuary Reviews, by inviting experts linked to IUCN or other groups with relevant expertise.

The IER had been asked how IWC Sanctuaries compare with other MPAs, and some members questioned whether those comparisons (between international, high-seas reserves and small, national, coastal MPAs) are fair ones. With those caveats in mind, the following section lists the 11 Scientific Committee perspectives on the value of Sanctuaries, the initial responses of the IER to those perspectives, and the subsequent discussions of the Working Group.

(1) SANCTUARIES PROVIDE A FOCUS FOR REGIONAL COOPERATION AT THE GOVERNMENT, INTER-GOVERNMENT AND NON-GOVERNMENT LEVEL.

IER response

While there is potential for the SOS to provide a focus for regional cooperation, at present the SOS does not appear to be a catalyst for regional cooperative efforts.

Working Group discussion

Some members argued that the SOS does provide a focus for regional cooperation at the government, inter-government and non-government level. While the IER suggested that regional cooperation was not triggered by the SOS, it was noted that Greenpeace, IFAW and WWF have hosted an international workshop to outline a programme of non-lethal research, have undertaken several cruises within the SOS and reported results to the Scientific Committee, and have developed new survey methods (e.g. passive acoustics) that have been used as part of national Antarctic research programmes and in collaboration with the IWC and CCAMLR. This work was undertaken in response to the establishment of the SOS. It was also noted that, although funding from commercial sources is often lost when sanctuaries are established, many other sources of funding become available. For instance, some research programs in the SOS are funded on the basis that the SOS exists (e.g. Australian Antarctic whale research) and that much of the collaborative work that is conducted by the IWC/SO-GLOBEC/CCAMLR Working Group in collaboration with national programs would not be accommodated if lethal methods were used to study whales. In response, others maintained that Sanctuaries might actually make funding for research harder, rather than easier to obtain, because in many cases the funding that governments allocate to fisheries research is related to the value of the fishery.

(2) SANCTUARIES PROVIDE A FOCUS FOR THE DEVELOPMENT OF NATIONAL AND INTERNATIONAL NON-LETHAL RESEARCH PROGRAMS.

IER response

There appear to be just as many non-lethal research programs inside as outside of IWC Sanctuaries, with the exception of some additional programs in the IOS.

Working Group discussion

No comments were made on the IER's assessment of this criterion.

(3) SANCTUARIES PROVIDE A NON-LETHAL RESEARCH FRAMEWORK THAT WILL ENABLE THE COMMISSION TO MAKE APPROPRIATE DECISIONS TO ENSURE THE EFFECTIVE CONSERVATION OF WHALE STOCKS IN THE REGION.

IER response

There are ways to operate concurrent lethal and non-lethal research programs in the same region, therefore there is no requirement that non-lethal programs should be confined to Sanctuaries.

Working Group discussion

No comments were made on the IER's assessment of this criterion.

(4) SANCTUARIES PROVIDE AN AREA TO STUDY WHALES UNDISTURBED BY WHALING ACTIVITIES.

IER response

The SOS and the IOS cannot be compared in terms of the scientific data they provide as a refuge from harvesting. The IOS was established prior to the moratorium on commercial whaling and therefore could provide empirical data for the comparison between harvested and non-harvested stocks/species. Because the SOS was established after the worldwide commercial moratorium, its implementation did not involve similar scientific benefits as those described for the IOS.

Working Group discussion

It was noted that comparative studies of exploited versus unexploited stocks are confounded by uncertainties regarding stock structure. One member argued, on general statistical grounds, that some whaling (perhaps augmented by some no-take areas serving as experimental controls – see SC/56/SOS7) was necessary to effect the disturbance needed to better estimate the parameters of whale population dynamics, and hence, sustainable levels of catch. In response, some members pointed out that the Southern Ocean whale stocks had already been impacted by past whaling, and asserted that long-term monitoring of population dynamics in the absence of additional whaling would best facilitate assessment of the impact of historical catches, e.g. through studies that estimate population parameters based on identification of individual whales. The proponent of the first view argued in response that the success of such approaches was compromised by the absence of effective population monitoring during the period when past whaling had heavily impacted stocks. The Working Group recognised that there are inherent difficulties in assessment of stocks prior to exploitation, however it was noted that there are published estimates of initial population size for almost all of the large whale species in the SOS.

In this context, the role of the IOS and SOS are not directly comparable, because the IOS was established prior to the moratorium.

(5) SANCTUARIES PROVIDE AN 'INSURANCE' AGAINST UNFORESEEN PROBLEMS WITH THE RMP.

IER response

IWC Sanctuaries may become an essential part of the RMP. However, reliance on Sanctuaries to insure against failures of the RMP should be avoided at this time. Were this to become a goal of the SOS (and IWC Sanctuaries in general), the risks are that:

(a) sanctuaries become instead a mechanism to increase harvest yields in areas where the RMP is applied;
(b) there is little empirical evidence on exactly how much 'insurance' Sanctuaries will provide; and
(c) given that almost the entire Southern Ocean is contained in the SOS, the insurance may be excessive.

Working Group discussion

Some members suggested that the RMP already incorporates the precautionary principle; it was also suggested that the SOS may provide an 'insurance' against unforeseen problems with the RMS. There was some

discussion about the need for insurance against RMP failure, if the RMP proves not to be sufficiently precautionary. It was suggested that the SOS should be evaluated on its own terms, irrespective of the implementation of the RMP. There was some discussion of the recommendation of Parrish (1999), who suggested that highly-mobile fish stocks were protected adequately only when 50% of the productive habitat was protected. The IER responded that this result (based on northeast Pacific small pelagic fisheries) is likely to be very case-specific, depending on the life-history attributes of the target organism and the fisheries management practices employed. The IER also noted that in a recent Special Issue of *Ecological Applications* on Marine Protected Areas, it was reported that 20-70% of habitat protection is optimal, depending on the biology of the target species. It was noted that the SOS does not protect the entire range of any stocks, except for those stocks migrating to the Indian Ocean, where they are protected by the IOS.

(6) SANCTUARIES PROTECT WHALES FROM COMMERCIAL WHALING, A NECESSARY FIRST STEP IN A MORE COMPREHENSIVE MANAGEMENT REGIME.

IER response

Notwithstanding the fact that whale species both in and out of Sanctuaries are currently protected from whaling, the notion that the SOS is a first step toward ecosystem management in the Southern Ocean is an important one. However, there are a number of untested ecological assumptions underlying this assumption. The current mandate of the IWC does not prohibit or control any activity other than commercial or subsistence whaling; therefore, the IWC would need to coordinate its activities with other regulatory and fisheries agencies with jurisdiction over other aspects of the Southern Ocean.

Working Group discussion

An IWC Sanctuary protects whales from commercial whaling and this was seen by some members as a necessary first step toward a more comprehensive management regime. However, some members questioned the value of this, given that the IWC does not currently regulate activities other than whaling.

(7) SANCTUARY PROPOSALS ONLY ADDRESS DIRECT CATCHES. CURRENT AND LIKELY FUTURE RMP MANAGEMENT STRATEGIES OF THE IWC WOULD ONLY ALLOW EXPLOITATION OF ABUNDANT WHALE STOCKS AND THEN AT CONSERVATIVE AND SUSTAINABLE LEVELS.

IER response

The IER was unsure what this meant, and requested clarification from the Working Group.

Working Group discussion

There was insufficient time to discuss this issue further.

(8) SANCTUARIES PROVIDE NO EXTRA PROTECTIONS FROM HABITAT DESTRUCTION, POLLUTION, SHIPPING AND FISHERIES INTERACTIONS, AND DO NOT DISTINGUISH AREAS OF CRITICAL HABITAT.

IER response

The SOS currently provides the same level of protection for all whale stocks whether they require protection or not. Some additional level of protection in important areas at key times would be an added benefit of the SOS.

Working Group discussion

It was suggested by one external reviewer that an IWC Sanctuary ought to trigger a management framework that addresses threats other than direct catches.

(9) SANCTUARY PROVISIONS MAY PREVENT UTILISATION OF STOCKS FOR WHICH A SUSTAINABLE CATCH WOULD BE ALLOWED UNDER THE RMP/RMS.

IER response

This statement may be correct if the SOS is used as an 'insurance' policy for the RMP. The SOS should not conflict with the RMP, but complement it. If there exists a disconnect between the goal and the implementation of the RMP and the SOS, both need to be re-examined.

Working Group discussion

To some members, Sanctuary provisions do not prevent utilisation of stocks for which a sustainable catch would be allowed under the RMP/RMS, because takes under special permit are allowed in the SOS. To others, Sanctuary provisions do prevent potential utilisation, because protection is afforded irrespective of the conservation status of stocks. It was suggested that answering this question is hindered by the lack of direct, clear objectives of the SOS. If the goal is to protect species diversity, then the management of the Sanctuary may be different than if the goal is to maximise sustainable yields in areas outside the SOS.

(10) WHETHER OR NOT AN AREA IS DESIGNATED AS A SANCTUARY IS IRRELEVANT TO WHETHER OR NOT RESEARCH IS CARRIED OUT IN THE AREA.

IER response

Yes. However, the reviewers recognised the potential for IWC Sanctuaries to attract research and funding.

Working Group discussion

No comments were made on the IER's assessment of this criterion.

(11) THE NEED TO PROVIDE INFORMATION RELEVANT FOR MANAGEMENT AND UTILISATION OF ONE SPECIES MAY STIMULATE RESEARCH THAT IS ALSO OF VALUE IN MONITORING DEPLETED SPECIES.

IER response

This statement assumes that species that are the focus of management and utilisation are not themselves depleted. Furthermore, the concept that one species should be harvested to benefit other more vulnerable taxa has been discredited in terrestrial wildlife management.

Working Group discussion

It was noted by some members that a commercial minke whale harvest in the SOS might fund much-needed research on blue whales, for example. There was no consensus on whether funding is likely to be helped or hindered by creation of Sanctuaries. In a humpback whale sanctuary in the USA, substantial funding has been allocated to protect a whale stock that is subject to non-consumptive use. Similarly, substantial funding has been allocated to whale surveys in the Southern Ocean, which have not been tied to a commercial whaling operation, and the work of the Australian Antarctic Science Program is in direct response to the SOS. However, it was noted that Japan's funding for SOWER was predicated on the understanding that the

research could lead ultimately to the resumption of commercial whaling (see discussion recorded under point (1), item 5.1.1.2).

Overall Working Group discussion on Scientific Committee perspectives on the value of Sanctuaries

The Working Group **agreed** that it was not able to completely evaluate the effectiveness of the SOS at the present time, because the objectives provided by the Commission to the Scientific Committee were unclear and were not associated with quantifiable performance measures. It was **agreed** that the objective(s) of the SOS must be clarified, in order to discriminate among designs that would, *inter alia*: protect whales; protect whale species diversity; and increase whaling yields outside the Sanctuary. The Working Group **agreed** on a series of recommendations that, once overall objectives of the SOS have been refined, will allow these objectives to be realised, and will facilitate evaluation in future reviews.

5.1.2 Recommendations

The Working Group **recommended**:

(1) The purpose(s) of SOS (and other IWC Sanctuaries) should be better articulated through a set of refined overall objectives (e.g. preserving species biodiversity; promoting recovery of depleted stocks; increasing whaling yield). In particular, the relationships between the RMP and the Sanctuary program should be articulated.
(2) Appropriate performance measures (e.g. recovering stock *x* to abundance *n* with *y%* certainty) both for Sanctuaries in general, and the SOS in particular, should be developed. These performance measures should link the refined objectives of the SOS with the monitoring programs in the field.
(3) Systematic inventory and research programs should be established or further developed so as to build the required information base for a Sanctuary management plan and subsequent monitoring programs.
(4) A Sanctuary management plan should clearly outline the broad strategies and specific actions needed to achieve Sanctuary objectives (e.g. how to protect *x%* of a given feeding area for stock *y*).
(5) A monitoring strategy that measures progress toward achieving the Sanctuary objectives should be undertaken. A key component of this monitoring strategy would be the development of tangible indicators to monitor progress.
(6) Review criteria that reflect the goals and objectives of the Sanctuary (as described above) should be established.
(7) The Sanctuary management plan should be refined periodically to account for ecological, oceanographic and possible other changes in an adaptive fashion.

6. INCORPORORATION OF MPA SCIENTIFIC CONCEPTS INTO IWC SANCTUARIES AND SANCTUARY PROPOSALS

6.1 Review of documents

Documents relevant to the Working Group were SC/56/SOS3 and SC/56/SOS5.

One of the tasks given to the IER was to discuss the inclusion of MPA concepts into IWC Sanctuaries. A presentation was provided to the meeting by one external reviewer as a summary of the relevant sections of SC/56/SOS5. She made the following points:

(1) It is important to clarify the difference between a MPA and a Marine Reserve. A Marine Reserve is a no-take area while a MPA may include multi-use components, including harvest.
(2) Marine Reserve theory is relatively new and there is not much data to support its concepts. Most Marine Reserves focus on protecting fish and invertebrates rather than large species like whales. There are some empirical data indicating benefits of Marine Reserves but there are also numerous areas where benefits have been speculated but not empirically demonstrated. Design issues for setting up a Reserve are varied and complex and the design considerations for migratory species can be quite different and need to be carefully considered.
(3) Results of a simple model for a marine mammal reserve show that for some long-lived species it may be several decades before a change will be seen as a result of implementing a MPA.
(4) The literature on reserves indicate that if objectives are not clear then reserves are unlikely to be successful as it makes it difficult to monitor and assess success. Reserves will work if they are set so that important life stages are protected, they should also be large enough to protect all the range of individuals.
(5) Dynamic boundaries and buffer zones may be useful to allow for protection of species with large home ranges, such as whales.

The following comments were made during the Working Group's discussion of the IER presentation on MPA scientific concepts.

One of the external reviewers commented that the Scientific Committee need not incorporate all of the issues raised in paper SC/56/SOS5. A range of conservation options were suggested in SC/56/SOS5, but not all are required to ensure that the existing goals of the SOS are met. If the Commission chooses to expand the mandate of the SOS, then many of the issues identified in SC/56/SOS5 will need to be considered more carefully.

One member commented that targeting areas of aggregation for protection was not always appropriate. Provided adequate other controls (e.g. catch limitation with appropriate compliance provisions) were in place, it was often the case in fisheries that aggregations were deliberately targeted for greater economic efficiency (greater catch rates, better quality product), as indeed was also the case for Southern Ocean species such as blue and minke whales.

One member commented that the original goal of the SOS was clear, and was the total prohibition of commercial whaling irrespective of the conservation status of whales (Paragraph 7(b), ICRW Schedule). However, over time other aims have been added which have led to confusion about the purpose of the SOS. This has been a contributing factor in making the discussions and assessment of the SOS more difficult. It was also noted that discussion of MPAs should consider existing management measures to ensure that MPAs are as effective as possible. In response, another member expressed the alternate view that the objective of

the SOS was to facilitate the recovery of greatly depleted whale populations in the Southern Ocean by protecting them on their feeding grounds (IWC, 1993, pp.41-48).

It was noted that MPAs can have moveable boundaries. An example of this was a MPA to protect turtles on the west coast of the USA. This MPA has boundaries based on oceanographic data, rather than fixed locations.

SC/56/SOS3 discussed how, at its 2003 meeting, the Scientific Committee had agreed that outside scientists could contribute: (1) to provide advice on how to introduce MPA scientific concepts to the IWC review of sanctuaries and sanctuary proposals and on the establishment of monitoring programs; and (2) to evaluate the effectiveness of the Southern Ocean Sanctuary given its objectives and the criteria developed by the Committee and approved by the Commission. The Commission agreed 'that the Scientific Committee should concentrate on the second point, taking into account other scientific concepts, such as MPAs where appropriate' (IWC, 2004a, p.24). SC/56/SOS3 examined 'MPA scientific concepts' including the more broadly stated need to protect endangered species, ecosystems and biodiversity that are relevant to the management of whales, and concluded that the SOS is not consistent with these concepts and that the RMP adequately addressed the management needs. It noted that while the IWC Sanctuaries meet the rather political definition of MPAs, they do not meet scientific requirements for the establishment of MPAs including the IUCN guidelines of 1999. It is therefore also concluded that if the IWC is to justify its Sanctuaries as part of any global initiative to establish MPAs, there will need to be a fundamental change in the concept of IWC Sanctuaries that would allow the sustainable use of abundant resources. The paper also argued that the introduction of language that incorporates 'MPAs' into discussions and documents of the IWC is, to a large extent, nothing new and simply a matter of semantics to match the currently fashionable politic. While the IWC's Sanctuaries in the Indian Ocean and the Southern Ocean meet the political sense of MPAs, they do not meet the scientific concepts for the establishment of MPAs such as described by the IUCN guidelines, primarily because they exclude any possibility of sustainable use and because they are not integrated with other management regimes dealing with all human activities that affect the ecosystem. Reasons for the establishment of MPAs and for their underlying 'scientific concepts' that apply to the conservation of whales, including the need to insure against scientific uncertainty and natural variability, are already adequately addressed by the RMP. Even when the moratorium is lifted and even if the existing Sanctuaries were no longer so designated, the resumption of commercial whaling under the RMP will, in the context of whales, essentially leave most of the world's ocean area protected. The review of Sanctuaries should therefore focus on whether or not sanctuaries are necessary in addition to the protection afforded by the RMP.

In response to SC/56/SOS3, one member stated that he perceived the paper more as a political statement than a scientific one, and as such, it highlighted the deep ideological division in the Scientific Committee regarding Sanctuaries, which should be overcome if progress is to be made. One of the authors of SC/56/SOS3 responded that the paper was actually an attempt to de-politicise the discussion surrounding MPAs and, for that purpose, the authors used the IUCN MPA guidelines, which they regard as scientific and objective, to review the SOS.

In general discussion, some members commented that, although instructions from the Commission were to consider how MPA concepts could be used in IWC Sanctuaries, this does not necessarily mean the SOS should be considered a MPA. The only protective measure covering the entire SOS is the protection against commercial whaling, but that does not exclude other protective measures, which may or may not involve the designation of MPAs, being applied to areas within the SOS. Although there are some parallels between the SOS and MPAs, they are not equivalent. It was also noted that there are several other International Agreements that provide protection for the waters around Antarctica within the SOS, including CCAMLR, Antarctic Treaty, and the International Convention for the Prevention of Pollution from Ships.

6.2 Recommendations

Marine sanctuaries and reserves are a subset of marine protected areas (MPAs). While marine reserves aim to provide protection from removal and disturbance, IWC Sanctuaries are waters closed to commercial whaling. The Working Group recognizes the value of exploring the rapidly developing theory and application of MPAs in relation to the review of the IWC Sanctuaries. However, the application of MPA scientific concepts to IWC Sanctuaries requires further investigation. The Working Group further recognised that MPAs and IWC Sanctuaries can vary widely in their goals, objectives, scales and management implications. The Working Group **recommended** that the goals of IWC Sanctuaries should be clearly articulated in Sanctuary proposals and that Sanctuary adoption should include measurable criteria that can be evaluated and monitored using systematic inventory (as described in SC/56/SOS5) and research programs that will be refined at periodic intervals. Finally, the Working Group seeks clarification from the Commission on more clearly measurable objectives for IWC Sanctuaries.

7. ADOPTION OF THE REPORT

The report was adopted at 21:53 on Canada Day, Thursday 1 July 2004. The Working Group expressed its thanks to the Chair and the rapporteurs.

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Appendix 1

AGENDA

1. Opening remarks
2. Election of Chair
3. Appointment of the rapporteurs
4. Adoption of the Agenda
5. Review of the Southern Ocean Sanctuary (SOS)
   - 5.1 Review of available documents
     - 5.1.1 Independent External Review of the SOS
       - 5.1.1.1 SOS evaluation criteria
       - 5.1.1.2 Scientific Committee perspectives on the value of sanctuaries
     - 5.1.2 Recommendations
6. Incorporation of MPA scientific concepts into IWC Sanctuaries and Sanctuary proposals
   - 6.1 Review of documents
   - 6.2 Recommendations
7. Adoption of the report