

## **Report of the Scoping Group Meeting for the Proposed IWC Workshop on Climate Change.**

The Scoping Group Meeting was held at Martin Johnson House on the campus of the Scripps Institution of Oceanography, La Jolla, California, USA 19-20 February 2008.

### **1. CONVENOR'S OPENING COMMENTS**

Simmonds welcomed everyone to the Scoping Group meeting - especially those who had come very long distances - and thanked Reilly for hosting the meeting. He noted that Nick Gales, Cristina Fossi and Lorenzo Rojas-Bracho had sent their apologies.

Simmonds commented that it was almost exactly 12 years since the first IWC workshop on Climate Change and Cetaceans (CC1) and that three of the participants in this planning meeting had also taken part in that meeting (Simmonds, Reilly and Moore). He noted that in 1993, the Commission had requested that the Scientific Committee should 'give priority to research on the effects of environmental changes on cetaceans in order to provide the best scientific advice for the Commission to determine appropriate response strategies to these new challenges.' At the following Scientific Committee meeting a number of areas to be addressed were identified including global warming, ozone depletion, chemical pollution, fisheries effects, noise and 'other human activities' (meaning tourism and coastal development). Implicit too was the consideration of the synergistic and cumulative effectiveness of these factors.

The Scientific Committee (SC) began to address this list via two specialist workshops. The Chemical Pollution workshop was held in March 1995 in Bergen and the first Climate Change Workshop (which also looked at ozone depletion) followed in March 1996 in Hawaii. Since then, there have also been IWC workshops and symposia on habitat degradation (March 2004 in Siena, Italy), on underwater noise (2004 SC.56 pre-meeting in Sorrento, Italy), on the reduction of polar sea ice (2005 SC.57 pre-meeting in Ulsan, Korea), on the potential effects of seismic survey (airgun) noise on cetaceans (2006 SC.58 pre-meeting, St Kitts) and on emerging diseases in cetaceans (2007 SC.59 pre-meeting in Anchorage, Alaska USA).

At the 59<sup>th</sup> meeting of the Commission, a proposal for a second workshop on climate change (CC2) was approved. With the release of the fourth report of the International Panel on Climate Change (IPCC) in March 2007, as well as growing evidence of changes to cetacean habitats, particularly at high latitudes, it is now timely to revisit and review this important matter. A four day expert workshop of some 30 participants is planned, with an overall goal to better inform cetacean conservation and management efforts. Specific outputs will include a meeting report containing advice to the IWC and peer-reviewed papers comprising a special edition of the Journal of Cetacean Research and Management.

Reilly reflected on the progress made since CC1 and noted that the workshop's primary conclusion was that cetaceans would be most affected by climate change via the links between them and their habitats; that we were essentially ignorant of the nature and extent of these links; and this ignorance primarily came from a lack of appropriate data. Such data need to be collected in focused multidisciplinary field programs that include, *inter alia*, physical and biological oceanographic studies. These studies require expertise not represented in the SC and need to be done on a scale that is beyond what the IWC could afford on its own. Consequently, the SC decided (and the Commission endorsed) that the best means to add to

our impoverished knowledge base was to collaborate with other international and national multidisciplinary field programs planning field work in areas and at times of potential interest, such as those of CCAMLR, GLOBEC and various nations on their own.

Reilly further noted that the first and largest collaboration resulting directly from CC1 was called SOWER2000. It was a full collaboration with the scientific committee of CCAMLR during their multi-vessel synoptic acoustic survey for krill in the South Atlantic sector of the Southern Ocean. Their multidisciplinary sampling was supplemented by IWC placing trained cetacean observer teams on three vessels. These teams conducted line transect sighting surveys. Data from the survey were analyzed to determine abundance of cetaceans in this region and consumption of krill by baleen whales (e.g. Reilly *et al.* 2004). Subsequent to this initial field program, IWC observers were placed on a number of Southern Ocean GLOBEC cruises and those of a few national programs, with initial analyses reported by Thiele *et al.* (2004). Data resulting from all these cruises including SOWER2000 have been compiled into an IWC data base to allow analysis, synthesis and modelling of cetacean-habitat linkages and likely effects of climate change. We are just now approaching a sufficient amount of data to allow such synthetic work.

## **2. ELECTION OF CHAIR AND FURTHER INTRODUCTORY COMMENTS**

Sue Moore was elected as Chair for the Scoping Group meeting and Mark Simmonds agreed to be rapporteur.

Moore noted that we were now working within the context of the IPCC 4<sup>th</sup> that provides both conclusive evidence of climate change and analyses at temporal and spatial scales of relevance to cetaceans (<http://www.ipcc.ch/>); at the time of the first workshop the IPCC had only just delivered its first report. She stressed the need to focus CC2 on cetacean populations where comparatively long time series data are available, preferably in regions of the world's oceans where a strong climate signal has been demonstrated. This focus is required to investigate whether or not the effects of climate change can be separated from other forces acting on cetacean population dynamics. As examples of strong climate signals, Suydam noted that sea ice retreat in the Arctic was proving to be even faster than models predicted and Parsons emphasised the importance of climate driven increases in ocean acidity.

## **3. THE FOCUS AND STRUCTURE OF THE WORKSHOP**

The Group noted that its aims were to develop a workshop plan focused on determining how climate change is/may already be affecting cetaceans and how best to determine these effects.

After discussion (and taking note of some helpful suggestions sent by Gales) the Group **agreed** the following objectives:

The Climate Change Workshop aims to bring together and enhance collaborations amongst experts in cetacean biology, modelling, marine ecosystems and climate change, as well as to review the current understanding and to improve conservation outcomes for cetaceans under climate change scenarios described in the IPCC 4<sup>th</sup> report by:

1. Identifying existing long term cetacean environmental data sets that can be analysed and included in models in relation to climate change variables;
2. Determining patterns that may be attributable to climate change via analyses of these data sets;

3. Modelling mechanisms to consider cause and effect relationships, provide predictions and identify data gaps that, if filled, would improve our understanding of the effects of climate change on cetaceans; and
4. Providing timely scientific advice related to cetacean research, conservation and management via peer-reviewed publications.

The Group took note of the deliberations of the first IWC Workshop on Climate Change (i.e., CC1) and the research that resulted from it. It also considered the report of the IWC Workshop on Habitat Degradation. The Group discussed possible ways forward for the next Climate Change workshop and developed a series of criteria that might be used to evaluate data sets in order to determine if investigation of them would be likely to be fruitful.

The agreed criteria in order to identify key studies are:

- Long term data sets (i.e. decadal) for the cetacean population(s) in question from a regions(s) with a strong climate signal for which relevant long term environmental data are available; and
- Necessary analyses of these data can be completed in time for the workshop.

Data sets that met these criteria would be considered at the workshop and further analysed with the assistance of modellers. In terms of the facilitation of data sharing, the IWC data availability model was considered as a suitable mechanism and the Secretariat will be consulted on this matter.

Given the need for a strong climate signal to be apparent and to meet the other criteria above, the group agreed that there were two likely sources of data:

- Key Study 1: Arctic: Eastern North Pacific gray whales and the Bering-Chukchi-Beaufort stock of bowheads
- Key Study 2: Western Antarctic Peninsula: southern right whales (possibly humpbacks and minke).

Other locations/populations that might meet the necessary criteria were also discussed including the Mediterranean, Eastern Tropical Pacific and eastern Antarctic and critically small cetacean populations that occur in restricted ranges (e.g., vaquita). Specifically, a paper concerning small cetaceans in the Sunderbans of Bangladesh, provided by Aguilar and Smith, was considered, as well as one by Smetacek and Nicol (2005). These researchers and others are encouraged to consider whether they have data that might be helpful to the process of investigating impacts of climate on cetaceans under the aforementioned guidelines of: (1) long time series and (2) strong climate signal. The scoping group anticipated further discussion on potential study populations and regions at the annual SC meeting.

The Scoping Group calls on relevant countries and scientists to bring forward these data and agreed the following schedule for presentations:

The Group **agreed** that the workshop would include a section of scene-setting presentations, including a retrospective by Reilly detailing developments arising from the last IWC climate change workshop, followed by detailed discussion of those regions and populations that met certain criteria likely to yield helpful results. A series of papers focusing on related issues (e.g., effects of ocean acidification, or sea ice loss on marine ecosystems) would also be

generated and made available to delegates as background information ahead of the workshop but would not be formally presented. All papers would be made available via the workshop's website one month ahead of the meeting itself.

A draft agenda for the CC2 workshop was discussed at some length and amended. The agreed version is presented here as Annex C.

#### **4. THE LOCATION OF THE WORKSHOP**

Simmonds presented an invitation from Cristina Fossi and Giuseppe Notobartolo di Sciara to hold the workshop in Sienna, Italy, at the Certosa di Pontignano (which proved to be an excellent venue for the Habitats Degradation workshop). Other options were discussed but the group agreed to recommend the centre in Siena for the CC2.

The Group **recommends** that the workshop be kept to a manageable size (i.e. in the region of 30 participants) and discussed at length which scientists might be able to best help the process of the workshop. The scientists suggested are identified in Annex D.

#### **5. ESTABLISHMENT OF AN IWC 2<sup>ND</sup> CLIMATE CHANGE (CC2) WORKSHOP STEERING GROUP**

Given that considerable work will need to be done ahead of the workshop – especially in terms of liaison with relevant researchers - the Scoping Group **recommended** that a steering group should be established by the Scientific Committee to guide this process. This should include at least a nominated workshop convener, the workshop chair and the IWC Head of Science.

The Group also discussed the need to help direct further research following the CC2 workshop and noted that some such research may need several years of planning and preparation. A small team of individuals might be helpful to direct this effort. It was noted that the IWC's Pollution 2000+ initiative has been successfully guided in a similar way. Thus, it may therefore be desirable for the IWC SC to assemble a planning team.

The work of various other international bodies on climate change was discussed, including specific mention of the joint IWC-CCAMLR meeting to be held in August 2008. Moore noted the recently completed 10-year international Arctic research plans (ICARP II), some of which specifically include aspects of cetacean research (see: <http://www.icarp.dk/>) . In addition Reilly mentioned the ICED (International Circumpolar Ecosystem Dynamics) initiative and will report on this to the next Scientific Committee on this.

Other relevant organisations that might help the CC2 Workshop included the British Antarctic Survey (BAS), Southern Ocean Collaboration (SOC) and the Convention for Migratory Species (CMS)<sup>1</sup>. In addition, a special volume of Ecological Applications looking at Arctic climate change and marine mammals is due to be published in spring 2008. Finally, Simmonds reported that the chair of the Scientific Committee of ACCOBAMS is willing to work closely with the IWC climate change workshop and this was welcomed.

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<sup>1</sup> In the list of proposed participants (Annex D) note is made of affiliation to some of the relevant international bodies.

Moore (in her capacity as Convenor of the Standing Working Group on Environmental Concerns) will consult with the other Scientific Committee conveners to investigate how the other subcommittees might guide and contribute to the CC2 workshop.

## 6. CONCLUDING COMMENTS

The primary source of funding for the workshop is expected to be the IWC but other support will be welcome and some NGOs might consider providing support.

At the close of the meeting Moore thanked every one for their time and thoughtful contributions. She noted that the proposed timing of CC2 Workshop is auspicious in that the anticipated analytical and modelling results could contribute to ongoing research that will ultimately result in the IPCC 5<sup>th</sup> report, due out in 2012. Physical and ecosystem models are now available at comparable spatial and temporal scales, offering an unprecedented opportunity to have cetaceans included as sentinels of the effects of climate change on marine systems.

## REFERENCES

Reilly, S., Hedley, S., Borberg, J., Hewitt, R., Thiele, D., Watkins, J., and Naganobu, M. (2004). Biomass and energy transfer to baleen whales in the South Atlantic sector of the Southern Ocean. *Deep-Sea Research II*, 51(12-13): 1397-1409.

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Smetacek, V. and S. Nicol (2005) Polar ocean ecosystems in a changing world. *Nature* 437: 362-368

## Annex A

### List of Scoping Group participants

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## **Annex B**

### **Agenda: IWC climate change workshop scoping group meeting San Diego 20-21 February 2007**

#### **DAY 1**

Welcome from the convener – background to the meeting  
Appointment of the chair and rapporteur  
Review Workshop Aims and Instructions from Commission  
Review the draft agenda  
Identify any missing issues  
Determine how to establish the current state of relevant knowledge (including predictive powers)  
Identify suitable case studies and key papers  
Identify contributors  
Determine implications for the work of the IWC, particularly the scientific committee working groups

#### **DAY 2**

Review conclusions from day one  
Generation of expert statement  
Facilitation of future research  
Discuss location  
Budget and sponsors  
Relationship to other initiatives

## Annex C

### Draft Agenda – 2<sup>nd</sup> Climate Change (CC2) Workshop.

A. Welcome from Convener and introductory comments

B. Election of Chair and Rapporteurs

C. Keynote presentations

- The first IWC workshop on climate change and subsequent developments – (Reilly)
- Broad-based evaluation of cetacean vulnerabilities (L. Rojas Brachos and S. Moore; w/ ref. to the NASA book)
- Setting the physical stage (E. Hoffman and J. Overland)
- Prey Linkages (C. Ashjian and S. Nicol)
- Methodological approaches relating cetaceans to their habitat (Redfern and modeller)

D. Background materials (new papers provided but not presented)

- ‘How resilient are cetaceans?’ – back ground paper looking at cetacean evolution (Fordyce?)
- Socio-economic responses to climate change with the potential to impact cetaceans at the poles (R. Suydam/M. Simmonds/WWF)
- Adaptive management responses (WWF)

E. KEY STUDIES

1. Identifying Case Studies.

Criteria for key studies: the following are essential requirements for this workshop:

- Long term data sets (i.e. decadal) for the cetacean population(s) in question and relevant long term environmental data in a region with a strong climate signal; and
- That any necessary analyses can be done in time for the workshop.

2. Presentation of Case Studies and modelling results

- Key Study 1: Arctic: Bering-Chukchi-Beaufort stock of bowheads and Eastern North Pacific gray whales
- Key Study 2: Western Antarctic Peninsula: southern right whales (possibly humpback and minke whales)

3. Other Studies: other Regions/populations (to be agreed subject to the above criteria prior to the meeting)

4. Evaluate analytical and modelling approaches used at the workshop and develop recommendations for refinement and alternative approaches

5. Synthesise conclusions from key studies and review implications for cetaceans in other regions, including vulnerable species and populations

F. Identification of resulting peer-reviewed publications; selection of topic editors and establishment of schedule to publication.

- G. Proposed future investigations
- H. Implications for the work of the IWC and other conservation organizations
- I. Connections with other international initiatives and processes.

## **Annex D**

### **Proposed Participants in the IWC Climate Change (CC2) Workshop**

Dave Ainley  
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Giuseppe Notabartolo di Sciara (ACCOBAMS SC)  
Jim Overland  
Wayne Perryman  
Jessica Redfern  
Steve Reilly (SWFS, retired)  
Lorenzo Rojas Branchos  
Robert Suydam  
Deb Thiele  
Phil Trathan  
George Watters (CCAMLR & gray whale modelling)  
Alex Zerbini