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Report of the Planning Workshop of the Southern Ocean Research Partnership (SORP)

The first planning workshop of the Southern Ocean Research Partnership (SORP) was held at the National Maritime Museum, Sydney, Australia, from the 23rd to the 26th of March 2009. In 2008, Australia proposed to the International Whaling Commission (IWC) the development of regional, non-lethal, cetacean research partnerships. These research partnerships would use modern, non-lethal, scientific methods to provide the information necessary to best conserve and manage cetacean species. The proposal was received very positively by many IWC member nations.

The opening morning of the SORP workshop comprised of a series of presentations on various topics that provided a framework for later technical discussions about the SORP. Participants were welcomed to the meeting by Donna Petrachenko (Australian Commissioner to the IWC; Marine Division, Department of Environment, Water, Heritage and the Arts) and the meeting opened with a keynote address by the Right Honourable Peter Garrett M.P. (Minister for the Environment, Heritage and the Arts). Introductory seminars were presented by Arne Bjørge (Chair of the Scientific Committee, IWC), John Gunn (Head of Science, Australian Antarctic Division (AAD)), Lyn Maddock (Director, AAD), Miguel Iñiguez (Argentinean Alternate Commissioner to the IWC), and Nick Gales (Leader of the Australian Marine Mammal Centre, AAD). Mike Donoghue (Department of Conservation, New Zealand) delivered a statement on behalf of the Minister of Foreign Affairs, Hon Murray McCully, reiterating the Government's strong commitment to the SORP and noting that the workshop outcomes would be valuable in shaping New Zealand's future contributions

The following notes report on the broad discussions that took place in the technical workshop that followed on from the overview presentations held on the first morning. This report is accompanied by a shorter document; Summary of Outcomes, which is a précis of the major outcomes of the meeting.

1. General introduction

The convenor, Nick Gales, opened the technical workshop and welcomed everyone to Sydney. A list of participants is presented in Appendix 1.

1.1. Workshop objectives

In describing the objectives of the workshop it was emphasised that the SORP is intended to be a model for other non-lethal, regional, research partnerships that may be established by the IWC. In order to achieve its aims, the SORP will not be a collective re-branding of whale science that is already being done in the Southern Ocean, but rather a new collaborative initiative that will respond to, and deliver, an enhanced and integrated range of outcomes against agreed research priorities. The partnership will receive a high level of scrutiny and its longevity will depend on its ability to deliver against its stated objectives and priorities.

The scope of SORP will be the entire Southern Hemisphere but its focus will be research in higher latitudes, where the benefits of the Partnership will be most beneficial. However, the inclusion of lower latitude research efforts were also viewed as important. Although the field aspects of the research programme will occur within the Southern Hemisphere, the participation and collaborations should be global and include all nations and research organisations who wish to contribute to the SORP objectives. All cetacean species will be considered, but those species most relevant to the IWC (i.e. blue, fin, minke, humpback, sei, southern right, sperm and killer whales) will receive greater attention.

Direction in resolving the research priorities will be influenced by existing information on:
- IWC priorities;
- Conservation status;
- National or regional priorities; and
- Linkages to relevant multi-disciplinary research efforts.

The level of detail for this workshop is broad and reasonably high level and will not involve detailed discussions of methodologies. Rather, the focus is on identifying types of methods, regions, and appropriate scales. The proposed five year time frame is to provide guidance to proposals discussed at the workshop but it is anticipated that the programme can and will expand beyond this timeframe, especially given the time it takes to establish Antarctic programmes and functionally embed them within broader programs.

The primary focus of the SORP is the large whale species managed by the IWC. These include the humpback whale, blue whale (both Antarctic and pygmy forms), fin whale, Antarctic minke whale, sei whale, southern right whale and sperm whale. Killer whales are also included within the core focus of SORP as they are numerous and likely to be an important component of the Southern Ocean cetacean community. The group recognised that sei whales remain very poorly understood in the region and their lower latitude distribution makes them generally more difficult to study that the other species. Studies of feeding ecology of sperm whales are also challenging because of a lack of understanding of the ecology of their prey. For these reasons, sperm and sei whales are under represented in the research plan at this stage. If and when research methods are developed that facilitate research initiatives on these species, such initiatives are likely to be included in SORP. The Southern Ocean will be the regional focus of the partnership, but relevant research efforts will also include associated migratory corridors and breeding grounds.

It was **agreed** that a draft report will be circulated after the workshop and finalised prior to IWC 61. Two documents will be developed for IWC 61: a report of this workshop and a Summary of Outcomes from the workshop.

2. Appointment of Chair and Rapporteurs

Nick Gales was elected Chair and Mike Double and Renata Robertson **agreed** to act as Chief rapporteurs with support from others.

3. Adoption of Agenda

The Agenda was adopted and is presented in Appendix 2.

4. Review of workshop documents and reports

The list of papers available to the meeting is provided in Appendix 3. No report is yet available from the 2009 IWC Climate Change Meeting recently held in Sienna, Italy, but its general, relevant outcomes will be considered at this workshop.

5. Existing non-lethal cetacean research in the Southern Ocean

5.1. Summary of existing research efforts

5.1.1. National

There was a brief discussion under this item and a summary including some examples of current research activities conducted nationally is presented in Appendix 8 and Appendix 9.

5.1.2. International

Paper SC/60/EM2 was reviewed and summarised available data on odontocetes relevant to the development of ecosystem models for the Antarctic marine ecosystem noting, that in many cases, data are extremely limited or non-existent. The odontocetes of the Southern Ocean are relatively poorly understood compared to the baleen whales. Twentieth century commercial whaling mainly concentrated on baleen whales and sperm whales in the Southern Ocean. However, much smaller takes of other odontocete species, particularly southern bottlenose whales, Arnoux's beaked whales and killer whales occurred on an opportunistic basis. While the feeding ecology of baleen whales within the Southern Ocean ecosystem is largely dominated by krill, odontocetes prey on a wide variety of species. Thus it is likely that odontocete populations will respond differently to physical, biological and anthropogenic factors. Around 22 species of odontocete show a regular, year round presence in the Southern Ocean.

In terms of biomass, sperm whales and southern bottlenose whales are the most important odontocete species, but killer whales also have important interactions as predators of marine mammals. Visual surveys to estimate

abundance of odontocete species are complicated by a number of factors. Many species are deep diving and inconspicuous at the surface resulting in low probability of detection on the track line. The main source of visual survey data in the region are the IDCR/SOWER surveys. Acoustic surveys have also provided data on sperm whale density and may be possible to apply to other odontocete species. In discussion it was noted that there may need to be further clarification of which species strictly occur within the Southern Ocean given that the SORP has a Southern Hemisphere context. It was noted that SC/60/EM2 was focussed on the CCAMLR area and other species found outside of the CCAMLR area and, therefore not included in the review, may be important in a general southern hemisphere context

Paper SC/60/EM3 was reviewed that considered most of the large baleen whales that were commercially exploited in the Southern Hemisphere: humpback, blue, fin, sei, Antarctic minke, and southern right. Other species lacked sufficient information for inclusion. The whales under consideration were all extensively exploited, with 2,000,000 animals taken in the 20th century. Indeed, whaling constituted what amounts to a gigantic experiment in population dynamics and ecosystem manipulation: what were the impacts on prey populations (notably krill), on populations of other predators, and on overall community structure?

The Southern Ocean is a very difficult, challenging, and expensive region in which to work. Sources of data for existing knowledge about whales include whaling data, the IWC IDCR/SOWER cruises, CCAMLR surveys, SO GLOBEC, national research programs, and surveys associated with the Japanese scientific whaling program, as well as some recent independent research projects.

Our level of knowledge of the six species of great whales reviewed here varies considerably. We know the catch history very well for all species, though this has been extensively revised in recent years to take account of large-scale illegal catches by the USSR; in the case of some species, these were under-reported by tens of thousands of animals. However, while we know the total catches, our ability to allocate those catches to specific areas, and to populations with identified boundaries, varies from reasonably good in the case of humpback and some right whale stocks to very poor for some other species.

The IWC has for years identified divisions known as Management Areas (numbered I to VI) for baleen whales, but it is widely recognised that these convenient lines drawn in the vastness of the ocean have varying and sometimes only very limited relevance to the realities of population structure. For some species, we are well informed about the linkages between Antarctic feeding grounds and the concentrated breeding grounds in lower latitudes. In others, we know little or nothing about where whales breed.

More is known about humpback whales than any other species; we have moderately good to excellent information on abundance, population structure and migratory movements. Seven populations of humpbacks are defined by the IWC based upon breeding areas, and all have been the subject of IWC Comprehensive Assessments which are currently in varying stages of completion. Some of these involve relatively good assessments of catch allocations, current abundance and status relative to historical pre-whaling levels. Others require additional work to clarify population structure, abundance and migratory linkages.

There is presently no agreed estimate of population size in Antarctic minke whales which is currently the target of a continuing hunt. The lack of agreement among these estimates is currently the topic of considerable debate by the IWC Scientific Committee. Significantly, we know very little about where minke whales breed, and this has inevitably hampered population assessments to a major degree.

Data on rates of recovery vary considerably, even within species. For example, in humpback whales we have a good time series of reliable estimates of abundance for the strongly recovering population off eastern Australia. In contrast, this species seems to have been extirpated from South Georgia. Information on recovery rates for other populations and areas fall between these two extremes. Blue whales are estimated to be at <2% of their pre-whaling abundance (Branch *et al*. 2004), but there is little knowledge about how the population is structured across the Southern Ocean.

Despite having been taken in larger numbers than any other species (more than 720,000 were killed), we know surprisingly little about the status of the fin whale population today. Existing estimates of abundance are imprecise, and the few estimates of rates of increase are unreliable and in some cases biologically impossible. Little is known of population structure or migratory linkages in this species.

There have been a number of studies aimed at understanding the foraging ecology of baleen whales in the Southern Ocean, but only a few large-scale studies in the region have estimated the distribution and abundance

of baleen whales and krill simultaneously. There have been numerous studies from whaling of what whales eat (i.e. mostly krill) but very few examining trophic relationships. However, new technology is currently being employed in some sophisticated studies of interspecific interactions, and we are likely to see more of this in the future. Overall, however, even though the Southern Ocean represents a relatively "simple" system compared to some areas, we are a long way from having an ecosystem model that can reliably predict linkages and outcomes.

Given all this, the challenges for research programs within the SORP program will vary considerably from species to species, and population to population. For some, such as some stocks of humpback and right whales, research will focus on refining what is an already quite extensive body of knowledge, and filling in gaps whose size and nature are reasonably well known. For others, such as sei whales, we lack even the most basic information about their abundance, distribution and population structure.

5.2. Summary of available data

A summary of available data and Southern ocean cetacean research programmes relevant to SORP are show in Appendices 8 and 9.

6. Research priorities

6.1. National

It is anticipated that National priorities will be incorporated into the research priorities but in many cases nations have not articulated their individual priorities clearly or specifically. A summary of some examples of current research activities conducted nationally is presented in Appendix 8 and Appendix 9.

6.2. International

There was considerable discussion about relevant international priorities. These priorities will feed into the SORP and will be used to inform and guide its work. Several pertinent international examples were considered. The recent joint CCAMLR-IWC Ecosystems Workshop in 2008 developed joint priorities for research at an ecosystem level in the Southern ocean. The existing IWC SOWER research programme also has relevance to SORP and is discussed further in 6.2.1. Other examples of programmes that have lots of synergies with SORP include Integrated Climate and Ecosystems Dynamics programme (ICED) and the Southern Ocean Sentinel Programme (SOS). Linkages between all of these programmes and SORP would be extremely beneficial and improve the quality and quantity of science considerably.

Other examples include regional collaborations such as the Buenos Aires Group (e.g. a collaborative approach to setting broad and joint research priorities for marine mammals in South America), the South Pacific Whale Research Consortium (e.g. coordination of research and conservation of marine mammals in the west and central south Pacific), The Latin American Humpback Whale Photo-identification Network, and collaborative research on humpback whales in southern Africa (e.g. previously the Indo South Atlantic Humpback Whales Consortium).

6.2.1. IWC

Paper SC/SORP/4 provides a comprehensive list of recent IWC Scientific Committee research recommendations with relevance to cetaceans in the Southern Ocean. To some extent this list reflects what the Scientific Committee has had on its agenda over the last few years, but the list can still be useful as basis for discussion of research needs to meet the requirements of the IWC Scientific Committee.

A key component of the IWC's research in the southern ocean is the SOWER research programme. A recent workshop to discuss the future of SOWER cruises advised that efforts to collect new data for abundance estimation should give priority to: 1: blue and Antarctic minke whales; 2: fin whales; 3 humpback whales; 4: sei and right whales; and 5: sperm whales.

The IWC recommendations from SC/SORP/4 were discussed, summarised and distilled into the key elements. The main themes of the IWC recommendations are:

a. There is a need for new abundance data for blue whales in the Antarctic and better utilisation of existing data (e.g. photo ID and sightings);
b. The population dynamics and change in abundance of Antarctic minke whales are still not well understood. Priority research should be focused on the density of minke whales in the pack ice and examining the effects of changing ice coverage;
c. The large number of recommendations on humpback whales is a direct result of the ongoing work on Comprehensive Assessment on this species. Most of the recommendations on humpbacks are to

investigate the complex stock structure on breeding grounds, mixing on feeding grounds and mixing in migration corridors;

d. There is a need for additional data from southern right whales, particularly from regions where surveys have not been conducted (e.g. off Chile). Other priorities include estimating abundance and trends in these poorly sampled areas, and a need to understand the reason for recent mass die-offs off Argentina;
e. There appears to be three eco-types of killer whales in the Antarctic. The taxonomy and stock structure needs to be documented and feeding ecology described; and,
f. There are also many recommendations about small cetaceans that are mainly related to coastal areas, e.g. around South America.

There are some recommendations that address research topics and are not specifically related to taxonomic groups:

a. Monitoring of pollutants in cetaceans and their environment. The SC is developing the second phase of the POLLUTION 2000+ programme. It has been recommended that the programme is expanded to include baleen whales;
b. Infectious and non-infectious diseases in marine mammals are becoming more frequent globally. There is a need for increased disease monitoring globally. One specific recommendation is to look into long-term data series in South America to look for effects of epizootics; and,
c. There is a general and widespread desire (from a range of research objectives) to determine animal age from biopsy samples.

6.2.2. Relationship of SORP to Southern Ocean Sanctuary

The Southern Ocean Sanctuary (SOS) was last reviewed by the IWC in 2004 and will again be reviewed in 2014. One of the potential objectives of the SORP programme could be to deliver research that can be used to evaluate the progress of the SOS, and potentially also the Indian Ocean Sanctuary.

7. SORP Research Plan

The Southern Ocean Research Partnership is an integrated, collaborative, non-lethal whale research consortium that aims to maximise conservation outcomes of Southern Ocean whales through an understanding of the status, health, dynamics and environmental linkages of their populations and the threats they face.

SORP will include participation and collaborations which are global and will be open to all nations and research organisations who wish to contribute to the SORP objectives. SORP partners intend to achieve this objective through:

- A strong commitment to the development of novel, powerful non-lethal technologies, important ecological theory, and analyses;
- focusing their collective research and funding efforts on projects that link most directly to priority conservation needs and for which a collaborative approach maximises research outcomes and funding efficiencies;
- maintaining an integrated and responsive relationship with the IWC Scientific Committee and its determined priorities;
- establishing strategic linkages with other relevant international research efforts; and,
- communicating the rationale for the research, its outcomes and threats to the conservation status of Southern Ocean whales.

7.1. Research priorities

Three working groups developed specific priorities for the SORP. The Terms of reference for these groups is attached in Appendix 4 and the reports from these groups are attached as Appendix 5, 6 and 7. A key part of SORP should be that it is not just focused on delivering high quality science but also on ensuring effective communication of the objectives and results from the programme. It is important the practical objectives and projects are developed under SORP and therefore priorities should be based on existing known priorities in the short term. In the longer term, it is important to explore potential projects on species and issues that we know little about otherwise we risk missing significant issues simply because they are presently poorly understood or documented.

Following consideration of the Working Group reports, the following synopsis was proposed.

Species and area focus:

The primary focus of the SORP is the large whale species managed by the IWC. These include the humpback whale, blue whale (both Antarctic and pygmy forms), fin whale, Antarctic minke whale, sei whale, southern right whale and sperm whale. Killer whales are also included within the core focus of SORP as they are

numerous and likely to be an important component of the Southern Ocean cetacean community. The group recognised that sei whales, and to a lesser extent, sperm whales, remain very poorly understood in the region and are generally more difficult to study that the other species. For this reason they are under represented in the research plan at this stage. If and when research methods are developed that facilitate useful research on these species, they are likely to be included. The Southern Ocean will be the regional focus of the partnership, but relevant research efforts will also include associated migratory corridors and breeding grounds.

SORP Themes:
In order provide direction to the development of SORP research projects, two over-arching themes for the SORP were **agreed** (listed below). Candidate research proposals for assessment and potential inclusion with the SORP will be developed against these themes. Some research questions that fit within the themes are listed below. These questions, and the research projects that are developed from them, are not intended to be independent; rather they will form part of an integrated approach towards understanding the role of whales within the Southern Ocean ecosystem and will link to other large scale research programs. This list does not include all questions and projects discussed at the workshop, but rather represents a summary of the core questions identified by the group. A more complete account of the discussions will be provided in the workshop report.

- Post-exploitation whale population structure, health and status.
  Work under this program will focus on developing an improved understanding of how whale populations have recovered since the cessation of commercial whaling. It will include a strategic and focused continuation and augmentation of valuable, long-term data series (such as some of those for humpback whales and southern right whales), initiate new focused data series, and address important current unknowns such as how endangered fin whales (the mainstay of industrial whaling) have responded to protection.
  - *How are populations of whales that feed in the Southern Ocean structured into identifiable breeding groups, and how are these breeding groups defined in time and space?* (Continue the relatively advanced work on humpback and southern right whales, and develop the currently poor understanding for other species. Major focus on coordinated collection of biopsies, as well as strategic tagging studies to monitor movement).
  - *How well have the species that were most heavily depleted during the industrial whaling era (fin and Antarctic blue whales) recovered?* (The focus of this project will be a long-term, circumpolar, acoustic monitoring network).
  - *Are we able to measure a population-scale index of southern ocean whale health, and if so, does it correlate to estimates of life-history variables?* (Utilise novel and developing non-lethal techniques to assess whale health with a focus on species for which long-term data exist)

- Changing atmosphere and oceans: Southern Ocean whales and their ecosystems.
  The Southern Ocean is a diverse environment and whales are known to utilise this habitat in regionally different ways. Populations of whales in some regions are recovering strongly and in others they are not. Some regions are changing fast and others more slowly.
  - *How do whale populations respond to climate processes in contrasting regions of the Southern Ocean for which climate effects are already evident (Antarctic Peninsula/south west Atlantic Ocean) and areas in which changes are less evident (eastern Antarctica)?* (Focus on populations of humpback and southern right whales that breed off the east coast of the South American continent, with populations that breed off Australia, New Zealand and/or the African continent).
  - *How important is sea-ice habitat for southern ocean whales?* (Utilise aerial survey, tagging and remote, satellite-sensed technologies)
  - *How do baleen whales interact with the physical and biological environment on their feeding grounds?* (Focus on combined predator-prey-environment studies using hydro-acoustics, environmental sensors and tagging)
  - *What aspects of their physical and biological environment shape the distribution and movements of Southern Ocean whales?* (Focus on existing survey and environmental data, along with new multi-scale tagging studies coupled with collection of ecological data).
  - *Will Southern Ocean whales recover to their former ecological role?* (Continue long-term monitoring of population trend data of species that migrate close to low latitude coastlines, i.e. humpback and southern right whales. These studies would also incorporate studies on the ecological role of large whales, including nutrient recycling)
  - *How are the different types of killer whales distributed in their Southern Ocean environment, and what role do they play in shaping baleen whale communities?* (Coordinated collection of killer whale photographs, biopsies, and ecosystem modelling exercises).

7.1.1. Scientific methods

More than 2,000,000 great whales were killed in the Southern Hemisphere during the last century, virtually eliminating an entire trophic level of the Southern Ocean ecosystem. Now, protection from commercial hunting has allowed some populations to begin recovery, perhaps eventually restoring whales to their former ecological role. Non-lethal methods, including telemetry, photo-identification, molecular genetics and eco-markers, provide unprecedented power to understand the impact of this post exploitation and the status of current populations of whales. It was **agreed** that a 2-day symposium and a 3-day workshop entitled, "*Living Whales in the Southern Ocean Ecosystem: A symposium and workshop on non-lethal research techniques*" should be held in 2011. The workshop will evaluate and coordinate non-lethal methods for the study of whales in the Southern Ocean, their associated migratory corridors and breeding grounds.

The intent is to adopt standardised methodology for the flagship programs of the SORP. These methodologies will be used to address various questions, including (*i*) the post-exploitation abundance, trends and structure of whale populations; and (*ii*) the feeding ecology of whales and the influence of changing atmospheres and oceans.

8. Tentative research plan schedule

There was a discussion of various research plans proposed for 2009/10 and some of these are summarised in Appendix 8. Most of these research plans have been developed in advance of the SORP and represent local or national research programmes rather than truly international, collaborative programmes. It is possible that many of these programmes will be brought under the SORP collaboration as core or associated projects in the future. Once the definitions of what constitutes a SORP project has been agreed, researchers can apply to the SORP Steering group to have their programmes endorsed as part of the SORP.

No specific time frames were discussed or agreed. However, there was agreement that there should be a SORP Year of the Whale in 2013/14 with a circumpolar research effort.

9. Partnership linkages

There was a discussion of various issues related to partnership linkages. It was **agreed** that it would be useful to have a specific website for the SORP and that it would be highly desirable to have an official launch of the SORP programme once the Steering Group has been convened and some projects have been endorsed by SORP.

The following comments are a summary of discussions and proposals.

SORP Research Plan and Projects:

A measure of the success of SORP will be the degree to which it focuses the research conducted by the Partnership towards new and integrated collaborations that most directly address the objectives. SORP partners are currently involved in a wide array of research efforts around the Southern Ocean, and in the regions to the north, that have developed from a wide range of influences and which address independently determined objectives. To simply re-brand existing research efforts as the SORP program would do little to drive research towards an integrated and focused framework. Consequently, a two-tiered SORP research framework was developed and **agreed**.

The first tier consists of the SORP core projects that will drive the SORP initiative and from which an assessment of performance against objectives can be determined. These core projects will demonstrably benefit from the integration of circumpolar research efforts and will directly address the SORP objective of improving our understanding of the status and health of whales within the Southern Ocean ecosystem and the threats and environmental changes they may face.

The second tier of research projects are the SORP associated projects. These projects may contribute to the SORP objectives and flagship programs but are determined to be effectively stand-alone research efforts that do not necessarily benefit from the collaborative framework, or are likely to be focused on smaller spatial scales, or on species of lesser interest for the SORP collaboration. Specific criteria for these two types of project will be developed and **agreed** by the SORP Scientific Steering Group (see details below).

Assessment and registry of SORP research projects:

A determination of where existing and newly proposed research efforts fit within the research framework (core or associated status) will be conducted by the SORP Scientific Steering Committee (SSC). The SSC will develop a mechanism to facilitate external peer review of research projects submitted to the SORP for inclusion within the partnership. The external review will assess the scientific merit of the proposal. The SSC will then assess the relevance of the proposal to SORP objectives and the degree to which it benefits from the partnership

framework. Each qualifying project will be registered centrally as a SORP core project or associated project. The SSC will maintain and update the registry of research efforts.

Data, tissue and analysis management and coordination:
The Australian Marine Mammal Centre (AMMC), based at the Australian Antarctic Division in Hobart, Australia, has offered to coordinate centralised registries of data, tissue and analysis protocols. Where possible these will utilise existing facilities, and are likely to be dispersed throughout the partnership membership. Updates of the holdings of these registries will be included in Annual reports to the IWC.

9.1. Funding available for SORP research
The Australian Government has committed $500,000 to an IWC-managed fund to support the SORP. This was welcomed by the workshop participants and the Australian Government was thanked for their generosity and support of the SORP. It is hoped that other Governments and organisations will also contribute to this fund. A process for managing the fund will be developed following IWC61 in consultation with the Chair of the SC and the IWC Secretariat.

In addition, the Argentinean Government generously offered research vessel time towards the objectives of the SORP. This was also welcomed by the Workshop and is seen as one of the first tangible steps in the development of a truly international and collaborative programme focused on whales in the Southern hemisphere. The workshop expressed their appreciation to the Argentinean Government for their support of the SORP.

9.2. SORP Steering Committee
It was **agreed** that it was desirable to keep this Committee relatively small yet inclusive but manageable with appropriate regional representation. It was also suggested that there should be representation of regional research Consortia. There was no consensus about the makeup of the SORP Steering Committee at the workshop and the Chair **agreed** to develop alternative models that would be circulated in the draft report. The suggested text from the Chair is provided below for consideration and appears in the accompanying document, SORP Summary of Outcomes drafted by the Chair following the workshop. It was also considered important that members of the Steering Committee should have strong links with Governments as this group will be key to getting leverage from Governments in the provision of significant resources which will be required by the SORP.

A SORP Scientific Steering Committee (SSC) will oversee the work and direction of the partnership. Membership of the SSC will, at least, include regional representation from the participating governments. In the first instance, the membership would include representative governments who attended the inaugural workshop, but would be open to additional members that provide an expanded regional representation if necessary (e.g. east Asia is currently not represented). Given the importance of linking SORP to broader multidisciplinary programs such as the Integrated Climate and Ecosystem Dynamics (ICED) program and the Southern Ocean Observing Systems (SOOS) program, representation on the SORP scientific steering committee from these programs would be considered. Additionally, given the importance of the linkage of the work of SORP to the IWC Scientific Committee, membership from the Chair of the Southern Hemisphere whale species Sub-Committee would also be advantageous. Additional specific Steering Committees will also be appointed to direct each of the core research projects that sit within the flagship programs.

The suggested model is for the SORP SSC to consist of regional representatives from:
- South Africa (1),
- USA (1),
- South America (2),
- Europe (2),
- Oceania (e.g. Australia, New Zealand and Pacific Island countries) (2),

with additional representatives from:
- ICED (1), and
- IWC (e.g. Chair of Scientific Committee and Chair of Southern Hemisphere whales sub-Committee) (2).

The IWC SC will be asked for annual input into the SORP research plan, as well as to evaluate progress. An independent review process will also be established to provide an assessment of the progress the SORP makes against stated objectives and to determine if improvements in direction or process can be achieved.

10. SORP Review

10.1. Annual Reporting and review

The Australian Marine Mammal Centre has offered to coordinate the overall work of SORP and manage the reporting responsibilities. An annual progress report will be provided to the IWC Scientific Committee reporting on the preceding annual activities. A report of the activities proposed for each forthcoming year will also be provided to the IWC Scientific Committee.

10.2. Interim review

The IWC SC will be asked for annual input into the SORP research plan, as well as to evaluate progress. An independent review process will also be established to provide an assessment of the progress the SORP makes against stated objectives and to determine if improvements in direction or process can be achieved.

10.3. Final review

It was **agreed** that there would be a final review of the outcomes of the SORP some time (e.g. 1-2 years) after the completion of the first five years of the SORP. An external and independent review of the SORP programme is seen as a necessary and useful part of the process. It was suggested that a panel of independent experts or something similar would be useful. Another suggestion was that a pre-meeting of science symposia rather than a formal review process would be more productive. It was noted that to have the review, there would need to be an assessment of progress against stated objectives and therefore SORP needs some clear and measurable objectives. It was emphasised that one of the measures of the success of SORP should be through the publication of results in the peer reviewed international, scientific literature and that papers stemming from the SORP should be catalogued on the SORP website. It was **agreed** that this matter will be further considered by the Steering Group when it is formed.

11. Summary of links with IWC, national and other programmes

There is considerable scope for the SORP to link with many other national and international research programmes in the Southern Ocean. There is also considerable potential overlap with other international fora (e.g. CCAMLR, CMS) that have active management roles in the region. One of the challenges of the SORP will be to become a truly collaborative and integrated programme that adds value to existing programmes and leads to the development of highly relevant new programmes. Another issue that was discussed was the linkages that are desirable between existing data repositories to ensure that the maximum benefit can be gained from joint data. This would include initiatives for data and sample sharing and have relevance for such things as the IWC supported Antarctic blue whale photo-identification catalogue. Overall, it was **agreed** that this was a critical issue to the SORP and that it would be revisited at a future time.

12. Adoption of Report

The meeting **agreed** that a draft of the workshop report will developed following the workshop and circulated by the Chair for review and agreement prior to IWC 61.

13. References

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APPENDIX 1

LIST OF PARTICIPANTS FOR THE PLANNING WORKSHOP OF SOUTHERN OCEAN RESEARCH PARTNERSHIP (SORP)

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APPENDIX 2

AGENDA FOR PLANNING WORKSHOP OF SOUTHERN OCEAN NON-LETHAL RESEARCH PARTNERSHIP (SORP)

Maritime Museum, Sydney, Australia, 23-26 March 2009

1. General introduction
1.1. Workshop objectives
1.2. Workshop procedures and time schedule
1.3. Logistic arrangements
2. Appointment of Chair and Rapporteurs
3. Adoption of Agenda
4. Review of Workshop documents and reports
5. Existing non-lethal cetacean research in the Southern Ocean
5.1. Summary of existing research efforts
5.2. National
5.3. International
5.4. Summary of available data
6. Research priorities
6.1. National
6.2. International
6.2.1. IWC
6.2.2. Relationship of SORP to Southern Ocean Sanctuary
6.2.3. Other
7. SORP Research Plan
7.1. Research priorities DRAFT SORP Workshop Agenda SC/SORP/1
7.1.1. Whale abundance, stock structure, and population dynamics
7.1.2. Whale habitats
7.1.3. Feeding ecology
7.1.4. Life history
7.1.5. Environmental variability and climate change
7.1.6. Community structure: past and present
7.1.7. Lesser known species
7.2. Scientific methods
8. Tentative research plan schedule
8.1. 2009/10
8.1.1. Location
8.1.2. Timing
8.1.3. Participation
8.2. Future
9. Partnership linkages
9.1. Partnership coordination
9.1.1. Documenting and reporting of participating projects
9.1.2. Standardised protocols
9.1.3. Shared analyses
9.1.4. Data and sample sharing
9.1.5. Data and sample archiving
9.2. Funding available for SORP research programmes
9.3. SORP Steering Group
10. SORP Review
10.1. Annual Reporting and review
10.2. Interim review
10.3. Final review
11. Summary of links with IWC, national and other programmes
12. Adoption of Report DRAFT SORP Workshop Agenda

APPENDIX 3

LIST OF DOCUMENTS FOR PLANNING WORKSHOP OF SOUTHERN OCEAN RESEARCH PARTNERSHIP (SORP)

Workshop documents:

SC/SORP/1 Draft SORP workshop Agenda (with annotations)
SC/SORP/2 SORP workshop Terms of Reference
SC/SORP/3 SORP workshop List of documents
SC/SORP/4 Summary of relevant recent IWC recommendations relevant to SORP
SC/SORP/5 Non-lethal research summary in the Southern Ocean template

For Information Papers:

Australian Government. 2008. Regional Non-Lethal Research Partnerships: a proposal for the Southern Ocean. IWC paper IWC/60/16 submitted by the Government of Australia, 60th Annual Meeting of the International Whaling Commission, June 2008. 3 p.

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IWC (2006). Report of the IWC Workshop on Future SOWER Cruises, 1-4 October 2004. Journal of Cetacean Research and Management 8 (Supplement): 303-312.

Leaper, R., J.L. Bannister, T.A. Branch, P.J. Clapham, G.P. Donovan, K. Matsuoka, S. Reilly and A.N. Zerbini. 2008. A review of abundance, trends and foraging parameters of baleen whales in the Southern Hemisphere. IWC SC Paper SC/60/EM3.

Leaper, R., P.B. Best, T.A. Branch, G.P. Donovan, H. Murase and K. van Waerebeek. 2008. Report of review group of data sources on odontocetes in the Southern Ocean in preparation for IWC/CCAMLR workshop in August 2008. IWC SC Paper SC/60/EM2.

Secretariat of the Pacific Regional Environment Programme (SPREP). 2007. Pacific Islands Regional Marine Species Programme 2008–2012. SPREP, PO BOX 240, Apia, Samoa. 50 p.

Waerebeek. 2008. Report of review group of data sources on odontocetes in the Southern Ocean in preparation for IWC/CCAMLR workshop in August 2008. IWC SC Paper SC/60/EM2 (Revised).

APPENDIX 4

TERMS OF REFERENCE FOR THE SORP WORKING GROUPS

WORKING GROUP 1:
Abundance, Stock Structure, Population Dynamics And Life History
Chair: Phil Clapham; Rapporteur: Lesley Gidding

The working group will first review and summarise existing knowledge on abundance, population structure, population dynamics, life history and breeding ecology for the Southern Hemisphere large whale species managed by IWC. These include humpback, blue, fin, Antarctic minke, sei, southern right and sperm whales. The group will identify major gaps in knowledge, prioritise questions to be addressed by collaborative research, and identify the principal non-lethal methods and scientific approaches by which such research would best be conducted. The key research questions and methods will be structured into the form of a series of research projects which will include:

- Clear research objectives;
- the relevance and priority of the work to the IWC and/or other relevant research bodies; and,
- sufficient methodological description to facilitate a meaningful review process within the IWC SC.

Although the group will discuss migratory movements and linkages between areas in consideration of population structure, topics relating to their intrinsic ecological importance as feeding or breeding habitats will be dealt with by Working Group 2 (see below) dealing with whale habitats and movements.

WORKING GROUP 2:
Whale Habitats And Movements
Chair: Lorenzo Rojas Bracho; Rapporteur: Russell Leaper
The working group will first review and summarise existing knowledge on what is known of the physical and biological characteristics of whale habitats (across a range of temporal and spatial scales) and linkages between different functional habitats for the Southern Hemisphere large whale species managed by IWC. These include humpback, blue, fin, Antarctic minke, sei, southern right and sperm whales. The group will identify major gaps in knowledge, prioritise questions to be addressed by collaborative research, and identify the principal non-lethal methods and scientific approaches by which such research would best be conducted. The key research questions and methods will be structured into the form of a series of research projects which will include:

- Clear research objectives;
- the relevance and priority of the work to the IWC and/or other relevant research bodies; and,
- sufficient methodological description to facilitate a meaningful review process within the IWC SC.

WORKING GROUP 3:
Cetacean Food Web Linkages and Community Structure (Past And Present)
Chair: Steve Nicol; Rapporteur: Simon Jarman
The working group will first review and summarise existing knowledge on what is known of the nature and extent of functional relationships between cetaceans and their prey, and the broader functional role of whales within their ecological communities for the Southern Hemisphere large whale species managed by IWC. These include humpback, blue, fin, Antarctic minke, sei, southern right and sperm whales. The group will identify major gaps in knowledge, prioritize questions to be addressed by collaborative research, and identify the principal non-lethal methods and scientific approaches by which such research would best be conducted. The key research questions and methods will be structured into the form of a series of research projects which will include:

- Clear research objectives;
- the relevance and priority of the work to the IWC and/or other relevant research bodies; and,
- sufficient methodological description to facilitate a meaningful review process within the IWC SC.

APPENDIX 5

REPORT OF THE WORKING GROUP ON GROUP ON ABUNDANCE, STOCK STRUCTURE, POPULATION DYNAMICS AND LIFE HISTORY
Chair: Phil Clapham; Rapporteur: Lesley Gidding

The working group reviewed existing knowledge on abundance, population structure, population dynamics, life history and breeding ecology for the Southern Hemisphere large whale species managed by International Whaling Commission (IWC). These included humpback, blue, fin, Antarctic minke, sei, southern right and sperm whales. The group sought to identify, for each species, major gaps in knowledge, to prioritise questions to be addressed by collaborative research, and to identify the principal non-lethal methods and scientific approaches by which such research could be best conducted.

Suggested research projects were prioritised by a combination of their importance to conservation/management and their practicability. Studies were divided into broader-scale multi-national collaborations, and projects that, while regional in nature, were considered of sufficient management importance to merit consideration by the Southern Ocean Research Partnership (SORP).

Objectives
The working group **agreed** that the primary objective of this working group was to identify research that would, as a primary goal, complete or significantly advance the IWC Comprehensive Assessments of the species/populations concerned. Such Comprehensive Assessments summarise existing knowledge of a population, and use estimates of current abundance and trends together with whaling catch data to assess the size of the pre-whaling population, and therefore the status of that population today relative to this pristine benchmark.

It was also **agreed** that the work of SORP is not restricted by the current work of the IWC and that SORP should be aligned with the current Comprehensive Assessments and contribute to their completion but not be restricted by this association.

It was noted that funding constraints should not be taken into consideration during the prioritising process. It was further noted that the work of the SORP should ideally focus on collaborative regional initiatives rather than national initiatives. However it is important to be strategic and to consider the best approach to successfully gain the information needed to fill key gaps in our knowledge. For example, it may be more appropriate to take a circumpolar perspective and consider multiple species, or a more regional and species-specific perspective, depending on the objectives of the project and the questions we are attempting to answer.

There was a concern that there is a dichotomy between those species for which we know a lot and those for which we know little because they are particularly difficult to study or because sightings are rare due to very low numbers. However, priorities can be set only with the knowledge at hand.

Review of Existing Knowledge
Leaper *et al*. 2008 was used as a basis, supplemented by additional information where available, to review the existing knowledge of large baleen whales managed by the IWC (humpback, true blue, pygmy blue, fin, Antarctic minke, sei and southern right whales). Sperm whales were reviewed using knowledge summarised within the working group.

Humpback Whale
The IWC currently recognises seven breeding populations (i.e. labelled A-G) of Southern Hemisphere humpback whales, with evidence for subdivision in at least three of them (e.g. there is evidence of potential gene flow mediated through mixing of breeding populations in feeding grounds). Linkages between breeding populations are known with varying degrees of certainty. The IWC has long broken Southern Ocean feeding grounds into six management areas (known as Antarctic Areas I-VI), but there is uncertainty regarding connections and mixing among these units. There are a number of abundance estimates for breeding populations with various rates of precision and confidence, and similarly variable estimates for

recovery rates. IWC Comprehensive Assessments for breeding stocks A and G have been completed; B and C are expected to be completed in 2009 but available information is poor. Assessments for stocks D, E and F remain incomplete and await further information.

There are indications of feeding in lower latitudes including off Chile and in the Benguela Current. There are various breeding grounds identified but linkages between feeding and breeding grounds are unclear in some cases. Reasonably complete historic whaling catch data are available and these have been allocated to Antarctic Management Areas, although for some data these allocations remain under revision.

The major gaps in the current information in relation to humpback whales in the Southern Ocean were identified as:

- The relationship among breeding grounds, and between feeding and breeding grounds for some populations;
- A lack of samples (notably biopsy and photographic data) from feeding grounds; and,
- Lack of sampling from previously unstudied or rarely sampled low-latitude areas.

The working group **recommended** that existing photo-identification and biopsy sampling be expanded, notably to include a major effort in high-latitude feeding grounds. The group also identified satellite tagging as a means of providing information with which to clarify population structure.

Antarctic ("true") Blue Whale

Antarctic or "true" blue whales, *Balaenoptera musculus*, are distinguished from the subspecific pygmy blue whale, *B. m. brevicauda*. There was a huge depletion of blue whales in the Southern Ocean due to industrial whaling. As a result, the current abundance of blue whales is widely believed to be extremely low. Widespread longitudinal movement is indicated from Discovery tagging, and data from IDCR/SOWER cruises indicate circumpolar distribution. The last circumpolar assessment of blue whales in the Southern Ocean was completed in 2008. The working group raised concerns regarding the confidence that should be placed on the blue whale IDCR/SOWER data as these are circumpolar sighting data and the level of resighting of individuals (due to movement between surveys) is unclear. Current work estimates that resighting rates are on the order of 14%.

Little information exists on population structure of blue whales, and there remains significant confusion between pygmy blue whales and Antarctic blue whales in some areas, and in the catch record. It was noted that there is some good information on the distribution of populations from feeding grounds; however, the location of any specific breeding grounds is unclear. In addition, the genetic diversity of the remnant blue whale population is unknown. It was also noted that Antarctic blue whales have been acoustically recorded from tropical and/equatorial waters, and trans-equatorial movements are possible.

The working group discussed the most effective methodologies for Southern Ocean blue whales. It was noted that it would be important to examine genetic diversity and possible genetic drift in the currently known population(s). The potential to compare genetics between past (historical) and current samples was discussed.

The working group identified major gaps in the current knowledge of Antarctic blue whales as:

- Population structure and abundance;
- Winter distribution and identification of breeding grounds;
- Understanding of the recovery of Antarctic blue whales is highly important given the high level of depletion from large-scale commercial whaling. The current rate of increase is estimated as 7.3% (95% CI = 1.4-11.4%), but future monitoring is essential.
- Genetic diversity would be important to investigate given the high level of depletion, using historical and current samples; and,
- Potential anthropogenic impacts on Antarctic blue whales, particularly in breeding grounds and migratory routes.

The working group discussed the primary methodologies available for Antarctic blue whale sampling and **agreed** that a full large-scale circumpolar sighting survey would be required to obtain new abundance estimates and an assessment of recovery. However, such surveys are hugely expensive and most cost-efficient alternatives would be preferably if these can be found. Such a survey would ideally be coupled with acoustic monitoring, photo-id, biopsy and satellite tagging work in key aggregation areas, but it is doubtful whether these tasks could be combined with a standard sighting survey without weakening the utility and power of each element. If sighting surveys are to be conducted, it would be useful to initiate these cruises on a regular (10-year) basis; given that the last circumpolar survey was undertaken in 2002/03, any new survey should be initiated for 2012/13.

If, however, a circumpolar cruise was conducted without a standard sighting survey component, other methods could be combined to yield multidisciplinary results. Prior to such a survey, it would be useful to use acoustic techniques to identify key aggregation areas to target for biopsy and satellite tagging and to initiate/continue satellite tagging programs in regional locations.

Pygmy Blue Whale
Pygmy blue whales can be distinguished from Antarctic blue whales by acoustic monitoring, genetic analysis, and sometimes by field observations. The mixing rates of these two subspecies in some feeding grounds are still unclear, although pygmy blues are believed to be very uncommon in high latitudes (above 60°S). Feeding grounds of pygmy blue whales have been identified in upwellings north of the Convergence adjacent to Australia, New Zealand and Chile. Known areas of aggregation include Madagascar, West Australia, South Australia, Chile (though the taxonomic status of this group is uncertain) and New Zealand (status not clear but acoustic monitoring suggests pygmy blue whales). Breeding grounds are unknown; however, pygmy blue whales have been sighted in tropical regions. There are no data available on overall abundance of pygmy blue whales; however, regional estimates are available for the Madagascar Plateau and West Australia. There is no information available on population trends or recovery following the cessation of post commercial whaling for this subspecies.

There was a discussion within the working group on whether pygmy blue whales are a true Southern Ocean species; however, there is some evidence that a small percentage of the blue whales reported from the Southern Ocean are indeed pygmy blues. Due to the small number of pygmy blue whales in the Southern Ocean, the working group **recommended** that research on this species be limited to targeted satellite tagging and acoustic monitoring programs in feeding and/or breeding grounds rather than any circumpolar work.

The working group identified the major gaps in the current knowledge on pygmy blue whales as abundance (regional and total), taxonomic status, population structure, and locations of breeding grounds. There is little scope for large collaborative projects on this species; however, focused research in certain areas and data and technique sharing will bring significant benefits. Three key projects were identified by the working group as priorities for SORP:

- Ongoing collaboration on the current Southern Hemisphere photo-identification catalogue for both Antarctic and pygmy blue whales;
- Focused research on Chilean blue whales (including a biopsy and satellite tagging program) to understand the genetic structure and dynamics of the population; and,
- Ongoing regionally focused satellite tagging and biopsy program at known aggregation sites.

Fin Whale
There is currently very little information available on fin whale populations in the Southern Ocean. Feeding grounds have been identified mostly around 60°S (some as far south as 65°-70°S) and wintering areas have been identified around 20°-35°S. Some information is available on fin whales from the IDCR/SOWER cruises. Fin whales are believed to be circumpolar (although most IDCR/SOWER sightings have been in Areas II and III) and the current abundance estimate for the IDCR/SOWER study area range from 4,000 to 9,000 (but with wide associated CVs of about 0.5).

It was noted that fin whales were known to be an abundant species prior to the extensive commercial whaling which resulted in serious depletion of the species; indeed, fin whales were killed in larger numbers

(more than 720,000 in the Southern Hemisphere) than any other species. The working group **agreed** that, as fin whales were so seriously depleted, it is essential to understand the recovery of this species. There are major gaps in the current information in relation to this species; considerably more information is required on population structure, abundance, location of critical habitats, recovery.

There was much discussion on the best methodologies to study such a poorly understood depleted population. The working group identified a number of possible methods such as circumpolar sighting surveys; however, as noted above, this would be an extremely expensive option. The group suggested that the best approach to broadening our understanding of fin whales was to target multiple locations identified from previous studies and to undertake a combination of biopsy and acoustic sampling as well as satellite tagging. Given that existing information on fin whales is so sparse, acoustic monitoring could be used to identify key aggregations which could then be further sampled using mark-recapture techniques.

Antarctic Minke Whale
It is thought that Antarctic minke whales are a relatively abundant species. The most recent abundance estimate is being calculated at present and will be reviewed by the IWC Scientific Committee in June 2009. Existing abundance and trend data are complicated by conflicting results of previous circumpolar surveys. There is also a major issue that an unknown portion of the population may exist within sea ice and has therefore been missed in abundance estimates to date. However, the abundance estimates from the first two circumpolar survey series have suggested that the Southern Ocean population has declined in recent years.

Population structure is unclear, and although the species is known to have a circumpolar distribution, subpopulations have not been clearly identified. Antarctic minke whale breeding grounds are unknown; however, the species is known to have a widespread pelagic distribution as far as 10°-°20 S, while some animals are known to remain in high latitudes in winter.

The working group identified that the major gaps in the current knowledge of Antarctic minke whales are:
- Population structure;
- Abundance; and,
- The location of breeding grounds.

The working group **recommended** that the priority issues to be addressed for the Antarctic minke whale include:
- Identification of breeding grounds;
- The proportion of the population that exists in sea ice and the impact of this on abundance estimates; and,
- Investigation into the possible downward trend in abundance.

The working group **recommended** that the issues associated with Antarctic minke whales are currently being considered elsewhere and although they should be considered by SORP given their abundance and role in the ecosystem, they are not likely to be a high priority for SORP at this stage.

Sei Whale
There is very little information available on sei whales in the Southern Ocean and there are large gaps in current knowledge. The information from IDCR/SOWER cruises is that sei whales are uncommon; given that recorded catches of sei whales in the Southern Ocean were on the order of 225,000 animals, they are probably highly depleted. Feeding grounds for sei whales are generally believed to be around 40°-°60S, south of the Convergence; while breeding grounds are assumed to be south of 30°S, and sometimes in lower latitudes, specific areas have not been identified.

The working group discussed the potential methodologies for increasing our knowledge on sei whales noting that as we currently know so little it is difficult to know where to start. The potential for acoustic sampling was discussed; however, this is not feasible at this stage because sei whale vocalisations have not been clearly identified or categorised. It was **recommended** that a satellite tagging program initiated in a

region where we know sei whales can be predictably found would be a good place to start; in this regard, there is a population off the coast of Chile that could be targeted for such work.

The group therefore concluded that there are huge gaps in knowledge of sei whales; however, as a first step to understanding this species, a satellite tagging program off Chile (i.e. in the Chiloe region) should be initiated. Other, opportunistic, satellite tagging and acoustic monitoring should also be conducted where possible.

Southern Right Whale
The southern right whale was seriously depleted due to industrial and pre-modern (historical) whaling. There is no current overall abundance estimate for this species, although some regional estimates are available. There remains uncertainty in current and historical distributions and linkages between feeding, breeding and calving areas. Studies have been conducted on four known calving grounds (Argentina, South Africa, Australia and NZ); these have been shown to be genetically distinct. The current pre-whaling estimate for Southern Right whales (55,000-70,000) is thought to be a significant underestimation. Current rates of increase are variable by generally high (6.9% for Argentina, 7.3% for South Africa, 8.1% for Australia).

The working group noted that the southern right whale is a species that may be particularly vulnerable to the effects of climate change, and therefore it is important to understand the feeding habits of this species and the impact of climate change on food sources. It was also noted that there are particular regional issues associated with this species. In particular, there has been a large and unusual mortality event involving southern right whales in Argentina (e.g. 183 animals in the last two years).

The working group identified the major gaps in current knowledge on the southern right whale as:

- Location of feeding areas and migratory routes;
- Apparent non-recovery of whales in some historically important areas;
- The reason for major Unusual Mortality Events in Argentina; and,
- Distribution of the critically endangered population off Chile.

The working group noted that this is a species that would allow regional work to be enhanced by SORP coordination and information sharing, and that research priorities should include:

- Targeted assessment of feeding and breeding areas through regional satellite tagging programs in known calving areas;
- Assessment of unusual mortality events in Argentina;
- Assessment of the critically endangered population scattered along the Chilean coast;
- Status assessment of the right whales off the eastern coast of Australia, relative to the population off the western coast;
- Investigation of historically important areas using acoustic monitoring and other techniques; and,
- Assessment of prey preferences (notably the degree to which krill and copepods are taken).

Sperm Whale
There are currently nine IWC stock divisions for sperm whales, however the genetic data suggest surprisingly little genetic variability among them. There is strong sexual segregation in sperm whale populations, with mainly mature males present in the Southern Ocean and females and young adults in low latitudes. Breeding grounds have been identified as being north of 40°S. There is little information available on sperm whale abundance and recovery. Sperm whale assessments are not currently a high priority for the IWC and little work in ongoing; however, the Australian government has funded an extensive sperm whale survey in south-western Australian waters which will commence in the near future.

The working group noted that sperm whale research is primarily a regional issue, and the key priorities should include abundance estimates, recovery and the impact of toxic chemical bioaccumulation.

The working group **recommended** that aerial surveys be undertaken in key areas (for example south-western Australia) to allow a comparison with pre-whaling estimates.

Overall summary

1. Abundance, population dynamics and life history

Monitoring of trends in abundance is clearly an important topic for Southern Ocean large whales, notably in light of the fact that virtually all species were subject to grave over-exploitation by whaling in the 20th century (and sometimes earlier). However, monitoring such trends over the vastness of the circumpolar regions is a very difficult and expensive exercise. Intensive sighting surveys (such as those conducted by IDCR/SOWER) are one approach, but in light of the immense expense involved it may be better to attempt alternative methods. Genotype-based mark-recapture estimation is one possibility, although it would require substantial sampling of species that are comparatively rare and widely distributed (notably blue and fin whales); identifying concentrations of these animals, through use of past data and current acoustic monitoring, would be a much better way of maximising the efficiency of sampling effort.

Long-term acoustic monitoring at carefully selected sites would potentially provide a crude index of abundance for fin, blue and perhaps other whales; if these populations are indeed increasing, then inter-annual fluctuations in call rates due to sampling bias or temporary distributional shifts should be overwhelmed by gradually increasing trends in received signals over long periods.

There was relatively little discussion of life history and population dynamic variables in this working group. Factors such as age, maturational class, reproductive class and survival are currently difficult to assess in pelagic habitats, and can best be obtained from long-term studies of identified individuals in easily accessible locations (e.g. coastal populations). However, new methodology (such as chemical or endocrinological methods for assessing age, pregnancy, etc.) may well make this increasingly feasible, and such techniques should be incorporated into future SORP studies where possible.

2. Population structure

Major uncertainties about population structure exist for all species under consideration. Linkages between or among breeding and feeding areas, and indeed lack of knowledge about the location of such grounds for some species, introduce major obstacles to population assessments. Photo-identification, genotyping and satellite tagging all offer proven means of addressing issues of population structure in cetaceans, and these were prominent themes in discussions of possible research projects.

3. Recommendations

The working group identified a number of research projects of either large-scale or regional importance. Where possible, the group attempted to maximise cost effectiveness by combining some of these projects into separate, integrated large-scale multinational studies. Remaining projects were prioritised, together with important regional research.

Furthermore, the working group **agreed** that to be most effective in the Southern Ocean it is preferable to move away from the historic sampling methods of sighting surveys to more targeted methodologies such as stationary acoustic monitoring, satellite tagging and biopsy sampling. The working group also took into account the current objectives of the IDCR/SOWER program to ensure that the SORP is complementary to this program. It is envisaged that IDCR/SOWER data would be used to effectively target aggregation areas in the Southern Ocean for species such as fin and blue whales.

1. Joint Unified STudy Southern Ocean (JUSTSO)

The working group **agreed** that many of the issues identified as important for IWC large whale assessments (and other management needs) could be addressed by a large-scale circumpolar cruise (or a coordinated group of cruises) using a variety of non-lethal methods together with standardised sampling. Such a cruise would cover widely dispersed locations identified from previous work as predictable areas of concentration for large whales. Methods used would include photo-identification (right, humpback and blue whales), biopsy sampling (all species), satellite tagging (all species) as well as deployments of long-term acoustic recording devices (aimed primarily at blue and fin whales). Further details are provided below. Together, these methods would provide a large body of data with which to further Comprehensive Assessments of the species concerned.

1.1 Satellite tagging: Attachment of satellite-monitored radio tags would help address key questions relating to population structure in the following species: humpback whales (feeding/breeding area connections), right whales (feeding/calving area connections), minke, fin and blue whales (identifying the location of their breeding grounds), and movements within the Antarctic feeding grounds (all species). Tagging could also be applied opportunistically for sei whales, the population structure of which is currently almost entirely unknown.

1.2 Acoustics: Long-term deployment of passive acoustic recorders for fin and blue whales would help identify areas of concentration, assess seasonal occurrence, and potentially facilitate long-term monitoring of abundance through variations in call rates over years. It was noted that passive acoustic arrays could ideally be located in low and high latitudes to investigate winter and summer ranges for fin, blue and humpback whales. Results could be used to target additional photo-identification and biopsy sampling, or additional directed studies. Although fin and blue whales were the primary species discussed (because of both their severely depleted status and the range over which their calls can be detected), acoustic monitoring would also provide valuable data on other cetacean species.

1.3 Photo-identification: A major gap in current research is the relatively low level of effort concerning photo-identification sampling for right, blue and humpback whales in Antarctic waters. Photographs taken across the Southern Ocean would be compared with often large existing catalogues for humpback whales (breeding grounds throughout the austral tropics), right whales (calving areas in Argentina, South Africa, Australia and sub-Antarctic New Zealand), and blue whales (Australia and western South America). The results of such comparisons would undoubtedly provide considerable clarification of migratory linkages and population structure.

1.4 Biopsy: As with photo-identification, the lower level of effort in biopsy sampling in austral high latitudes has hampered assessments of migratory movement and genetic population structure. All species of large whales can be readily biopsied, providing a wealth of information on genetics, sex and genotype (for individual identification), as well as other topics such as stable isotope, fatty acid, hormonal, contaminant, ecological markers and other analyses. In addition, the working group stressed the importance of assessing genetic diversity in true blue whales in light of their severe depletion by commercial whaling.

1.5 Other: Large-scale cruises could also serve as a platform for other studies, including physical and biological oceanography, and prey sampling (notably for right whales to assess the proportion of copepods vs. krill in the diet).

1.6 Timeline: Such a large-scale effort would likely require ship time from several countries in order to simultaneously cover extensive areas of the Southern Ocean. As a result, the preparation for such an endeavour would be extensive, and is unlikely to occur in less than two years, at a minimum. At least one year of sampling would be required, preferably two.

2. Catalogues, Sample and Song Collections

The working group recognised the considerable value of existing photo-identification and biopsy sample collections throughout much of the Southern Hemisphere, and **recommended** that support be provided for continuation and expansion of these collections. In particular, these provide vital information on abundance, population structure and life history of right, blue and humpback whales. In addition, collection of humpback whale songs in low- (and sometimes high-) latitude regions is a low-cost endeavour that can provide clues regarding population mixing. A central web-based registry for all such material, including metadata available to all collaborating researchers, would represent a valuable resource.

3. Coordinated right whale projects in calving (and other) areas

Use of standardised methodology to study right whales across major known calving grounds would provide considerable advantages in terms of coordination and comparability of data. Such work would potentially include satellite tagging to assess the location of feeding areas (a major question in all calving areas), as well as photo-identification and biopsy sampling for multi-area studies of movements, genetic structure and other topics. Areas concerned would include (but not be limited to) Argentina, Brazil, Uruguay, South Africa, Australia and New Zealand (sub-Antarctic islands). It was noted that several nations are already

working around the Antarctic Peninsula, a known area of predictable concentration for feeding right whales; consequently, a coordinated effort among the researchers of such countries would bring benefits in terms of data sharing, methodological standardisation and increased sample sizes for studies.

4. Breeding Ground Surveys for Humpback Whales
Although much work is being conducted across humpback whale breeding grounds of the Southern Hemisphere, major gaps in coverage exist. A project involving standardised photo-identification, biopsy and acoustic sampling across large areas of the tropics would provide important data with which to clarify population structure, notably in comparisons to often extensive photographic and genetic catalogues from some regions.

5. Abundance Assessments
Other methods for assessing abundance and monitoring trends in populations should be attempted. These would include continuation of long-term counts in predictable coastal locations (e.g. humpbacks off the coast of eastern Australia), as well as initiation of annual block aerial surveys in selected locations in the Antarctic (e.g. the Peninsula area, where there are several airstrips).

6. Regional Projects
The following projects are all regional in nature, but were considered important enough to be considered for inclusion under SORP.

6.1 Right whales
6.1.1 Surveys (by aircraft and/or vessels) of the coast of Chile, coupled with targeted biopsy work, to clarify the distribution and occurrence of the critically endangered right whale population of this region. The working group considered this the highest priority among regional studies.
6.1.2 Investigation of recent unusual mortality events (and possible links to attacks by gulls) in Argentina. The cause of these mortalities is unknown, and studies are hampered by the simple lack of a suitable vehicle to reach stranding sites, and by the lack of any salary for investigators.
6.1.3 Investigation of the marked difference in recovery between right whales in western and eastern Australia.
6.1.4 Aerial surveys for photo-identification and biopsy work, notably in those areas with an existing time series of such data; these include Argentina, Brazil, Uruguay, South Africa and Australia.

6.2 Sei whales
Satellite tagging off Chile (Chiloe region); sei whales are found in this area fairly predictably. Such a study (conducted as a pilot project) could represent an important first step in understanding this poorly studied and little-known species.

6.3 Sperm whales
6.3.1 Conducting aerial surveys to match those run by aerial spotter planes from the whaling station at Albany, Western Australia during the period of sperm whaling (up to the 1970's). The intent would be to gather comparative data on sperm whale abundance to examine whether recovery was occurring in this population. Similar surveys could be run in other places where sperm whales were taken, such as off Durban (South Africa).
6.3.2 Satellite tagging of sperm whales in high or lower latitudes to assess population structure and movements.

APPENDIX 6

REPORT OF THE WORKING GROUP ON WHALE HABITATS AND MOVEMENTS
Chair: Lorenzo Rojas Bracho; Rapporteur: Russell Leaper

The workshop considered some general questions that need to be addressed to better understand whale habitat (see below). Individual species were considered in the context of these questions, including what is currently known, ongoing research and possible future research.

Some general questions were identified in relation to whale habitat studies:

a. Are feeding grounds mixed aggregations of whales from different breeding grounds?
b. How does site fidelity to feeding grounds vary with age, sex and reproductive class?
c. What are the indicators of whale habitat, are these factors changing and how might whales respond to these changes? (Critical changes might include the effects of fisheries, climate change and/or ocean acidification)
d. Do whales move to track certain physical features that may help to aggregate prey?
e. How consistent is a species between feeding grounds in terms of habitat utilisation?
f. Is there comparable site fidelity in the Southern Ocean to that observed elsewhere?
g. How dependent are whales on the ice edge and as the ice edge moves, do whales follow the edge and miss out on other feeding grounds?
h. Where do non reproductive animals go?
i. What are the cues that cause whales to migrate away from high latitudes?
j. What data are there on the connection between diving patterns and feeding that might facilitate better interpretation of telemetry data?
k. Can a model to describe habitat features developed in one area be applied to another and could such models be applied across species?

Humpback whales
The IWC Scientific Committee recognises seven major breeding stocks of Southern Hemisphere humpback whales. The wintering grounds of these are described by Reilly *et al*. (2008) as:

A (Southwest Atlantic): coast of Brazil;
B (Southeast Atlantic): the coast of West Africa from the Gulf of Guinea down to South Africa;
C (Southwestern Indian Ocean): coasts of eastern South Africa, Mozambique, Madagascar (southern, western and eastern coasts), Mayotte and the Comoros;
D (Southeastern Indian Ocean): northwestern Australia;
E (Southwest Pacific) northeastern Australia, New Caledonia, Tonga and Fiji;
F (Central South Pacific): Cook Islands and French Polynesia; and,
G (Southeast Pacific): Ecuador, Galápagos, Colombia, Panama and Costa Rica.

The reproductive areas for breeding stock A have been well studied off the coast of Brazil with a distribution north to around 5°S (with occasional whales moving northwest towards the northern coast of South America (~2-3°S). Aerial surveys between 5°S and 21°S have established that the off-shore banks off the coast of Brazil, especially the Abrolhos Bank, are important areas during winter. There are also data on the physical and biological characteristics of these areas. Photo-identification and satellite tracking have identified linkages between feeding areas and reproductive areas, but there are many data gaps in the understanding of the characteristics of feeding areas. There are few records from along the coast of Argentina. The migratory routes, as revealed by telemetry, are largely offshore and the large majority of migrating whales don't even go close to Argentina

Although some reproductive areas for breeding stock B have been identified, there are more gaps in research effort along the coast of west Africa than the east coast of South America. Thus habitat characteristics are not well known for all the wintering areas. Satellite tracking has shown that whales move from Gabon to the ice edge. Based on recent discussions within the IWC Scientific Committee it appears there is currently insufficient information for a comprehensive assessment of breeding stock B.

For breeding stock C, although data exist on the reproductive areas, there is little information on linkages with Antarctic feeding areas.

There are a long time series of data on coastal migration patterns for breeding stock D along the west coast of Australia and breeding stock E on the east coast of Australia. Discovery tags, photo-id, and more recent satellite telemetry, provide data on linkages between reproductive and migration areas of breeding stock E and Antarctic feeding grounds. Not all reproductive areas for this stock have been studied in detail.

A project focussed on studies along longitudinal sectors that include both reproductive and feeding areas could help understand the physical and biological variables that define feeding habitat, reproductive habitat and migratory routes. Integrated studies of humpback whale populations that migrate along the east and west coasts of South America and around Australia would provide comparisons from contrasting regions within the Southern Ocean. In particular, with regard to climate change, the Antarctic Peninsula area has seen large changes in recent years whereas little change has been apparent in eastern Antarctica. The project would address threats in reproductive areas largely through national or regional efforts, while the combined data would allow investigation of the potential impacts of fisheries, climate change and ocean acidification on the Southern Ocean feeding grounds. The workshop noted that this proposal focussed on stocks whose feeding grounds were in areas of the Antarctic with a high level of ongoing research effort. If some of the Antarctic components of SORP included the appropriate longitudinal range then the B and C stocks might also be included.

This overall project would involve the following:

a. Detailed, fine scale (of the order of tens of km), individual based studies of three dimensional movements of whales in relation to their prey. Data would be collected using consistent methodology in a way that allowed comparison between contrasting feeding areas. Fine scale data would also allow better interpretation of satellite telemetry data with respect to identifying dive patterns that indicate feeding.
b. Analysis of existing survey data (including IDCR/SOWER and multi-disciplinary research cruises) to determine physical and biological variables that can be used in predictive spatial models. Combined analysis of satellite telemetry data to analyse relationships with physical and biological variables, and site fidelity, including understanding how these may be different for whales on feeding grounds, migration routes and reproductive areas.

Table 1 was prepared (by Friedlander) to illustrate the types of data available for habitat studies of humpback whales. This species was used as an example to identify data types and research methods, but there was insufficient time to discuss other species at this level of detail.

Table 1. Multi-scale data requirements for humpback whale population level habitat assessment

	Current	**Historic**	**Disposition**	**Countries Active**
South America - *Calving/breeding areas*				
Photo-ID	yes	yes	??	Brazil, Argentina, Chile, Peru…
Biopsy	yes	yes	??	??
Satellite tags	??	??	??	??
Bathymetry/coastline data	yes	yes	remote sensing	Brazil, Argentina, Chile, Peru…
SST, Chlorophyll a	yes	yes	remote sensing	all
Ocean Height	yes	yes	remote sensing	all
Antarctic Peninsula - *Feeding areas*				
Photo-ID	yes	various	various	USA, Brazil, Chile, Others?
Biopsy	??	yes	SWFSC?	USA, Brazil, Chile, Others?
Satellite tags	??	yes	NMML?	USA, Brazil

	Current	Historic	Disposition	Countries Active
Bathymetry/coastline data	yes	yes	remote sensing	all
Sea ice data	yes	yes	remote sensing	all
SST, Chlorophyll a	yes	yes	remote sensing	all
Short-term foraging tags	yes	no	Duke	USA
quantitative prey measurements	yes	various	LTER, GLOBEC, AMLR, Duke	USA
Australia - *Calving/breeding areas*				
Photo-ID	yes	yes	various??	Australia
Biopsy	??	yes	??	Australia
Satellite tags	Yes	no	??	Australia
Bathymetry/coastline data	yes	yes	remote sensing	all
SST, Chlorophyll a	yes	yes	remote sensing	all
Ocean Height	yes	yes	remote sensing	all
East Antarctica - *Feeding areas*				
Photo-ID	??	yes	AAD? Deakin?	Australia
Biopsy	??	yes	AAD? Deakin?	Australia
Satellite tags	yes	no	AAD?	Australia
Bathymetry/coastline data	yes	yes	remote sensing	all
Sea ice data	yes	yes	remote sensing	all
SST, Chlorophyll a	yes	yes	remote sensing	all
Short-term foraging tags	no	no		
quantitative prey measurements	no	various	AAD??	Australia

Right whales

Southern right whales include some populations that are recovering well and others that are still at very low numbers. For example, the subpopulation west of South America is listed as critically endangered by IUCN (Reilly *et al*. 2008). Long-term data sets on reproductive areas can provide insights relevant to conservation efforts of the most depleted populations as well as habitat changes on feeding grounds.

Along the east coast of South America, the study of southern right whales at Peninsula Valdes provides one of the longest time series of individual based studies for any cetacean population. Current studies include photo-identification, aerial surveys, stable isotopes and the effects of gull attacks. Elsewhere in Argentina, Santa Cruz province used to be a breeding ground and there have been some aerial surveys in this area plus photo-identification from oil platforms in the Magellan Strait. Right whales are seen up to about 16°S off the coast of Brazil, particularly on the Abrolhos Bank, in the same area as humpback whales. However, the main concentrations are around 28°S including mating groups and mother-calf pairs. There have been several photo-identification matches between the main areas of right whale concentrations east of South America suggesting a high rate of exchange. Joint surveys between Brazil and Uruguay in 2008 detected 32 right whales off Uruguay in September. Calves are seen off Uruguay, but the proportion of mother-calf pairs is less than in Brazil. Throughout the region, there is only sparse data off-shore and on migration routes although the Soviet whaling in the 1960s did find southern right whales off-shore off the coast of Argentina.

Right whales off South Africa have also been the subject of long term studies. Several right whales tagged off South Africa travelled to the ice edge. It is possible that there may be some mingling of different populations on feeding grounds. There have also been so recent sightings of right whales in areas of the

southern Indian Ocean, which were once important to the species. It seems likely that these populations were whaled to extinction.

A workshop to review the current level of knowledge on right whales around Australia was held just prior to the SORP meeting. It appears that although right whales off western Australia are recovering well, the population off east Australia is still at very low numbers with no evidence of trend. These whales may group closer to the New Zealand population genetically, but sample sizes for analysis are small. Despite healthy populations around the Campbell and Auckland Islands there are relatively few right whales around New Zealand itself. In Maori mythology it appears that right whales were present in an area of tropical waters south east of the Kermadec Islands. This is supported by some whaling records although there are differing views on the reliability of those records. Current research efforts around New Zealand have included trying to establish whether whales observed off the mainland are a distinct population.

An overall project designed to understand southern right whale habitat would include:

a. Extending global analyses of historic right whale abundance and distribution;
b. Comparison of photo-id catalogues between calving areas off South America and South Africa to investigate movements of individuals between these and possible merging on feeding grounds;
c. Further work to identify feeding grounds based on isotope analysis and satellite telemetry (as for (b) for humpback whales); and,
d. Develop or strengthen existing sightings networks in areas used by the populations that are still at very low numbers in order to allow cost-effective data to be collected (particularly photo-identification).

Blue whales

Blue whales are still at low numbers with limited sightings data from large-scale surveys. Winter distribution is poorly known but blue whales were caught off Namibia, South Africa and Chile in winter (Best 1998). More recently, aerial surveys off the coast of Chile have identified areas of blue whale concentrations south of Chiloe and in the Gulf of Corrovado. These areas have a relatively high level of vessel traffic and aquaculture (e.g. salmon farming). It has been suggested that the poor skin condition observed in many whales in these areas may be indicative of a degraded environment. Studies off the coast of Chile have included photo-identification and satellite tagging with around a 30% resighting rate between years and one match with a whale seen off northern Chile.

The IWC maintains a Southern Hemisphere blue whale photo-identification catalogue and obtaining images whenever blue whales are encountered has been a component of the SOWER cruises including some survey effort designed for blue whales.

Passive acoustic methods are particularly appropriate for blue whales and there have been numerous successful deployments of bottom mounted acoustic recording packages. These provide data on calling rates throughout the year and have shown the year round presence of blue whales in Antarctica.

Pygmy blue whales appear confined mainly to the area north of 55°S even in summer (Reilly et al. 2008) and have been studied off Australia including photo-identification with plans for satellite tagging (Australian Marine Mammal Centre).

An overall project designed to understand blue habitat would include:

a. Item (b) as for humpback whales above. In particular such analysis would be used to design a network of deployments of passive acoustic devices to monitor seasonal and inter-annual changes in blue whale calling rates at a circumpolar level.
b. Continued efforts with a global photo-identification catalogue

Antarctic minke whales

Antarctic minke whales have been the focus of the IDCR/SOWER surveys which have indicated a possible decline in numbers. Investigating these data has been a major priority for the IWC Scientific Committee including understanding the relationship of minke whales with sea ice habitat. Reproductive areas of minke whales remain largely unknown but whaling occurred at low latitudes in the Indian Ocean and

concentrations of minkes have been observed off the coast of Brazil. Detailed studies of minke whale habitat and comparison with humpback whales were a focus for research on GLOBEC cruises around the Antarctic Peninsula. There have also been recent aerial surveys to investigate minke whale density in relation to ice habitat in the Weddell Sea (Kock et al. 2009) and off Eastern Antarctica (Australian surveys). Passive acoustic methods have not had much success with Antarctic minke whales and there are no regularly produced sounds that can be reliably attributed to the species.

An overall project designed to understand Antarctic minke whale habitat would include:

a. Satellite tagging of whales at high latitudes to identify reproductive areas;
b. Item (a) as for humpback whales listed above; and,
c. Aerial surveys of minke whales in sea ice habitat using consistent methodology across contrasting areas.

Fin whales

Along with blue whales, fin whales were the mainstay of the Antarctic whaling industry with an estimated 725,000 killed in the Southern Hemisphere in the 20th Century (Clapham and Baker 2002). From the 2005/06 season fin whales were also targeted by the JARPAII program. Although only 13 animals have been taken up until the 2007/08 season, the annual catch limit has been set at 50 fin whales. Neither the summer or winter distribution patterns of Southern Hemisphere fin whales are well known. It is thought likely that a component of the population remains above 60°S in summer and thus has not been included in estimates from the IDCR/SOWER surveys. The SOWER surveys have identified areas potentially important for fin whales on transit passages to the Antarctic from South Africa and Chile. Fin whale migration is poorly understood. For example, tagging studies of fin whales in the north Pacific have shown large latitudinal movements, sometimes in the opposite direction from what might have been expected.

An overall project designed to understand Antarctic fin whale habitat would include:

a. Analysis of sightings data along the lines of (b) in humpback whales to determine the optimum deployment of passive acoustic devices to measure long-term trends in fin whale numbers including north of areas north of 60°S.

Sperm whales

The distribution of sperm whales in the Southern Ocean is better documented than for other odontocetes. Of the great whales, sperm whales were second only to fin whales in terms of the numbers of individuals (over 400,000) taken by 20th century whaling operations (Clapham and Baker 2002) in the Southern Hemisphere. Tynan (1998) used historic catch data to show the influence of the Southern Boundary of the Antarctic Circumpolar Current on sperm whale distribution and suggested this was about the southward limit of their distribution. However, Kasamatsu and Joyce (1995) reported high densities of sperm whales between 150°-180°E and south of 66°S, with sightings as far south as 74°S in the Ross Sea. Thus concentrations of sperm whales do occur to the south of the Southern Boundary. Globally, sperm whale are known as a deep water species and similar distribution patterns in relation to water depth and bottom topography are seen in the Antarctic (Kasamatsu *et al*. 2000).

Passive acoustic techniques using towed hydrophones on multi-disciplinary research cruises have proven effective for sperm whale surveys in the Southern Ocean (Gillespie 1997; Leaper *et al*. 2000). Similar techniques may prove effective for surveying other odontocetes in the Southern Ocean and there is currently ongoing research to develop these methods for beaked whales which is showing considerable promise.

Current studies on sperm whales by the Otago University Marine Mammal Research Group focus on documenting the 3-D diving behaviour of sperm whales at Kaikoura. A large-aperture unlinked hydrophone array has been developed using a stereo vertical array on a 100m cable, and four custom built GPS-referenced recording sonobuoys. The system is highly portable and is deployed from a 6m boat. The buoys are deployed in a star configuration around a diving whale, with each buoy 1-2km apart. The boat positions itself in the centre of the star, as near to the diving whale as possible, and deploys the vertical array. Synchronisation is obtained via a GPS timing pulse. The hardware is fully developed. Software development is well advanced. If the whale is within the array, confidence ellipses of the whale's position

are in the vicinity of a whale length. Localisation accuracy declines substantially as the whale moves beyond the array. The system can provide detailed 3-D dive profiles of sperm whales, and has value in documenting how whales use their habitat at fine scales. Particularly if sampling systems can be developed to simultaneously quantify the distribution and relative abundance of prey, a much greater understanding of how sperm whales feed, and what factors influence habitat choices, could be possible.

Abundance estimates for sperm whales based on extrapolation using environmental co-variates suggests very different numbers from previous estimates (Whitehead 2002). Further studies of the relationship between sperm whale distribution and environmental covariates could improve these estimates. Passive acoustic methods to estimate sperm whale density have proven cheap and effective on multi-disciplinary cruises.

APPENDIX 7

WORKING GROUP ON CETACEAN FOOD WEB LINKAGES AND COMMUNITY STRUCTURE (PAST AND PRESENT)

Chair: Steve Nicol; Rapporteur: Simon Jarman

The Working group first examined what were perceived to be the major questions that required attention in the subject area of food web linkages and community structure. The questions were grouped under three headings which reflected the key issues that are likely to affect cetaceans in the Southern Ocean, recognising that there were likely to be interactions between many of these questions.

The first set of questions addressed basic ecological questions that would need addressing in order to make progress in understanding food web linkages in the Southern Ocean and their importance:

a. How relatively important is the Southern Ocean in providing energy for whales?
b. What is the distribution of whales on feeding grounds?
c. What is the species composition and productivity of prey species?
d. How long are whales staying on feeding grounds?
e. What is the role of cetaceans in the overall productivity of the system?
f. What are the origins of nutrients in areas that whales are feeding?
g. What changes might occur in the energy pathways in the Southern Ocean (e.g. primary production-krill vs. primary production-*copepods-myctophid* fish) and how might whales respond to such changes if they occur?

The second set of questions related to possible interactions between existing and potential fisheries and the Southern ocean food web:

a. What are the key uncertainties in fishery activity relevant to whales?
b. Is there interference by fisheries on whale foraging success? e.g. fisheries changing the nature of krill swarms
c. What is the effect of whales on krill swarming behaviour? Could whales enhancing fishery performance?
d. Additionally, the working group noted that fisheries that could be studied for potential food web interactions include the existing fisheries for krill, icefish and toothfish, and various potential fisheries: squid, *Pleuragramma* and *myctophids*.
e. The third set of questions related to the potential effects of climate change (including ocean acidification) on the Southern Ocean Food web.
f. What is the potential for feeding grounds to move in response to forcing factors such as climate change and ocean acidification?
g. What changes in productivity of the Southern ocean might be expected and how might these vary regionally?
h. What is the relationship between whale behaviour and distribution and the 3 dimensional structure of ocean?

The working group identified a number of fundamental gaps that exist in our knowledge of the Southern ocean ecosystem and made some assessments of the feasibility of addressing significantly some of these deficiencies. These assessments form the basis of the research programs indicated later in the report.

Foraging strategies of baleen whales

What proportion feeding by whales occurs in the Southern Ocean compared with areas outside of the Southern Ocean? Satellite tracking studies make this a tractable problem, especially when combined with telemetry and ground truthing. What is the foraging behaviour of cetaceans in relation to distribution of prey at large and fine scales? This is also a tractable problem with advances in technology.

Functional response of cetaceans to prey availability

Difficulties in making direct measurements make determining functional responses intractable at the present time. However, modelling approaches could be developed using inferences based on studies measuring basic foraging behaviour in relation to local prey densities.

The squid and toothed whale system
The lack of ability to quantify the role of squid in the Southern Ocean was seen as a major deficiency. Some tools are available to improve our knowledge of some aspects of squid biology and ecology. Studies on land based squid predators such as seals and penguins can provide some information on areas of squid abundance and the importance of various squid species. Abundance information on toothed whale and other squid predators would enable better estimates of total squid abundance and importance.

The determination of the prey of killer whales was viewed as a tractable problem and might allow some assessment of the possibility of prey switching. This would allow an indication of how many prey types were being utilised and how prey changes with location?

Southern Bottlenose Whales were acknowledged as being abundant in the Southern ocean and were potentially important predators of squid and fish. Many of the techniques developed for other toothed whales would be applicable to studying their role in the food web.

Role of cetaceans in nutrient cycling
The working group noted that there was growing interest in the role of large cetaceans in the cycling of iron and other essential nutrients. This subject was amenable to field, laboratory and modelling studies. This is a good area to concentrate effort in as the questions are tractable and because the consequences of the existence of this feedback loop are considerable.

Absolute abundance of krill
It was acknowledged that although considerable advances in scientific acoustics had occurred over the last decade it was still a subject of active area of research in other fora such as CCAMLR. Because of uncertainties with acoustic target strength and survey effort it was difficult to envisage the production of reliable estimates of global krill abundance being available in the near future at the level of precision that would allow examination of issues such as competition by whales for the krill resource.

Newer technologies such as acoustic wave guide propagation, and at a smaller scale multibeam acoustics, may allow synoptic overviews of krill distribution in an area. Only with better knowledge of regional abundance of krill can we examine the relative importance of current and past whale populations in shaping the Southern Ocean food web be examined.

Future of cetaceans in a changing world
The working group recognised that predicting the impacts of climate change and ocean acidification on the distribution and recovery of whale populations arising from changes in prey communities and distribution was a key issue. This would rely heavily on modelling studies.

Historical changes in the Southern Ocean and its food web
Although historical changes in the Southern Ocean has received considerable research attention there are still great uncertainties. There is a need for more data on past physical changes. Additionally the collation of data on changes in land based predators and integration with whale and fishery data will allow a more holistic view of Southern Ocean changes.

Potential studies on cetacean food webs
Baleen whales
1) Studies of baleen whales on feeding grounds.
Objective: to investigate behaviour of whales relative to distribution and abundance of prey at micro- and meso-scales. These studies could also incorporate studies on nutrient recycling. Suggested areas include the Antarctic Peninsula because of recent well studied changes and ready availability of fishery and other ancillary ecological data; and East Antarctic because of regional differences in sea ice.
Relevance to IWC: would provide data that will address key gaps in our understanding of food web linkages.
Methodological description:

a. Major one year study but with considerable methodological development beforehand. Multi-year developmental work (modelling and technical) over several years that should be iterative and incorporated into the life of the project
b. Initial meso-scale information from hydroacoustics, physical oceanography and remote sensing. Comparisons of nutrients within and outside foraging patches.
c. Individual behaviour taken from day-long suction tags that can report on feeding events. Prey measured at two spatial scales at: 1km with vertical and patch density from ship; and local scale from boats. Small scale hydroacoustics also gives krill abundance etc. at different scale and level of disturbance.
d. Development of functional relationships from individual whale behaviour.
e. Compare with information from other predators such as penguins, seals.
f. Look at areas with different krill swarm types to see reaction of whales to different density / patchiness?
g. Gliders and Unmanned Aerial Vehicles (UAVs) could be used for longer term sampling of the environment for prey and physical properties.
h. Diet can be studied through stable isotope and lipid studies on biopsy samples. Faecal samples can be collected for morphological and DNA analysis.
i. Energy usage could be calculated from 3D accelerometers with the potential to calculate annual energy budgets.
j. Use of genetic information and ecotyping.
k. Humpback, fin and minke whales would be the most attractive candidate species for such a study but humpbacks are possibly the most tractable species for many aspects of such a study. In some areas they overlap with land based predators. They can be tagged at locations outside of the Southern Ocean.

2) Comparative studies on prey switching by baleen whales in non Southern Ocean locations.

Objective: to improve understanding of food web linkages in areas where this is already known to occur and to develop techniques, through using model systems in other parts of the world.

Relevance to IWC: will accelerate progress in understanding food web dynamics in the Southern ocean.

Methodological description:

a. Use of existing studies in locations such as the Gulf of Maine, Channel Islands, southern Chile, Australia to develop the technologies and methods to be used in the Southern Ocean.
b. A focus on humpbacks may be useful because they are more generalist foragers and are known to feed on schooling fish as well as on krill in the northern hemisphere.
c. Examine the conditions under which humpbacks forage on one species over another.
d. Would require the ability to define the relative abundance of different potential prey species in the meso-scale coupled with observations of foraging behaviour and dietary analysis through molecular techniques as well as through fatty acids/stable isotopes.

Odontocetes

1) Studies of diet and fishery interactions in killer whales and sperm whales.

Objective: To quantify the interactions between killer whales and toothfish fisheries and the degree of dependence of this species on toothfish.

Relevance to IWC/CCAMLR: it would address the issue of depredation and of the importance of toothfish in the diet of killer whales.

Methodological description:

a. Type B Killer whales are easiest studied with biopsies at different times in the season for lipid and stable isotope analysis of diet.
b. Instrumentation will be more useful for fish feeding killer whale populations i.e. type C.
c. Some potential for D-tag use but this may be difficult when the whales are moving through sea ice.
d. It is possible to get faecal samples for diet analysis of killer whales.
e. Interactions between killer whales and fishing vessels such as toothfish longliners could be further studied using CCAMLR observers already aboard vessels.
f. More information on the fisheries that interact with killer whales.
g. Possibly use active acoustic devices attached to longlines to locate killer whales relative to ships / longline.

h. Some mitigation work of effects of killer whales on longlining has been tried with pots at Kerguelen. Studies on mitigation needed. This is also an issue for sperm whales.
i. Biopsy sampling in fishery areas to investigate diet.
j. Sperm whales highly amenable to acoustic surveying (e.g. sonabuoys, towed arrays and moorings). Longline acoustic devices could be used to determine feeding.
k. Regional studies and comparisons among them could be useful.

2) Develop methods for studying diet in toothed whales in general

Objectives: to improve knowledge of diet in toothed whales in general and on sperm whales.

Relevance to IWC/CCAMLR: Studies at tractable locations such as New Zealand or convenient South American locations could provide considerable information on squid species composition in these areas and would develop techniques that could be applied in the Southern Ocean.

Methodological description:

a. 3D arrays can be useful for sperm whales.
b. Light traps etc could be used for sampling diet items.
c. Engage with the Southern Ocean squid experts.
d. Use of stranded animals for stomach contents and isotope analysis of blood/skin.
e. Skin samples for isotope analysis.
f. Use of acoustic moorings.
g. Kaikoura a very tractable location for sperm whale studies.
h. Develop relative prey abundance estimators to allow relationships between prey and predator abundance to be better studied.

APPENDIX 8

SUMMARY OF SOUTHERN OCEAN RESEARCH PROJECTS THAT HAVE POTENTIAL LINKAGES TO SORP

The following is a list of projects that were identified at the workshop as potentially having useful linkages to SORP. This is not an exhaustive or complete list but rather a cross section of some projects occurring in the Southern Ocean that may be applicable as core or associated SORP projects.

1) Southern right whale and humpback whales research in western Australia. Investigators: J. Bannister and collaborators.
   a) Southern right whales: Subject to funding, it is proposed in 2009 to continue the 16-year series of annual aerial surveys along the southern Australian coast to provide continuing information on population trend and number, pending a modelling exercise to determine the frequency and extent of future surveys. Shore-based fieldwork at Head of Bight, South Australia, where a breeding concentration has been observed over some 17 years, would also continue. The programme has the twin objectives of estimating the extent to which the population may be approaching K, and investigating the effects of environmental change on reproductive success.
   b) Humpback whales: Results from a survey off Western Australia to estimate population size of breeding stock D in 2008 are now becoming available. It is proposed (subject to funding) to undertake a combined analysis of results from the 2008 survey and two previous surveys in 2005 and 1999.
2) There are many relevant projects from French researchers:
   a) CETA (CEtacean observation off Terre-Adélie) is a two year joint (French/Chilean/Australian) pilot study that will document information on the summer presence and relative abundance of cetaceans over the continental shelf off Terre Adélie, Eastern Antarctica. Two observers will join *R/V Astrolabe* that will be used as a platform of opportunity during a 10 day oceanographic cruise. Investigators: J-B Charrassin, C. Garrigue, Carlos Olavarria and V. Ridoux
   b) The OHA-SIS-BIO project (Observatory of HydroAcousticity from SISmicity and Biodiversity in the Indian Ocean) will deploy 4-8 autonomous hydrophones at different sites in Southern Indian Ocean (French sub-Antarctic area) in 2009. The aim of the research is to obtain a complete annual picture of occurrence, seasonality and distribution of baleen whales, especially fin whale and blue whale subspecies (Antarctic and pygmy). Investigators: S. Flore, O. Adam, J-Y. Royer Jean-Yves, K. Stafford and C. Guinet.
   c) Eparses Islands Acoustic Monitoring Project: We intend to deploy for one year (2009-2010) 4 autonomous hydrophones around Madagascar to evaluate presence/absence and seasonal occurrence of whales of cetaceans (including blue, fin and humpback whales). Investigators: F. Samaran, Terres Australes et Antarctiques Françaises, Agence des aires marines protégées, CEBC/CNRS, Université de Bretagne Occidentale.
   d) Survey of the French Overseas EEZ in the south west Indian Ocean. As part of the ongoing Global survey of the French Overseas EEZ, an aerial survey centred on the French EEZ in the SW Indian Ocean (i.e. Mayotte, La Réunion) and some neighbouring EEZs will give the first large scale and standardised map of preferred habitats for cetaceans in this part of the IO. The survey should be conducted from November 2009-January 2010. Investigators: V. Ridoux
   e) Cetaceans and fisheries interactions. Examining the demographic response of the Crozet Islands killer whale population to interactions with illegal Patagonian toothfish longliners. This is part of a continuation and reinforcement of an ongoing program, photo-ID collection of killer and sperm whales by fishery observers within the Crozet and Kerguelen EEZs will be conducted. It will allow for a better definition of the populations under study and a better understanding of the social organization and structure. Investigators: P. Tixier, N. Gasco, G. Duhamel, C. Guinet.
   f) Cetaceans and fisheries interactions. This involves the quantification of sperm whales and killer whales impact on the toothfish fishery over the Kerguelen and Crozet plateaus. This is a collaborative project between the ORCASAV project associating fishermen, the TAAF administration, IFREMER, CEBC-CNRS and MNHN. It is aimed at developing, testing and assessing the efficiency pot lines to fish Patagonian toothfish in a way to reduce both seabird

bycatch and cetacean depredation. A pilot study will be conducted in 2009. Investigators: P. Tixier, N. Gasco, G. Duhamel and C. Guinet.

g) In New Caledonia, it is planned to deploy satellite tag on humpback whales in the breeding ground Eii in 2009 and 2010. The aims are to investigate the habitat used and connection within breeding ground and to identify migratory pathways and feeding destination of this sub stock. Investigator: C. Garrigue.

3) Studies on Sperm whales at Kaikoura, based from Otago University, have been underway since 1990. More than 210 individual sperm whales are photographically identified, some of which are present for several months at a time and return regularly. Photogrammetric length estimates are available for some individuals. The most recent thrust of this work has been in the development of a large-aperture unlinked hydrophone array and associated software techniques to localise diving sperm whales in 3-D. Fieldwork in this project will continue through 2009. Investigators: S. Dawson. E. Slooten, B. Miller.

4) NZ sub Antarctic southern right whales, winter 2009. A survey of southern right whales in the sub Antarctic Auckland Islands of New Zealand is planned (funding dependent) for the austral winter of 2009 by the Marine Mammal Institute, Oregon State University, and University of Auckland, in collaboration with members of AMMC. This will be the 4th year of an intended 4-year series of vessel-based surveys to collect skin biopsy samples and individual identification photographs for estimation of abundance, genetic diversity, population structure and molecular aging. The result will be compared to those from a previous 4-year series of surveys during the winters of 1995-98 (Patenaude et al. 1998; Patenaude 2001), with the intent of measuring trends in abundance and any other changes in this unusual sub Antarctic calving grounds. Individual identification by microsatellite genotyping of the more than 600 samples collected from 2006-08 is underway to establish linkages with right whales around the mainland of New Zealand and analysis of mtDNA has been used to described differentiation from right whales along the coast of Australia. Investigators: C.S. Baker, E. Carroll, G. Dunshea, S. Childerhouse

5) Fine scale foraging behaviour of humpback whales, trophic dynamics and predator-prey ecology off the Western Antarctic Peninsula. From 21 April-12 June 2009, and 10 February-20 March 2010 we will use novel tagging technology combined with traditional fisheries acoustics methods to quantify the prey consumed by a poorly understood yet ecologically integral and recovering krill predator in the Antarctic, the humpback whale. We will use a combination of advanced non-invasive tag technology to study whale behaviour concurrent with hydro-acoustic techniques to map krill aggregations. We will use data logging tags that have been used to monitor the underwater activities of whales and reconstruct fine-scale movement patterns in three dimensions. Measurements of krill biomass, size structure and aggregation behaviour at high vertical and temporal resolution will be made using a combination of a vessel mounted and towed multi-frequency echosounders and physical sampling, e.g., MOCNESS. We will then use novel statistical approaches to integrate and synthesize these data. Our research will (1) provide direct and quantitative estimates of krill consumption rates by humpback whales and incorporate these into models for the and management of krill stocks and the conservation of the Antarctic Marine Ecosystem; (2) provide information integral to understanding predator-prey ecology and trophic dynamics, i.e., if/how baleen whales affect the distribution and behaviour of krill and/or other krill predators; (3) add significantly to the paucity of knowledge regarding the diving behaviour and foraging ecology of baleen whales in the Antarctic; and (4) develop new geospatial tools for the construction of multi-trophic level models that account for physical as well as biological data. Investigators: A. Friedlaender, D. Nowacek, P. Halpin, P. Tyack, & M. Zhou.

6) Pacific Whale Foundation have several relevant projects:

a) Ecuador: Plans are to continue humpback whale photo-identification, song and land-based work. We will continue to fund the coordination and analysis of west Latin American humpback photo-identification catalogues (e.g. Costa Rica, Panama, Columbia, Chile, Peru) along with ongoing comparison to the Antarctic humpback catalogue. There is a July - October field season. Investigator: G. Kaufmann.

b) East Australia: research on humpback whales continues with photo-identification and song recordings off Cooktown/Port Douglas, Whitsunday Islands, Hervey Bay and Eden. There is a July - November field season. Investigator: G. Kaufmann.

7) There are several relevant projects from Chile. CEQUA & INACH scientific projects to be undertaken during the next summer season 2009-2010.

a) Field work will be undertaken in Patagonian channels and fjords north of Magellan strait. The timing will comprise a two month survey undertaken from September 2009 onwards. The research is focused on sighting surveys for humpback whales and coastal dolphins species (e.g. Chilean, Peale's, Commerson's dolphins and Burmeister porpoise). Investigator: C. Olavarria.
b) Photo-identification and biopsy sampling will be undertaken in Channels near Tierra del Fuego south to Cape Horn. It will comprise of weekly surveys during summer 2009-2010. Investigator: C. Olavarria.
c) Sighting surveys for whales and coastal dolphins will also be undertaken around Carlos III Island, Magellan strait during the summer 2009-2010. Investigator: C. Olavarria.
d) Further research on the theodolite tracking of humpback whales with commercial and tourist vessels. Investigator: C. Olavarria.
e) Research in northern Patagonia, Chile during the austral summer to continue long-term research on blue and humpback whales. The research will including photo-identification (abundance and vital parameters), biopsy sampling (genetics, organochlorine analysis, fatty acids), together with theodolite tracking (local movements) and acoustics (characterising vocalisations). During 2009 we will also complete the analysis of cetacean line transect abundance survey performed during this past austral summer. Investigators: R. Hucke-Gaete, Universidad Austral de Chile, Centro Ballena Azul NGO, University of St. Andrews, American Museum of Natural History, Centro de Estudios del Cuaternario, Instituto Antártico Chileno.
f) As previously reported, the Southern Hemisphere Collaborative Blue Whale Catalogue is a collaborative research effort to undertake photo-ID comparisons of blue whales in Southern Hemisphere. Barbara Galletti with the Centro de Conservacion Cetacea of Chile is currently implementing a central web-based system, by adapting the Mingan Island Cetacean Study software for Northern Hemisphere blue whale matching. During 2009-2010 Southern hemisphere blue whale photo-Identification matching will take place by comparisons of catalogues from different researchers groups. Given the large number of researchers involved, comparisons will be facilitated through one coordinator within each region. Regions were initially defined as Gulf of California/Eastern Tropical Pacific/South America (coordinated by Barbara Galletti); Antarctica (Coordinated by Paula Olson from Southwest Fisheries Science Centre) and Indonesia/Australian/New Zealand (coordinated by Chandra Salgado from Curtin University). Investigator: B. Galletti, P. Olsen, C. Salgado.
g) Since 2004, Centro de Conservacion Cetacea (CCC) conducts the Alfaguara (blue whale) Project. During summer/autumn 2010, CCC will continue research on blue whales off Isla de Chiloe, southern Chile with focus on photo-identification, line-transect surveys, biopsy sampling and health assessment. Other species, including humpback whales, sei whales and fin whales will also be opportunistically monitored. Investigator: B. Galletti.

8) Active Projects by Wildlife Conservation Society/Cetacean Conservation and Research Program in 2009/2010 will continue. We will be moving forward on all analyses described in research summaries, along with some small-scale field work. In both Madagascar and Gulf of Guinea (Congo and/or Gabon) there will be a focus on coastal dolphins (particularly *Sousa* spp.) and associated small-scale humpback whale sampling surveys. In addition, potential projects include satellite tagging of humpback whales from Madagascar in winter 2009 or 2010, and continuation/expansion of acoustic monitoring and survey effort for offshore whales and inshore odontocetes off the coast of Angola (pending funding). Analyses on acoustic, genetic, and photographic datasets from humpback whales (largely from breeding grounds, but some Southern Ocean feeding grounds) will continue with the intention of completing reports and papers for publications. A student from Universidad de Austral, Chile will conduct population genetic analyses on blue whale samples from Chile and the SE Pacific. Investigators: S. Cerchio, H. Rosenbaum
9) In the summer of 2009/10 the Australian Marine Mammal Centre will undertake a third aerial survey for Antarctic minke whales in the sea ice in eastern Antarctica. This aerial survey will cover the area between longitudes 95°-115° E and extend north to the edge of the sea ice and just beyond. The aerial survey is scheduled to start around 10 December, 2009 and will finish around 6 February, 2010. These aerial surveys are flown in a CASA-212 fixed-wing aircraft and are based at Casey Station. A paper describing this proposed aerial survey will be presented at IWC in June, 2009. Investigators: N. Kelly, D. Peel.

10) Some countries that harvest of krill in the Southern Ocean (e.g. Norway) send vessels to estimate krill production and abundance. Norwegian vessels are likely to operate in the South Georgia area (because the Norwegian krill fishery takes place there) and in the zone around the Norwegian Bouvet Island. There may be possibilities for cetacean observers onboard these vessels. Contact: A. Bjorge.
11) Cooperative work conducted by independent, non-governmental research groups from Argentina (Instituto de Conservación de Ballenas and Fundación Cethus), Brazil (Projeto Baleia Franca), Chile (Centro de Conservación Cetacea) and Uruguay (Organización para la Conservación de Cetáceos) will focus on the continuation of photo-identification aerial surveys of southern right whales along the Atlantic coast of Argentina, Brazil and Uruguay and on land-based and aerial surveys along the Chilean coast between July and November. Meetings to update the analyses of photographs using the appropriate software and to continue catalogue comparisons will be held. At present, a joint proposal to continue promoting the studies on population dynamics, movements and distribution and to coordinate aerial photo-id surveys in the four countries is being developed. Other studies that will be conducted during the next 5 years include:
    - Genetics;
    - stable isotopes;
    - acoustics;
    - determining the foraging locations and krill dependencies of baleen whales in the southern ocean;
    - the response of tissues of southern right whales to contaminants;
    - monitoring right whale health through necropsies of stranded animals; and,
    - behavioural studies.

Financial support to conduct these projects is required. Table 1 summarises the aerial survey details and schedule in the four countries.

Table 1 Summary of aerial survey details and schedule for southern right whale research in eastern South America

Country	***Area***	***Organisation***	***proposed # surveys / yr***	***time period***	***average # whales photo-identified/survey***	***estimated # hrs flown / survey***	***estimated # photos taken / survey***	***Contact***
Argentina	*Península Valdés*	*Instituto de Conservación de Ballenas*	*1*	*Sept*	*200-250*	*25*	*7,000*	*Mariano Sironi (msironi@icb.org.ar)*
Argentina	*Río Negro*	*Marybio*						*Alejandro Cammareri (ale@marybio.org)*
Argentina	*Buenos Aires*	*Fundación Cethus*	*5*	*June to Oct*	*1 to 5*	*15*	*50*	*Miguel Iñíguez (miguel.iniguez@cethus.org)*
Argentina	*Santa Cruz*	*Fundación Cethus*	*5*	*June to Oct*	*1 to 10*	*15*	*100*	*Jimena Belgrano (jimena.belgrano@cethus.org)*
Brazil	*Southern Brazil*	*Projeto Baleia Franca*	*3*	*Aug to Oct*	*100*	*47*	*2000*	*Karina Groch (karina@baleiafranca.org.br)*
Chile	*Northern*	*Centro de Conservacion Cetacea*	*Opportunistic*	*Sept-Oct*	*1 to 5*	*4*	*50*	*Barbara Galetti (barbara@ccc-chile.org)*
Chile	*Central*	*Centro de Conservacion Cetacea*		*Sept-Oct*		*3*	*50*	
Chile	*Southern*	*Centro de Conservacion Cetacea*		*Sept-Oct*		*8*	*50*	
Uruguay		*Organizacion para la Conservacion de Cetaceos*	*6*	*Aug to Oct*	*30 to 40*	*5*	*600*	*Rodrigo García (rodrigo@OCC.org.uy)*

APPENDIX 9

SUMMARY OF CETACEAN RESEARCH PROGRAMMES AND DATA RELEVANT TO THE SORP

Name of programme	***Nationality***	***Contact person***	***Area of operation***	***Years of operation***	***Target species***	***Type of research***	***Data available***
AMMC minke whale aerial survey	*Australia*	*Nathalie Kelly (natalie.kelly@aad.gov.au)*	*Casey Station (~110°E); pack ice*	*2008-09*	*minke whales; killer whales*	*Aerial surveys to assess abundance of cetaceans in pack ice*	*Line transect data held by AMMC*
AMMC passive acoustic monitoring of marine mammals in the Southern Ocean	*Australia*	*Jason Gedamke (jason.gedamke@aad.gov.au)*	*IWC Areas III, IV and V*	*2005-2009*	*Whales and seals*	*Deployment of moored hydrophones for 1 year to detect presence of whales; sonabuoys for distribution*	*Acoustic data held by AMMC*
New Zealand southern right whale project	*New Zealand*	*Simon Childerhouse (simon.childerhouse@aad.gov.au)*	*New Zealand sub-Antarctic*	*2006-2009*	*southern right whales*	*Biopsy and photo-ID to assess abundance, population structure and population recovery*	*600+ biopsy samples and photo-ID records*
AMMC humpback whale tagging	*Australia*	*Nick Gales*	*East coast of Australian; IWC Areas IV and V*	*2004-2008*	*Humpback whales*	*Satellite tracking to assess distribution, population structure and interchange, and migratory connections*	*56 whales tracked*
Antarctic killer whale research	*USA*	*Robert Pitman (robert.pitman@noaa.gov)*	*Antarctic Peninsula; Ross Sea*	*2001-2009*	*Killer whales*	*Satellite tagging for local movements and migration, food, foraging, abundance, biopsy, photo-id, systematics*	*15 whales tracked, 91 biopsies, 150+ photo-ids, acoustic recordings, diet records and samples*
Population dynamics of right whales	*Australia*	*John Bannister (bannisj@bigpond.com)*	*Coastal southern Australia: Cape Leeuwin (WA) - Ceduna (SA) ('Australian' population)*	*1993-2008*	*Right whales*	*Aerial survey counts and photo-id*	*Population number, trend, and photo-id information held at WA Museum*

Name of programme	*Nationality*	*Contact person*	*Area of operation*	*Years of operation*	*Target species*	*Type of research*	*Data available*
Population status of humpbacks	*Australia*	*John Bannister (bannisj@bigpond.com)*	*Shark Bay area, Western Australia (Southern Hemisphere Breeding Stock D)*	*2008*	*Humpbacks*	*Aerial and shore - based line transect survey*	*Line transect data held at WA Museum*
East Australia Humpback Whale Project	*USA*	*Greg Kaufman (greg@pacificwhale.org)*	*Whitsunday Islands,QLD*	*1990-'99*	*Humpback whales*	*Photo-ID to assess abundance, population structure, interchange, and migratory connections and population recovery distribution*	*4200+ photo-ID records, song recordings, aerial surveys*
			GBR, QLD	*1984-'90*			
			Point Lookout, QLD	*1984-'91*			
			Hervey Bay, QLD	*1987-'09*			
			Eden, NSW	*1993-'09*			
			Sydney, NSW	*2003-'09*			
			Coff's Harbour, NSW	*1985-'89*			
West Australia Humpback Whale Project	*USA*	*Greg Kaufman (greg@pacificwhale.org)*	*Exmouth, Shark Bay & Perth, WA*	*1986-'95*	*Humpback whales*	*Photo-ID to assess abundance, population structure and population recovery*	*800+ photo-ID records, song recordings*
Tonga Humpback Whale Project	*USA*	*Greg Kaufman (greg@pacificwhale.org)*	*Vava'u and Ha'apai, Tonga*	*1985- 1986, 2003-2009*	*Humpback whales*	*Photo-ID to assess abundance, population structure, interchange and population recovery distribution*	*130+ photo-ID records, song recordings*
American Samoa Project			*Tutuila*	*1984, 1994*			
PWF Antarctic Humpback Whale Catalogue	*USA*	*Greg Kaufman (greg@pacificwhale.org)*	*Area I*	*1983*	*Humpback whales*	*Photo-ID to assess abundance, population structure, interchange, and migratory connections and population recovery distribution*	*5 photo-ID records*
			Area V	*1986*			
			A. Peninsula	*1988-'89*			

Name of programme	***Nationality***	***Contact person***	***Area of operation***	***Years of operation***	***Target species***	***Type of research***	***Data available***
Demografía de la Ballena Jorobada y otros cetáceos en Costas Ecuatorianas	*Ecuador*	*Cristina Castro (cristina@pacificwhale.org)*	*Marine Area of Machalilla National Park*	*1997-2009*	*Humpback whales*	*Photo-ID to assess abundance, population structure and population recovery*	*Around 1400 whales with photo – ID records*
Demografía de la Ballena Jorobada y otros cetáceos en Costas Ecuatorianas	*Ecuador*	*Cristina Castro (cristina@pacificwhale.org)*	*Marine Area of Machalilla National Park*	*1998-1999/ 2002-2006*	*Humpback whales*	*Theodolite Land station to know the impact of the whale watching boats on the humpbacks*	*Track data, Behaviour data*
Reducción del Impacto de las Artes de Pesca sobre cetáceos menores en el PNM	*Ecuador*	*Cristina Castro (cristina@pacificwhale.org)*	*Marine Area of Machalilla National Park*	*2009*	*Dolphins and sea lions*	*Incidental catches study, bio-economic study*	*Dolphin catch rates and dolphin species composition*
Estudio de la Ballena Jorobada en Salina	*Ecuador*	*Fernando Felix (fernandofelix@femm.org)*	*Machalilla National Park Salinas*	*1991- 1996/ 2002-2009*	*Humpback whales*	*Photo-ID to assess abundance, population structure and population recovery*	*Around 1100 whales with photo – ID records*
New Zealand southern right whale project, Phase 1	*New Zealand*	*Nathalie Patenaude (npatenaude@lgl.com)* *Scott Baker (scott.baker@oregonstate.edu)*	*New Zealand sub-Antarctic*	*1995-1998*	*southern right whales*	*Biopsy and photo-ID to assess abundance, genetic diversity, population structure and population recovery*	*~300 biopsy samples and photo-ID records*
South Pacific Whale Research Consortium, humpback whale migration between breeding grounds E, F and G and Antarctic feeding Areas	*New Zealand, Australia, New Caledonia, Tonga, Cook Islands, Samoa, American Samoa, French Polynesia, Colombia, Chile, USA*	*Scott Baker (scott.baker@oregonstate.edu)* *on behalf of Claire Garrigue, Nan Hauser, Mike Donoghue, Michael Poole, Phil Clapham, Dave Paton, Mike Noad, Simon Childerhouse, Rochelle Constantine and Debbie Steel*	*New Caledonia, New Zealand, Tonga, Cook Islands, French Polynesia, Colombia (breeding grounds E, F and G); Antarctic Areas IV, V, VI and I*	*1991-2005 (ongoing in 2006-08)*	*Humpback whales*	*Biopsy sampling for genotyping and photo-ID to estimate abundance, population structure and migratory interchange*	*n = 1064 unique genotypes for all breeding grounds;* *n = 175 unique genotypes for all breeding areas;* *>1,000 photo-ID also available from breeding grounds*

Name of programme	***Nationality***	***Contact person***	***Area of operation***	***Years of operation***	***Target species***	***Type of research***	***Data available***
New Caledonia humpback whale project	*France*	*Claire Garrigue (Op.cetaces@lagoon.nc)*	*New Caledonia*	*1995-2008*	*Humpback whales*	*Biopsy and photo-ID to assess abundance, distribution, population structure*	*500+ Photo-ID 500+ biopsy samples*
Blue whale ecology and conservation project	*Chile*	*Rodrigo Hucke-Gaete (rhucke@uach.cl)*	*Northern Patagonia, Chile*	*2000-2009*	*Blue and humpback whales*	*Photo-ID and line transect surveys to assess abundance, population structure and population recovery.*	*128 identified blue whales and 27+ humpbacks. Boat based line transect data is being collected at the moment and is a joint work with Rob Williams.*
Blue whale satellite tagging off Chile subproject	*Chile*	*Bruce Mate (bruce.mate@oregonstate.edu)*	*Gulf of Corcovado, Chile*	*2004*	*Blue whales*	*Satellite tracking to assess distribution, population structure and interchange, and migratory connections.*	*Unpublished data from 5 satellite tagged whales held at Oregon State University and Universidad Austral de Chile.*
Fine-scale whale movements subproject	*Chile*	*Rodrigo Hucke-Gaete (rhucke@uach.cl)*	*Gulf of Corcovado, Chile*	*2006-2009*	*Blue whales; humpback whales*	*Theodolite tracking for fine-scale movement monitoring of large whales.*	*Whale movement data held by Centro Ballena Azul and Universidad Austral de Chile.*
Blue whale acoustics subproject	*Chile*	*Rodrigo Hucke-Gaete (rhucke@uach.cl)*	*Gulf of Corcovado, Chile*	*2008-2009*	*Blue whales*	*Acoustic recordings using directional hydrophones in close presence of blue whales for call characterization and determining population/subspecies identity.*	*24+ continuous hours of acoustic data held at by Centro Ballena Azul, Universidad Austral de Chile. jointly with U. St. Andrews.*

Name of programme	*Nationality*	*Contact person*	*Area of operation*	*Years of operation*	*Target species*	*Type of research*	*Data available*
Molecular ecology of great whales subproject	*Chile*	*Rodrigo Hucke-Gaete (rhucke@uach.cl)*	*Northern Patagonia, Chile*	*2004-2009*	*Blue and humpback whales*	*Biopsy sampling to examine population structure at a regional scale as well as individual id and sexing, maternally directed fidelity to the area, movements and association patterns.*	*60+ biopsies from blue whales and 10+ from humpbacks. PhD thesis underway. Samples held at Centro Ballena Azul and Universidad Austral de Chile. Analysis in collaboration with Howard Rosenbaum, Carlos Olavarría and other colleagues.*
Toxicology of great whales in southern Chile subproject	*Chile*	*Rodrigo Hucke-Gaete (rhucke@uach.cl)*	*Northern Patagonia, Chile*	*2006-2009*	*Blue and humpback whales*	*Whale blubber from biopsy samples and faecal material collection for diet and persistent organic contaminant studies.*	*Fatty acid and organochlorine pollutant analysis underway. Data held at Centro Ballena Azul and Universidad Austral de Chile.*
Cetacean distribution in the fjords of southern Chile	*Chile*	*Rodrigo Hucke-Gaete (rhucke@uach.cl)*	*Patagonia, Chile*	*2001*	*Whales and dolphins*	*Surveys on platforms of opportunity to assess cetacean distribution.*	*Sighting data held at Centro Ballena Azul and Universidad Austral de Chile.*
Habitat modelling of small cetaceans in Northern Patagonia	*Chile*	*Francisco Viddi (fviddi@gse.mq.edu.au)*	*Northern Patagonia, Chile*	*2007-2009*	*Peale´s dolphin;Chilean dolphin*	*Line transect surveys to assess dolphin distribution, abundance and related fine scale oceanography*	*Line transect data held by Centro Ballena Azul jointly with Macquarie University, Australia.*

Name of programme	***Nationality***	***Contact person***	***Area of operation***	***Years of operation***	***Target species***	***Type of research***	***Data available***
Fine-scale Dolphin Movement	*Chile*	*Francisco Viddi (fviddi@gse.mq.edu.au)*	*Northern Patagonia, Chile*	*2007-2009*	*Peale´s dolphin;Chilean dolphin*	*Group follows and behavioural data collection to assess fine-scale dolphin movement.*	*Behavioural and tracking data held by Centro Ballena Azul jointly with Macquarie University, Australia.*
Social structure of dolphins in Southern Chile	*Chile*	*Francisco Vidd (fviddi@gse.mq.edu.au)*	*Northern Patagonia, Chile*	*2007-2009*	*Peale´s dolphin;Chilean dolphin*	*Photo-ID and line transect surveys to assess dolphin social structure.*	*Dolphin Photo-ID catalogue. Data held by Centro Ballena Azul, jointly with Macquarie University, Australia and University of Valparaiso.*
Habitat preference of Dolphins		*Francisco Viddi (fviddi@gse.mq.edu.au)*	*Magellan Strait*	*2001*	*Peale´s dolphin*	*Group follows and behavioural data collection to assess fine-scale dolphin movement.*	*Behavioural and tracking data held by Centro Ballena Azul.*
Brazilian Right Whale Project	*Brazil*	*Karina R. Groch (karina@baleiafranca.org.br or krgroch@terra.com.br)*	*Southern and Southeasthern Brazil*	*1982 to present*	*southern right whales*	*Aerial surveys for censuses and photo-ID to assess abundance, population structure and habitat use patterns (since 1987); land-based surveys (including theodolite tracking) to assess behaviour and anthropogenic impact (since 1998)*	*+500 photo-ID records + behaviour and sightings from land-based surveys*

Name of programme	***Nationality***	***Contact person***	***Area of operation***	***Years of operation***	***Target species***	***Type of research***	***Data available***
New Zealand Cook Strait whale survey	*New Zealand*	*Nadine Bott (nbott@doc.govt.nz)*	*Cook Strait New Zealand*	*2004 - 2008*	*Humpback whales, blue whales, southern right whales*	*Biopsy and photo-ID to asses, population structure, linkages to overwintering grounds in Oceania and population recovery*	*38 photos and 57 biopsy samples*
New Zealand southern right whales	*New Zealand*	*Steve Smith (smsmith@doc.govt.nz)*	*North and South Islands, Stewart Island*	*2003 -2009*	*Southern right whales*	*Biopsy and photo-i.d. of southern right whales close to the coastline to establish whether or not there is a mainland population that is genetically-distinct from subantarctic population*	*36 photos and 36 biopsy samples*
Hauraki Gulf Bryde's whales	*New Zealand*	*Rochelle Constantine (r.constantine@auckland.ac.nz)*	*Hauraki Gulf*		*Bryde's whales*	*Biopsy and photo i.d. to establish genetic identity, distribution and population abundance*	*74 photos and 31 biopsy samples*
OHA-SIS-BIO (Observatory of HydroAcousticity from SISmicity and Biodiversty in the Indian Ocean)	*France*	*Flore Samaran (samaran@cebc.cnrs.fr)*	*Subantarctic area in Indian and Southern Ocean (Crozet, Kerguelen and Amsterdam); IWC Areas III & IV*	*2006-2007 & 2009-2011*	*Blue whales sub-species, Fin whales*	*Deployment of moored hydrophones for 1 year to detect presence, seasonal occurrence and localisation of whales*	*One year of acoustic data at 3 different sites and two years at 4-8 sites in future work*

Name of programme	*Nationality*	*Contact person*	*Area of operation*	*Years of operation*	*Target species*	*Type of research*	*Data available*
CETA Cetacean observation off Terre Adélie, Antarctica	*France*	*Jean-Benoît Charrassin (jbc@mnhn.fr)*	*Continental shelf off Adélie Land, East Antarctica; IWC Area V*	*2010, 2011 and possibly beyond*	*Humpbacks, blue, fin, killer & Minke whales*	*Ship-based, opportunistic (non-designed) surveys to assess abundance of cetaceans over the shelf off Adélie Land; photo- ID and biospsies of Humpbacks and Blues when feasible*	*Will start in 2010*
Fisheries depredation by killer and sperm whales in the Crozet and Kerguelen EEZs	*France*	*Christophe Guinet (guinet@cebc.cnrs.fr)*	*Subantarctic area in Indian and Southern Ocean (Crozet and Kerguelen); IWC Areas III*	*2009, 2010 and 2011*	*Killer and sperm whales*	*Data collection from commercial longliners to quantify and locate depredation, to assess killer and sperm whales abundance, distribution and population structure, and to test efficiency of different mitigation procedures.*	*Photo-ID records and fishing data*
NAMC (Univ Paris11)	*France*	*Olivier ADAM (adam@univ-paris12.fr)*	*Madagascar*	*2009-10-11*	*Humpback whales*	*Acoustics observation, analysis of songs*	*Started in 2007*
Taking Stock – a review of the impact of humans on NZ's marine ecosystem (including marine mammals) over the last millennium	*New Zealand*	*Alison MacDiarmid (a.macdiarmid@niwa.co.nz)*	*NZ EEZ but with focus on greater Hauraki Gulf and Otago/Catlins shelf*	*2006-2009*	*All presently or previously common species of whales and dolphins*	*Estimates of population sizes at 5 snapshot periods over last 1000 years (present day, 1946, 1790, 1400, 1000 AD)*	*Population estimates*

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Cetacean Survey French EEZ, for AAMP (Marine Protected Areas Agency)	*France*	*Vincent Ridoux (vridoux@univ-lr.fr)*	*Fre,nch EEZ, SW Indian Ocean*	*2009-10*	*cetaceans*	*Aerial survey*	*Starts in November2009*
Cetacean Survey French EEZ, for AAMP (Marine Protected Areas Agency)	*France*	*Vincent Ridoux (vridoux@univ-lr.fr)*	*Fre,nch EEZ, New Caledonia*	*2010-11*	*cetaceans*	*Aerial survey*	*To be determined with partners*
Cetacean Survey French EEZ, for AAMP (Marine Protected Areas Agency)	*France*	*Vincent Ridoux (vridoux@univ-lr.fr)*	*Fre,nch EEZ, Polynesia*	*2011-12*	*cetaceans*	*Aerial survey*	*To be determined with partners*
Oregon State University, Marine Mammal Institute Humpback whale tagging	*USA*	*Bruce Mate (bruce.mate@oregonstate.edu) Joel Ortega*	*Western Antarctic peninsula*	*2006*	*Humpback*	*Satellite tracking to assess distribution, population structure and interchange, and migratory connections (with biopsies)*	*12 whales tracked*
Status of marine mammals in Samoa	*Samoa*	*Malama Momoemausu (Malama.Momoemausu@mnre.gov .ws) Juney Ward (Juney.Ward@mnre.gov.ws)*	*Coastal waters of Samoa*	*2001, 2003 - 2008*	*Humpback whales; spinner dolphins*	*Boat surveys using photo-ID and biopsy to determine population structure and determine abundance*	*Photo-ID records and biopsy samples*

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Right Whale Program / Programa Ballena Franca Austral	*Argentina and USA*	*Mariano Sironi (msironi@icb.org.ar) Vicky Rowntree (rowntree@biology.utah.edu)*	*Argentina, Peninsula Valdes, Chubut Province*	*1970-2009*	*Southern Right whales*	*Photo-id aerial surveys, genetics, isotope studies, behavioral observations, acoustics, toxicology, health monitoring through a stranding program, monitoring of the frequency of gull attacks on the whales*	*2,573 photoidentified individuals as of 2007 + 310 Skin biopsies for genetics and isotope analyses + 400+ tissue samples from necropsies collected between 2003-2008*
Commerson´s dolphins Program	*Argentina*	*Miguel Iñíguez (miguel.iniguez@cethus.org) Vanesa Tossenberger (vanesa.tossenberger@cethus.org) Marta Hevia (marta.hevia@cethus.org) Cecilia Gasparrou (cecilia.gasparrou@.cethus.org).*	*Santa Cruz Province*	*1986 - 2009*	*Commerson´s dolphins*	*Photo ID, genetics, behavioural observations, interaction with fisheries, stomach contents, evaluation of whalewatching-vessel traffic effects*	*100photoidentified individuals. 27+skin biopsies. 73skeleton and tissue samples from stranded individuals between 2000-2009.*
Peale´s dolphins Program	*Argentina*	*Cristián de Haro (cristián.deharo@cethus.org)*	*Santa Cruz Province*	*1992-2009*	*Peale´s dolphins*	*Photo ID, genetics, behavioural observations, distribution*	*1+skin biopsies.*
Southern Right Whale Program	*Argentina*	*Jimena Belgrano (jimena.belgrano@cethus.org)*	*Santa Cruz Province*	*2000 - 2009*	*Southern right whales*	*Photo ID, Aerial survey, habitat use, climate factors, sightings index, behavioural observations.*	*6 photoidentified individuals since 2007.*
Sei Whale Project	*Argentina*	*Miguel Iñíguez (miguel.iniguez@cethus.org) Jimena Belgrano (jimena.belgrano@cethus.org)*	*Santa Cruz Province*	*2004 - 2009*	*Sei whales*	*Behavioral observations*	

Name of programme	*Nationality*	*Contact person*	*Area of operation*	*Years of operation*	*Target species*	*Type of research*	*Data available*
Franciscana Dolphins	*Argentina*	*Pablo Bordino (bordino@aquamarina.org)*	*Buenos Aires Province*		*Franciscana*	*Behavioral observations, line transects, distant sampling, photo ID, reduction of gillnet bycatch, genetics*	*16 photoidentified individuals, 4 satellite tags successfully deployed, 8 biopsy samples*
Bottlenose Dolphins	*Argentina*	*Pablo Bordino (bordino@aquamarina.org)*	*Buenos Aires Province*		*Bottlenose dolphins*	*Behavioral observations, line transects, photo ID*	*5 photoidentified individuals*
Bottlenose Dolphins	*Argentina*	*G M Svendsen / M A Romero*	*Río Negro Province*	*Since 2006*	*Bottlenose dolphins*	*Behavioral observations, habitat use, abundance and distribution*	*100 photoidentified individuals*
Southern right whales	*Argentina*	*G M Svendsen / M A Romero*	*Río Negro Province*	*Since 2006*	*Southern right whale*	*Behavioral observations, habitat use, abundance and distribution*	
Common dolphins	*Argentina*	*G M Svendsen / M A Romero*	*Río Negro Province*	*Since 2006*	*Common dolphin*	*Behavioral observations, habitat use, abundance and distribution*	
Dusky Dolphins	*Argentina*	*G M Svendsen / M A Romero*	*Río Negro Province*	*Since 2006*	*Dusky dolphins*	*Behavioral observations, habitat use, abundance and distribution*	
Beagle Channel cetacean species	*Argentina*	*RNP Goodall (ngoodall@tierradelfuego.org.ar)*	*Tierra del Fuego Province*		*All species of cetaceans found in the Beagle Channel*	*Sightings*	*Sightings from platforms of opportunity – tourist catamarans, fishing boats.*
Ushuaia to Antarctic Peninsula cetacean species	*Argentina*	*RNP Goodall (ngoodall@tierradelfuego.org.ar)*	*Tierra del Fuego Province*		*All species of cetaceans found in the Beagle Channel*	*Sightings*	*Sightings from platforms of opportunity – tourist ships..*

Name of programme	*Nationality*	*Contact person*	*Area of operation*	*Years of operation*	*Target species*	*Type of research*	*Data available*
Franciscana Dolphins	*Argentina*	*Luis Cappozzo (cappozzo@macn.gov.ar) María Fernanda Negri (mfnegri@macn.gov.ar), María Victoria Panebianco (panebianco@macn.gov.ar), María Natalia Paso Viola (pasoviola@macn.gov.ar)*	*Southern Buenos Aires Province*		*Franciscana*	*Photo ID*	*45 photoidentified individuals*
Southern right whale	*Argentina*	*Alejandro Arias (aamarino@speedy.com.ar), Daniel Perez Martinez*	*Chubut Province*		*Southern right whale*	*Distribution, interaction with vessels*	
Project Right Whale	*Argentina*	*Alejandro Cammareri (ale@marybio.org)*	*Province Rio Negro*	*2008-2009*	*Southern right whales*	*Determination of habitat usage patterns, behavioural response to tourism activities, photo-id*	*Behavioural data of > 2 years*
Southern Right Whale Project/Chile – Centro de Conservacion Cetacea	*Chile*	*Barbara Galletti (barbara@ccc-chile.org)*	*Coast of Chile*	*2003-2009*	*Southern Right Whale*	*Photo-ID and coastal and aerial surveys to assess distribution and abundance*	*Photo-ID records*
Alfaguara Project - Centro de Conservacion Cetacea	*Chile*	*Barbara Galletti (barbara@ccc-chile.org)*	*Isla de Chiloe, Southern Chile*	*2004-2009*	*Blue whales mainly, humpback whale and sei whale secondary*	*Photo-ID and line transect aerial surveys to assess distribution, abundance and health conditions Biopsy to assess population structure*	*+250 blue whale photo-ID records and 12 biopsy samples*
Southern Hemisphere Collaborative Blue Whale Catalogue	*Southern Hemisphere*	*Barbara Galletti (barbara@ccc-chile.org)*	*Gulf of California/Eastern Tropical Pacific/South America*	*2008-2009*	*Blue whales*	*Photo-ID to assess abundance and migratory connections*	*+750 photoID*

Name of programme	*Nationality*	*Contact person*	*Area of operation*	*Years of operation*	*Target species*	*Type of research*	*Data available*
		Paula Olson (paula.olson@noaa.gov)	*Antarctica*				*+300 photoID*
		Chandra Salgado (c.salgado@cmst.curtin.edu.au)	*Indonesia/Australian/New Zealand*				*+100 photoID*
Strengthening Marine Mammals Stranding and Necropsy Response Capacities in Latin America	*Latin America*	*Barbara Galletti (barbara@ccc-chile.org)*	*Argentina, Brasil, Chile, Uruguay, Peru, Ecuador, Colombia, Venezuela*	*2008-2009*	*All cetacean species*	*Increase stranding and necropsy response capacities in Latin American; enhance coordination and communication strategies; and standardize protocols for data and sample collection to develop an accurate diagnostic of cetacean mortalities in the region and monitor populations and ecosystem health and trends more effectively.*	*Measurements and samples in private and public collections from different organizations. Most of them not analyzed.*
Projeto Baleias PROANTAR	*Brazil*	*Eduardo Secchi (edu.secchi@furg.br)*	*IWC Areas I and II*	*summer 1994/95 and 1997/98 to 2008/09 (except 2007/08)*	*Humpback whales*	*ship-board surveys to assess distribution and estimate abundance; biopsy for genetics and pollution analysis; photo-id for habitat use and migration; satellite telemetry for habitat use patterns*	*~500 photos of flukes; 200+ biopsies; 11 whales tracked*
Franciscana Monitoring	*Brazil*	*Eduardo Secchi (edu.secchi@furg.br)*	*FMA I and II*	*2009-10*	*Franciscana dolphin*	*Aerial surveys to assess distribution and estimate abundance*	*60hs flght, 59 groups*

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Dolphins of Patos Lagoon Estuary	*Brazil*	*Eduardo Secchi (edu.secchi@furg.br)*	*Soutehrn Brazil, (32º09'S , 52 º 05W)*	*1998-2009*	*Common bottlenose dolphin*	*Boat surveys to assess distribution and estimate abundance. Biopsy sampling for genetic structure*	*Fruet (2008)*
Projeto Talude - FURG and CMA	*Brazil*	*Eduardo Secchi (edu.secchi@furg.br) Paulo Flores (Paulo.flores@icmbio.gov.br)*	*South-Southeastern Brazil (RS to ES)*	*2009-11*	*Sperm, Bryde's, killer, beaked, humpback, southern right whales; small cetaceans*	*Ship surveys to assess distribution and estimate abundance. Biopsy sampling for genetic structure*	*Starting*
Population structure of bottlenose dolphins along the Brazilian coast	*Brazil*	*Larissa Oliveira Paulo Ott (lari.minuano@gmail.com)*	*Brazilian coast (33º45'S , 53 º 22W - 00º56'N; 29º22'W), RS to ASPSP*	*2005-2008*	*bottlenose dolphins*	*Biopsy to population structure*	*~80 biopsies*
Phylogeography of Southern right whale in the Atlantic coast of South America	*Brazil*	*Paulo Ott Larissa Oliveira (paulo.henrique.ott@gmail.com)*	*Southern Brazilian coast (33º45'S , 53 º 22W), RS and SC*	*2005-2008*	*Southern right whale*	*Biopsy to population structure, sex ratio and effective population size*	*~120 biopsies*
Bottlenose dolphins in São Pedro and São Paulo Archipelago	*Brazil*	*Thales R. O. Freitas/UFRGS (thales.freitas@ufrgs.br)*	*São Pedro and São Paulo Archipelago; 00º55'N; 29º20'W*	*Dec 2005 – Jan 2009*	*Common bottlenose dolphin*	*Bioacoustics, genetics, photo-identification, feeding ecology and population parameters of offshore bottlenose dolphins' population*	*Photo-ID records; 12 biopsies, acoustic data*

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Brazilian Right Whale Project	*Brazil*	*Karina R. Groch (karina@baleiafranca.org.br or krgroch@terra.com.br)*	*Southern and Southeasthern, (RS 33º45'S , 53º22W to RJ 22º20'S , 41º45'W), Brazil*	*1982 to present*	*southern right whales*	*Aerial surveys for censuses and photo-ID to assess abundance, population structure and habitat use patterns (since 1987); land-based surveys (including theodolite tracking) to assess behaviour and anthropogenic impact (since 1998)*	*+500 photo-ID records + behaviour and sightings from land-based surveys*
Projeto Golfinho Sotalia – CMA	*Brazil*	*Paulo Flores (paulo.flores@icmbio.gov.br)*	*Santa Catarina Island region*	*1993-2005*	*Guiana, common bottelnose and franciscana dolphis*	*Boat surveys and photo-id to assess distribution, occurrence, habitat use, abundance estimate and reactions to boats . Biopsy sampling for genetic and social structure*	*Photo-ids: ~50 Guiana dolphins, 39 common bottlenose dolphin. Biopsy: 6 Guianas. Teeth: 33 Guianas*
Laguna Dolphins (Aquatic Mammals Lab./Federal University of Santa Catarina	*Brazil*	*Paulo César Simões-Lopes (lamaqsl@ccb.ufsc.br)*	S. Western Atlantic, SC	*2007-2009*	*Common bottlenose dolphins*	*ship-board surveys to assess distribution and estimate abundance; photo-id for habitat use and migration*	6,970 *photosof dorsal fins*

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Projeto BIOCOM	*Brazil*	*Marta J. Cremer (marta.cremer@univille.net)*	*Babitonga Bay, SC, South Brazil*	*2007-2009*	*Guiana dolphin, franciscana dolphin and common bottlenose dolphin*	*Effect of noise on distribution and communication; sound characterization; Density and abundance estimates, behaviour and habitat use*	*Acoustic data*
Projeto Atlantis	*Brazil*	*Marcos Santos (sotalia@gmail.com)*	*Lagamar estuary (24°50'-25°30'S), south SP and north PR*	*SP: 1996 to 2009; Parana 2006 to 2009*	*Guiana dolphins and Franciscana (live) + incidental captures of Guiana, Franciscana, and Atlantic Spotted dolphins.*	*Live animals: photo-identification (abundance, use of area, social organization) + biopsy samplings (genetics, contamination) Dead animals: Incidental captures in fishing operations*	*Two catalogs: Cananeia (198 individuals), Parana (182 individuals); Biopsies (20), Captured and necropsied dolphins (124)*
Projeto Baleia de Bryde – CEMAR	*Brazil*	*(cemar@cemarbrasil.org)*	*MPAs of the north coast of S.Paulo State (24o50' to 23o22'S – 45o to 46oW)*	*2000-2006 opportunistic, 2007-2008 systematic*	*Bryde's whale*	*Tourism boats used to assess distribution, occurrence and behaviour*	*Photographs*
Projeto MAQUA – Laboratório de Mamíferos Aquáticos, UERJ	*Brazil*	*Alexandre de Freitas Azevedo (azevedo.alex@uerj.br) José Lailson Brito Jr. (lailson@uerj.br)*	*RJ*	*1995-2008*	*Delphinids (specially Sotalia guianensis)*	*Biopsy, acoustic recordings and photo-ID to assess abundance, habitat use, bioacoustic, genetics, contaminant levels.*	*abundance, habitat use, acoustic, genetics, contaminant levels.*

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Research Group in Marine Protected Areas (UFF / CNPq)	*Brazil*	*Liliane Lodi (lilodi@uninet.com.br)*	*Southeastern Brazil, RJ (23º01´50´´S, 43º12´70´´W)*	*Winter and spring 2004 to 2008*	*Bottlenose dolphins*	*ship-board surveys to assess group size and composition and video-id for habitat use and social organization*	*Video-Id records of 29 individuals*
Projeto Boto Sotalia – Instituto Baleia Jubarte (Humpback Whale Institute)	*Brazil*	*Leonardo Wedekin (Leonardo.wedekin@baleiajubarte .org.br)*	*Abrolhos Bank, southern BA (16° to 18ºS)*	*2002 to 2008*	*Guiana Dolphin*	*Boat surveys to study the population dynamics (through photo-identification), ecology and behaviour*	*Photo-identification of over 130 dolphins. Rossi-Santos et al 2007; Rossi-Santos & Wedekin 2006*
BSA Humpback whale aerial surveys – Instituto Baleia Jubarte and Centro Mamíferos Aquáticos (CMA/ICMBio)	*Brazil*	*Leonardo Wedekin (Leonardo.wedekin@baleiajubarte .org.br)*	*Brazilian Coast, 11 to 21° S (2001-2004) and 6 to 24° S (2005;2008)*	*2001 to 2005 and 2008*	*Humpback whale*	*Aerial surveys to assess abundance of humpback whales along the Brazilian coast*	*6,251 humpback whales estimated in 2005, data of 2008 is been analysed.*
BSA Humpback whale ship surveys – Instituto Baleia Jubarte	*Brazil*	*Milton Marcondes (Milton.marcondes@baleiajubarte. org.br)*	*Brazilian Coast 11 to 19° S*	*1989 to 2008*	*Humpback whale; Southern Right whale; Dolphins*	*Ships surveys to study population dynamics, ecology and behaviour.*	*Photo identification of 3,200 individuals in the catalogue .Biopsy samples for genetic and pollution studies (~ 500 samples). Engel et al (2008)*
Stranding Program – Instituto Baleia Jubarte	*Brazil*	*Milton Marcondes (Milton.marcondes@baleiajubarte. org.br)*	*Brazilian Coast 11 to 19° S*	*1990 to 2008*	*Humpback whale and other cetaceans*	*Record of strandings, anthropogenic interactions (entanglements ; ship strikes); causes of mortality*	*Samples and records of over 120 humpback whales*

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Humpback Whale behaviour and interaction with whale watching vessels – Instituto Baleia Jubarte	*Brazil*	*Milton Marcondes (Milton.marcondes@baleiajubarte.org.br)*	*Abrolhos Archipelago 17^{o} S*	*1998 to 2005*	*Humpback whale*	*Population dynamics, ecology and behaviour. Use of a land station to observe the behaviour using a theodolite*	*Morete et al (2003); Morete et al (2007); Morete et al (2008)*
South Georgia Expedition – Instituto Baleia Jubarte	*Brazil*	*Milton Marcondes (Milton.marcondes@baleiajubarte.org.br)*	*South Georgia Area II*	*2005*	*Humpback whale and other cetaceans*	*Ships surveys to photo identification and collecting biopsy samples*	*2 biopsy samples; 4 photoid matches with BSA (20 photo identifications) Engel et al (2008).; Rossi-Santos et al (2008)*
Bioacoustics research – Instituto Baleia Jubarte	*Brazil*	*Marcos Rossi Santos (marcos.rossi@baleiajubarte.org.br)*	*Abrolhos Bank and Northern Bahia, Brazil (11 to 19^{o}S)*	*1998-2008 (humpback) 2002-2008 (Guiana)*	*Humpback whale and Guiana Dolphin*	*Characterization of Humpback Whale's Songs and Guiana dolphin vocalizations; study of anthropogenic noise disturbance;*	*16 hours of recordings of humpback whale songs (2005-2008); 10 hours of recordings of dolphin sounds and other of sources of human-made noise*
Grupo de Pesquisa em Mamíferos Áquaticos de Ilhéus - GPMAI	*Brazil*	*Yvonnick Le Pendu (yvonnick@uesc.br)*	*Ilhéus (14º47'S, 39º02'W), Southern coast BA*	*2005-2009*	*Estuarine dolphin*	*Surveys to assess habitat use; photo-ID and direct observations to define population structure and ethology. Etno-ecological studies to investigate conflicts with human activities*	*~5000 photos under analysis*

Name of programme	*Nationality*	*Contact person*	*Area of operation*	*Years of operation*	*Target species*	*Type of research*	*Data available*
Humpback Satellite Track – Instituto Aqualie	*Brazil*	*Alexandre Zerbini (Alex.Zerbini@noaa.gov)*	*ES and BA; IWC Breeding Stock A*	*2005-2009*	*Humpback whales*	*Distribution and movements; Migratory patterns; Photo-id; Biopsy*	*11 whales tagged and tracked (Zerbini et al 2006); 14 flukes, 57 dorsal fins; 53 biopsies; Zerbini et al (in press)*
Monitoramento do boto-cinza na Praia de Iracema	*Brazil*	*Ana Carolina Meirelles (cameirelles@yahoo.com.br)*	*Ceará, Northeastern Brazil (03°43'S, 38°31'W)*	*1992/2000 and 2004/2005*	*Guiana Dolphin*	*Fixed-platform observations to access group size, behaviour, habitat use and site fidelity*	*500 sightings; 1096h of direct observation; 16 dolphins photo-id*
Projeto Golfinho Rotador – CMA	*Brazil*	*José Martins da Silva Jr. (jose-martins.silva-junior@icmbio.gov.br)*	*Fernando de Noronha, Archipelago, FN (03◦51S, 32◦25W)*	*1991-2009*	*Spinner dolphins*	*Occurrence, behaviour, genetic structure, reaction to boats*	*Biopsy samples, ~100 phooid*
REMAB – Brazilian Stranding Network – CMA	*Brazil*	*Paulo Flores (paulo.flores@icmbio.gov.br) Iran Normande (iran.normande@icmbio.gov.br)*	*Brazil*	*1998 – continued*	*All occurring in Brazil*	*Natural history, biology, anatomy, reproduction, diet, contaminant loads, health assessment, genetics*	*Tissues samples, stomach contents*
Brazilian Coastal Small Cetaceans – CMA	*Brazil*	*Paulo Flores (paulo.flores@icmbio.gov.br)*	*South to North Brazi, (04◦26'S, 51◦31'W)*	*2009 ?*	*Guiana dolphin, common bottlenose dolphin, franciscana*	*Abundance estimates and trends, bycatch estimstes, health assessment, genetics structure*	*Existing photo-id catalogues and skin+blubber samples*
SO GLOBEC – passive acoustic monitoring	*USA*	*Ana Širović (asirovic@alaskapacific.edu)*	*Western Antarctic Peninsula (Marguerite Bay); Scotia Sea*	*2001-03*	*Baleen whales*	*Deployment of 7 moored acoustic recorders for 2 years to detect presence of whales; Sonobuoy deployments during 8 cruises. 1 moored acoustic recorder deployed in Scotia Sea for 1 year*	*Acoustic data held at the Scripps Institution of Oceanography*

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SO GLOBEC – marine mammal visual observations	*USA*	*Ari Friedlaender (asf7@duke.edu)*	*Western Antarctic Peninsula (Marguerite Bay)*	*2001-2003*	*Whales and seals*	*Line transect visual survey concurrent to echosounder and physical data, biopsy samples, photo ID*	*Sightings information from line transect surveys*
ANSLOPE	*USA*	*Ana Širović (asirovic@alaskapacific.edu)*	*Ross Sea*	*2004*	*Baleen whales*	*Deployment of a moored acoustic recorder to detect presence of whales; Sonobuoy deployments for investigation of distribution.*	*Acoustic data held at the Scripps Institution of Oceanography*
Palmer LTER	*USA*	*Ari Friedlaender (asf7@duke.edu)*	*Western Antarctic Peninsula*	*1993-2006*	*Baleen whales*	*Standardized survey lines and stations visited annually*	*Sightings information collected opportunistic to bird surveys*
Palmer LTER	*USA*	*Ari Friedlaender (asf7@duke.edu)*	*Western Antarctic Peninsula (Palmer Station)*	*1993-2001*	*Humpback whales*	*Sightings information from visual surveys*	*Sightings information and annual relative abundance of whales*
South African right whale project	*South Africa*	*Peter Best (pbest@iziko.org.za)*	*Coastal southern Cape, South Africa (Nature's Valley to Muizenberg, Cape Coast)*	*1980-present*	*Southern right whales*	*Aerial survey counts and photo-identification*	*Population number, trend, and photo-id information held by University of Pretoria's Mammal Research Institute*
East Southern Africa humpback whale project	*South Africa / Mozambique*	*Ken Findlay (kenfin@telkomsa.net)*	*Migration path surveys (shore based) Cape Vidal, South Africa; Breeding ground line transect surveys (Mozambique)*	*1988 - present*	*Humpback whales*	*Vessel based line transect surveys; shore based surveys; photo-identification*	*Population number, trend, photo-identification*

Name of programme	*Nationality*	*Contact person*	*Area of operation*	*Years of operation*	*Target species*	*Type of research*	*Data available*
West Southern Africa humpback whale project	*South Africa*	*Jaco Barendse / Peter Best (pbest@iziko.org.za)*	*Shore based and small boat surveys, Saldanha Bay, South Africa;*	*1992 - 2004*	*Humpback whales*	*Shore based surveys; photo-identification*	*Population number, trend, photo-identification*
South African humpback whale tail fluke catalogue	*South Africa*	*Herman Oosthuizen / Mike Meyer (mmeyer@deat.gov.za)*	*South Africa East and West coasts / Mozambique*	*Data 1988 - present*	*Humpback whales*	*Photo-identification*	*Photo-identification (tail flukes)*
WCS/CCRP Madagascar and Mozambique Channel Humpback Whale photo-ID	*Madagascar France USA*	*Salvatore Cerchio (scerchio@wcs.org)*	*Madagascar (C3): Antongil Bay; Toliara; Nosy Be. Mayotte (C2)*	*1996-2008*	*Humpback whales*	*Long-term Photo-ID mark recapture assessment of abundance and population structure*	*Photo-ID database held by WCS/CCRP, New York*
WCS/CCRP – IWC Humpback Whale Breeding Stock C photo-ID	*Madagascar South Africa USA*	*Salvatore Cerchio (scerchio@wcs.org)*	*IWC Breeding Stocks C1 (South Africa, Mozambique) and C3 (Antongil Bay)*	*2000-2006*	*Humpback whales*	*Photo-ID mark recapture assessment of interchange between C1 and C3*	*Photo-ID database held by WCS/CCRP and South African Collaborators*
WCS/CCRP Humpback Whale Breeding Stock B photo-ID	*Gabon, Congo, Gulf of Guinea, UK, USA*	*Tim Collins (tcollins@wcs.org)*	*IWC Breeding Stocks B1 (Gabon)*	*2000-2006*	*Humpback whales*	*Long-term Photo-ID mark recapture assessment of abundance and population structure*	*Photo-ID database held by WCS/CCRP, New York, Congo*
WCS/CCR – Mammal Research Unit-IWC Humpback Whale Breeding Stock B1-B2 Assessment	*UK, USA, South Africa*	*Tim Collins (tcollins@wcs.org) Jaco Barendse (jbarendse@wwf.org.za)*	*IWC Breeding sub stocks B1 and B2*	*1983-2005*	*Humpback whales*	*Photo-ID mark recapture assessment of interchange between B1 and B2*	*Photo-ID database held by WCS/CCRP and South African Collaborators MRU–SAMuseum*
WCS/CCRP SW Indian Ocean, West and Eastern South Atlantic Population Genetic analyses	*Madagascar Gabon, Brazil, UK, USA*	*Howard Rosenbaum (hrosenbaum@wcs.org)*	*IWC Breeding Stocks A, B, C and associated sub-stocks*	*1996-2008*	*Humpback whales*	*Long-term population genetic analyses using multiple molecular markers addressing individual and population based questions*	*Tissue samples and genetic database held by WCS/CCRP, New York*

Name of programme	*Nationality*	*Contact person*	*Area of operation*	*Years of operation*	*Target species*	*Type of research*	*Data available*
WCS/CCRP, University of Lisbon, Mammal Research Unit, IWC humpback whale Breeding Stock B population genetic	*UK Portugal USA South Africa*	*Carvalho, Collins Rosenbaum, Barendse, Best*	*IWC Breeding sub stocks B1 and B2*	*1983 - 2006*	*Humpback whales*	*Genetic assessment of Population Structure and Temporal Movements*	*Photo-ID and genetic databases held by WCS/CCRP and South African Collaborators (MRU – SA Museum)*
WCS/CCRP/Oman Whale and Dolphin Research group humpback whale Breeding Stock X assessment	*Oman UK, USA*	*Gianna Minton (gianna.minton@gmail.com) Tim Collins (tcollins@wcs.org) Cristina Pomilla Robert Baldwin Howard Rosenbaum*	*IWC Breeding Stock X (Oman)*	*2000-2006*	*Humpback whales*	*Photo-ID mark recapture assessment of abundance and population structure, habitat use/distribution, genetics, conservation threats, awareness campaign*	*Photo ID database held by Oman Whale and Dolphin Research Group, tissues held by Gov. of Oman and WCS/CCRP, NY*
WCS/CCRP Humpback Whale Song Interregional Comparisons	*Madagascar Gabon Brazil Australia UK USA*	*Salvatore Cerchio (scerchio@wcs.org)*	*IWC Breeding Stocks A, B, C, D*	*BS A,B,C: 2000-2006 BS D: 2004*	*Humpback whales*	*Comparisons of song for stock structure assessment: B-C, completed for 2003; C-D completed for 2004; A-B-C 2000-2006 beginning*	*Acoustic data from Gabon and Madagascar held by WCS/CCRP, New York, Madag*
WCS/CCRP Passive Acoustic Monitoring off Coast of Angola	*Angola, UK, USA*	*Salvatore Cerchio (scerchio@wcs.org)*	*Northern Angola, off mouth of Congo River*	*2008*	*Large whales, coastal odontocetes*	*Deployment of Cornell MARUs for 9 months, Mar-Nov, for detection of whales in offshore environment and delphinids in nearshore environment*	*Acoustic data held by WCS/CCRP, New York*

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Pan SH humpback whale Population Genetic analyses	*USA*	*Howard Rosenbaum (hrosenbaum@wcs.org), Scott Baker + Regional Leads*	*IWC Breeding Stocks A-G +X and associated sub-stocks*	*1996-2008*	*Humpback whales*	*Long-term population genetic analyses using multiple molecular markers addressing population based questions*	*Tissue samples and genetic database held by WCS and OSU labs.*
Circumpolar Feeding Ground Analysis	*USA, Peru, Chile, Australia*	*Howard Rosenbaum, Jacqueline Loo, Carlos Olavarria, Debbie Thiele*	*IWC Feeding Grounds associated with Breeding Stocks*	*IWC SOWER, & INACH & SOGLOBEC cruises where humpback samples collected*	*Humpback whales*	*Long-term population genetic analyses using multiple molecular markers addressing population based questions*	*DNA samples and genetic database held by WCS and OSU labs. Tissues archived at SWFSC*
Analysis of connectivity between breeding and feeding grounds	*USA, Peru*	*Howard Rosenbaum Jacqueline Loo.*	*IWC Feeding Grounds and Breeding Stocks A, B, C*	*IWC SOWER samples and genetic samples from Breeding Stocks A, B, C*	*Humpback whales*	*Long-term population genetic analyses using multiple molecular markers addressing population based questions*	*Tissue samples and genetic database held by WCS*
WCS/CCRP monitoring of coastal cetaceans and manatees - Angola	*Angola USA, UK*	*Tim Collins (tcollins@wcs.org)*	*Northern Angola, off mouth of Congo River*	*2008*	*Whales, coastal odontocetes West Afr. Manatees*	*Surveys for coastal cetaceans and manatees in the Congo River Estuary. Work is conducted in conjunction with development of a Liquefied Natural Gas facility and aims to identify species present and relevant threats.*	*Survey data held by WCS/CCRP. New York*

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WCS/CCRP Coastal Dolphins of Madagascar	*MadagascarArgentina, USA*	*Salvatore Cerchio (scerchio@wcs.org)*	*Madagascar: Antongil Bay, Toliara/Anakao, Nosy Be*	*Ant Bay: 1996-2006; Tol: 2004-2008; Nosy Be: 2007-2009*	*Sousa, Tursiops, other coastal odontocetes*	*Assessment of species diversity and population status through surveys, photo-ID, genetics; conservation of populations*	*Survey data, Photo-IDs and tissue samples held by WCS/CCRP, New York, Madag.*
WCS/CCRP Coastal Dolphins of Gabon and Congo	*Gabon, Congo, UK*	*Tim Collins (tcollins@wcs.org)*	*Gabon: Akanda, Pongara, Iguela, Mayumba. Congo : Conkouati*	*2007-2009*	*Atlantic humpback dolphins, Tursiops, other coastal odontocete.*	*Assessment of population status through shore based surveys, small boat surveys, genetics and interviews; Development of training for national observers, coastal education program*	*Survey data, Photo-IDs and tissue samples held by WCS/CCRP, Mayumba Nat. Pk (Gabon) and Conkouati Douli Nat. Pk (Congo)*
Aquamarina+CCRP Franciscana dolphins in Argentina	*Argentina USA*	*Martin Mendez mm1772@columbia.edu*	*Coastal Buenos Aires Province, Argentina*	*1998-present*	*Pontoporia blainvillei*	*Population status, structure and movement patterns. Oceanographic data collection.*	
Conservation Biology Of Hector's dolphin	*New Zealand*	*Steve Dawson & Liz Slooten (steve.dawson@otago.ac.nz liz.slooten@otago.ac.nz)*	*Coastal NZ; especially Banks Peninsula*	*1984-present*	*Hector's dolphin, Maui's dolphin*	*Photo-ID 1984-present (Catalog size c. 600), Dissections 1984 – 1999 (n. = 119) Line-transect surveys 1999-2005. Static acoustic monitoring.*	*Data held by Otago University*
Ecology of sperm whales at Kaikoura	*New Zealand*	*Steve Dawson & Liz Slooten (steve.dawson@otago.ac.nz liz.slooten@otago.ac.nz)*	*Kaikoura*	*1990-present*	*Sperm whales*	*Photo-ID (catalog = 210 Acoustic surveys, 3-D acoustic array 2005-present*	*Data held by Otago University*

Name of programme	***Nationality***	***Contact person***	***Area of operation***	***Years of operation***	***Target species***	***Type of research***	***Data available***
Ecology of Bottlenose dolphins in Fiordland	*New Zealand*	*Steve Dawson & Liz Slooten (steve.dawson@otago.ac.nz liz.slooten@otago.ac.nz)*	*Fiordland*	*1990-present*	*Bottlenose dolphins*	*Photo-ID (Doubtful-Dusky Sound catalog = 160); behavioural obs, sound recordings, static acoustic monitoring.*	*Data held by Otago University*
Ecology of Southern Ocean ecosystems	*Chile*	*Anelio Aguayo (*aaguayo@inach.cl*) Jorge Acevedo (*Jorge.acevedo@cequa.cl*) Carlos Olavarría (carlos.olavarría@cequa.cl)*	*Antarctic Peninsula IWC Area I*	*1993-2008*	*Humpback whale. Also information for minke, killer and southern right whales*	*Sighting surveys, photo-ID and biopsy sampling for assessing distribution, relative abundance, interchange, migratory connection and population structure of humpback whales*	*100 biopsy samples, 298 photo-ID, sighting records*
Ecology of whales in the Patagonian channels	*Chile*	*Anelio Aguayo (*aaguayo@inach.cl*) Jorge Acevedo (*Jorge.acevedo@cequa.cl*) Carlos Olavarría (carlos.olavarría@cequa.cl)*	*Magellan strait and Patagonian channels (southern South America)*	*2003-2009*	*Humpback whale. Also information for sei, killer and dwarf minke whales, as well as dolphin species*	*Sighting surveys, photo-ID and biopsy sampling for assessing distribution, relative abundance, interchange, migratory connection and population structure of humpback whales*	*94 biopsy samples, 102 photo-ID records, sighting records of humpback whales. A few skin samples and photo-ID of other species*
Southern right whale distribution in Chile	*Chile*	*Anelio Aguayo (aaguayo@inach.cl) Jorge Acevedo (Jorge.acevedo@cequa.cl) Carlos Olavarría (carlos.olavarría@cequa.cl) Rodrigo Hucke* (rhucke@uach.cl) Rodrigo Moraga	*Chile and Area I*	*1976-2008*	*Right whale*	*Records for assessing distribution*	*Sighting records, few biological samples and photo-ID. See Aguayo_Lobo et al. 2008*

Name of programme	***Nationality***	***Contact person***	***Area of operation***	***Years of operation***	***Target species***	***Type of research***	***Data available***
Sperm whales in the tropical Pacific	*Chile*	*Hal Whitehead* *Anelio Aguayo (aaguayo@inach.cl)* *Marcelo Flores* *Marx Buscaglia*	*Northern Chile*	*2000*	*Sperm whales, but also a number of whale and dolphins species*	*Distribution, relative abundance, interchange, migratory connection and population structure*	*Sighting records. Potentially photo-ID, biopsy samples, acoustic records.*
Cetacean diversity in Aysén fjords	*Chile*	*Anelio Aguayo (aaguayo@inach.cl)* *Jorge Acevedo (Jorge.acevedo@cequacl)*	*Aysén region*	*2001-2002*	*Several species of whale and dolphins*	*Cetacean distribution*	*Sighting records . See Aguayo-Lobo et al. 2006*
Chilean dolphin ecology in central Chile	*Chile*	*María josé Perez (mjose.perez@eutropia.cl)* *Rodrigo Moraga*	*Central Chile*	*2000-2009*	*Chilean dolphin*	*Distribution, interchange, residency patterns and population structure*	*Sighting records. Possibly photo-ID and biopsy samples*
Bottlenose dolphins ecology at northern Chile	*Chile*	*María josé Perez (mjose.perez@eutropia.cl)* *Rodrigo Moraga* *Jorge Gibbons* *Juan Capella* *Yerko Vilina*	*Northern Chile*	*1990-2009*	*Bottlenose dolphins. Also blue, fin and humpback whales and several species of dolphins*	*Distribution, relative abundance, interchange, residency patterns and population structure*	*Sighting records, photo-ID and skin sampling*
Humpback whale studies in Magellan strait	*Chile*	*Juan Capella* *Jorge Gibbons*	*Magellan strait*	*1999-2009*	*Humpback whales. Also several species of dolphins*	*Sighting surveys, photo-ID and biopsy sampling*	
Cetacean diversity in central Chile	*Chile*	*José Luis Brito (jose_luis_brito@yahoo.es)*	*Central Chile*	*1990?-2009*	*Several species of whales, dolphins and porpoises*	*Records of cetacean sightings and strandings*	
Southern right whales in eastern Magellan strait	*Chile*	*Jorge Gibbons* *Carlos Olavarria*	*Eastern Magellan strait*	*1985-2008*	*Southern right whales*	*Temporal and spatial distribution*	*Sightings records. See Belgrano et al. 2008*