Agenda Item 3.7.1

Review of New Information on Threats to Small Cetaceans

Emerging Issues

Climate Change

Information Document 3.7.1.b

Report of the ACCOBAMS Expert Workshop on the Impact of Climate Change on Cetaceans of the Mediterranean and Black Seas

Action Requested

- Take note

Submitted by

ACCOBAMS Secretariat

NOTE:
DELEGATES ARE KINDLY REMINDED
TO BRING THEIR OWN COPIES OF DOCUMENTS TO THE MEETING

Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area, concluded under the auspices of the Convention on the Conservation of Migratory Species of Wild Animals (CMS)

Accord sur la Conservation des Cétacés de la Mer Noire, de la Méditerranée et de la zone Atlantique adjacente, conclu sous l'égide de la Convention sur la Conservation des Espèces Migratrices appartenant à la Faune Sauvage (CMS)

REPORT OF THE ACCOBAMS EXPERT WORKSHOP ON THE IMPACT OF CLIMATE CHANGE ON CETACEANS OF THE MEDITERRANEAN AND BLACK SEAS

Summary

The Parties to ACCOBAMS have expressed their interest in assessing the impact of climate change on Cetaceans, through the adoption of the Resolution 4.14 (November 2010, Monaco) stating that necessary actions to reduce anthropogenic contributions to climate change and marine acidification have to be taken.

The ACCOBAMS workshop on The Impact of Climate Change on Cetaceans of the Mediterranean and Black Seas met in Monaco on 11th June 2014. Seventeen experts from eight countries from across the ACCOBAMS region and beyond attended, including representatives from a number of international organisations and members of the ACCOBAMS Scientific Committee.

The workshop considered the latest pronouncements from the IPCC, noting that ecosystems change has already been identified in the region. The situations in the Mediterranean and Black Sea basins were reviewed and the workshop received a number of detailed reports of ongoing research in the region and pertinent investigations being conducted elsewhere. In addition, the work proposed on climate change under the auspices of the Convention for Migratory Species was considered and the workshop expressed its appreciation and support for these plans.

Discussion led to the identification of the need to build better synergies between various research efforts and international bodies, and the identification of particular knowledge gaps, including a lack of basic knowledge about cetacean populations which is especially pronounced in some areas. The importance of the maintenance of long-term studies and was emphasised along with the value of cetaceans as sentinels of ecosystem health and indicators of climate change.

The workshop recognised climate change as a profound threat to the cetaceans of the region and made two sets of recommendation, the first aimed at policy makers and the second concerning future research.

The workshop was hosted by the Oceanographic Museum of Monaco and part-sponsored by the Humane Society International.

Monaco, 11th June 2014

Table of contents

Background

1. The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (**ACCOBAMS**) is a legal conservation tool based on co-operative actions. Its purpose is to reduce threats to cetaceans, including by improving our current knowledge of the biology of these animals and the issues that are affecting them. This intergovernmental Agreement embodies the drive of member countries to conserve all the species of cetaceans and their habitats (as specified both in the text of the Agreement - **Article II, 1** - and in its Annex 2, Conservation Plan) within the Agreement area.

2. The Parties to ACCOBAMS have expressed their interest in assessing the impact of climate change on Cetaceans, through the adoption of the Resolution 4.14 stating that necessary actions to reduce anthropogenic contributions to climate change and marine acidification have to be taken. The Convention on Migratory Species held a workshop on climate change in Costa Rica from 9th to 11th April 2014. Other international bodies are also considering the likely impacts of climate change and we note that this includes the Bern Convention which will hold an expert workshop on 19th June 2014 in Strasbourg. ACCOBAMS will be seeking to build synergies with the Convention on Migratory Species, the Bern Convention and other international organizations on this topic.

3. Recent scientific reviews have indicated that the connections between predicted changes in marine environment and their consequences for cetaceans are only poorly known. Climate change may affect marine mammals directly through, for example, changes in their prey, or indirectly, through changes in human behaviour. The ACCOBAMS workshop was intended to facilitate further understanding of these matters and identify ways forward to improve understanding and, ultimately, conservation.

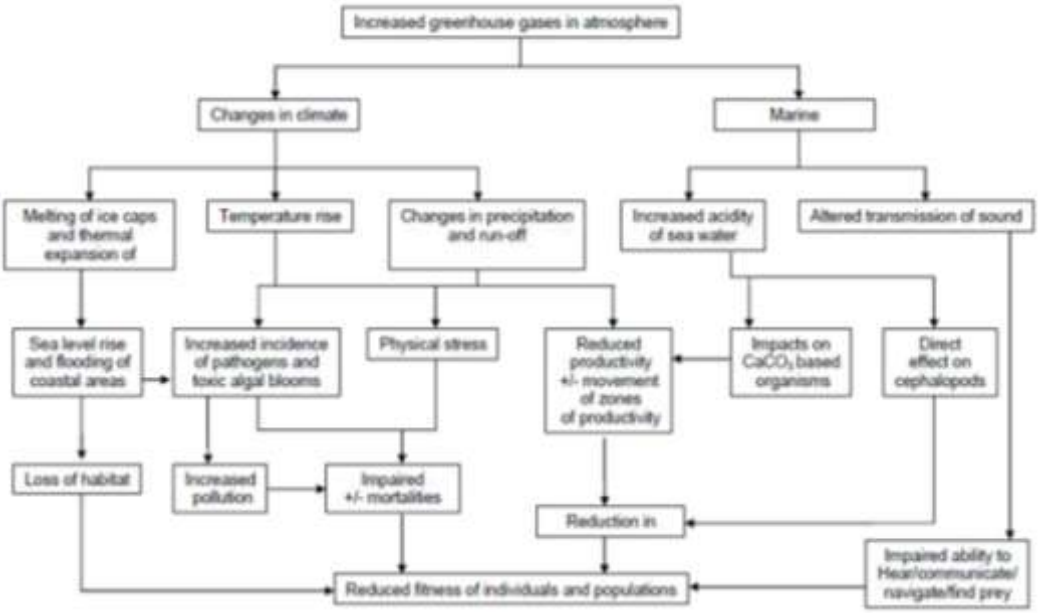

Figure 1 from Simmonds, D. Gambaiani and G. Notarbartolo di Sciara. 2012. Climate change effects on Mediterranean Cetaceans: Time for action. In: '*Life in the Mediterranean Sea: a look at Climate Change*.' Ed: N. Stambler. Nova Science Publishers, Inc. pp 685-701

4. The workshop aimed to:
   i. Establish the current state of knowledge relating to climate change and its impacts on the marine environments in the Black and Mediterranean Seas;
   ii. Determine the consequences of climate change for cetaceans in the Black and Mediterranean Seas; and
   iii. Identify gaps in knowledge and possible topics for further research;
   iv. Exchange information among other international organizations and to review the effects of climate change.

5. **The final objective was to prepare for adoption at the next Meeting of the Parties (November 2016), specific proposals, guidance and/or recommendations to help Parties, the scientific community and other international organizations in addressing the challenges of climate change**.

Item 1. Welcome and practical matters

6. The workshop was opened at 9 a.m. on Wednesday 11th June 2014 by Olivier Dufourneaud Oceans Policy Director of the Oceanographic Museum of Monaco, who welcomed the participants and emphasized the specificity of the workshop; inviting experts of cetaceans and from others different fields to share and to combine their knowledge. Mrs. Florence Descroix-Comanducci, Executive Secretary of ACCOBAMS expressed her gratitude to the Oceanographic Museum for hosting the workshop and invited the participants to introduce themselves.

7. The workshop was attended by members of the ACCOBAMS Scientific Committee, representatives of international organizations and observers. The full list of participants appears as Annex 1 to this report. The workshop was part-sponsored by a grant from the Humane Society International.

8. Florence Descroix-Comanducci briefly presented ACCOBAMS and its objectives and Mark Peter Simmonds, convener and chair of the workshop, introduced the topic of climate-driven changes in the cetacean context.

9. He referred to a bibliography of relevant literature that had been prepared for the meeting (Annex 4) and drew particular attention to (i) the complex interactions that may occur between changes in the atmosphere and cetaceans (figure 1. above); (ii) that climate-change driven impacts on cetaceans can be expected to include those caused by changes in human behaviour as a result of changing climates as well as direct effects on the animals, their prey and their habitats; and (iii) the recently reported role of cetaceans in bringing nutrients into the upper layer of the oceans and promoting productivity and the removal of carbon from the atmosphere.

10. He also outlined the latest published materials from the International Panel on Climate Change (IPCC), all of which is available on the Panel's website. Observations from the IPCC

include (i) that it is virtually certain that the upper ocean (above 700m) has warmed from 1971 to 2010; (ii) that it is very likely that the inter-basin contrast in freshwater content has increased: (iii) that the Atlantic has become saltier and the Pacific and Southern Oceans have freshened; and (iv) that there is very high confidence that the Arctic sea ice extent decreased over the period 1979 – 2012. A gradual acidification of the oceans has also been observed and the Mediterranean is highlighted in the latest IPCC briefing as a sea area where there has been ecosystems change.

11. The agenda was then reviewed and approved and appears in Annex 2 to this report.

Item 2. Addressing climate change

2.1 - Lessons learnt from other species and the CMS climate change process

12. Heidrun Frisch (UNEP/CMS Secretariat) delivered the first part of the presentation, focusing on the policy processes within the Convention on Migratory Species dealing with climate change. She emphasized how important it was that the unique perspective of the CMS and its Agreements was conveyed into other, wider negotiations on the issue, since the effects on species and their value as indicators of change were not otherwise heard. CMS' work on the issue began in 1997, when a Scientific Council working group was formed. Several resolutions on the subject had been passed, with the most recent (Res.10.19) in 2011, and two technical workshops convened. At the last, held in April 2014 in Costa Rica, a draft resolution including a "Programme of Work on Climate Change and Migratory Species" was developed. This would be the key document setting the agenda for the work of the Convention on the subject in the coming three years. It would be discussed at the 18th Meeting of the CMS Scientific Council in early July and would then go to the Conference of Parties in November 2014. She also mentioned that the CMS Climate Change Working Group was open to the participation of further experts, and mentioned the possibility of joining forces within the CMS Family of agreements.

13. Colin Galbraith outlined recent work by CMS, noting that the forthcoming Conference of the Parties will have a Resolution proposing a forward plan of activity for the Convention in relation to climate change.
He summarised the following:
    - CMS and the processes involved
    - Progress by of the CMS Working Group on Climate Change
    - The time-line for action from this meeting
    - The content of the draft Resolution
    - Provided examples of change
    - Reported on the recent workshop held in Costa Rica
    - Outlined the developing a programme of work

The programme of work has been developed as a key product from the CMS working group on climate change and has taken a holistic approach, focussing on the key problems at the global level. It was noted that the implementation of the programme of work will require resources and partnership and coordination.
The programme includes the following key elements:

- Measures to facilitate species adaptation in response to climate change
- Vulnerability assessment
- Knowledge exchange
- Monitoring and research
- Climate change mitigation, human adaptation, and land use planning
- Capacity building
- Cooperation and implementation

The draft Resolution and programme of work will now be scrutinised by the CMS Scientific Council at a meeting to be held in early July. He encouraged the participation of ACCOBAMS in the CMS working group on climate change.

14. *Discussion*. Participants highlighted the need to use the best information data available, both academic and scientific. The species recognized as being affected are cetaceans, marine turtles and others. Some species might become migratory.

2.2 - Comments on the vulnerability of Mediterranean and Black Sea cetaceans

15. Simone Panigada presented an overview of cetaceans in the ACCOBAMS area. The main habitat characteristics of the species present in the Mediterranean and Black Sea were discussed. The IUCN status of the Mediterranean and Black Sea sup-population was presented and discussed, underlining how all cetacean species have been going through negative trends over the last few years. An overview of threats affecting cetaceans (habitat degradation, naval traffic, ship strikes, bycatch, chemical and acoustical pollution) was also presented and discussed during the workshop, with an emphasis on the cumulative effect that single threats may have on cetacean population. Some examples of how climate change may impact cetaceans in the ACCOBAMS areas were provided and discussed by workshop participants. As an example: in the Mediterranean Sea climatic changes have altered the distribution of preferred prey species of common and bottlenose dolphins; the distribution of krill will also be altered by climate changes, with some species, such as *M. norvegica* which is known as the main prey for fin whales in the Mediterranean, characterized by strict temperature ranges; species that breed, calve and feed in coastal area will be also affected due to the construction of new infrastructures.

16. *Discussion*: Cetaceans are important tracers for change. Considering that there is an existing baseline data of distribution, that the ACCOBAMS Survey Initiative is planned and that most of the species are isolated in the Mediterranean, therefore, the climate change impact would be visible on these resident species and easily monitored.

Item 3. Change in the ACCOBAMS area

3.1 - Monitoring the impacts of climate change on Mediterranean Biodiversity

17. Maria del Mar Otero informed the participants that the latest assessment by the Intergovernmental Panel on Climate Change (IPCC) found that the Mediterranean would be strongly affected by climate change over the course of this century. The Mediterranean Sea is already and will be expecting warmer waters, acidification, sea level rise and other hydrological changes with impacts that are already modifying marine ecosystems. There are already early signs of its effects on marine communities that are forcing species distributions toward the northern areas or to greater depths and expansion of non-native species, necrosis of coralligenous formations and mass mortality events of benthic species and population blooms. Future impacts will affect the performance and survival of many organisms with calcium carbonate structures and vulnerable species like cetaceans, increasing the accumulation of pressures on them.

18. *Discussion*: Impacts on cetaceans could force certain species to migrate further north, change the availability and abundance of food for cetaceans, particularly those with highly specialized diet and increase disease outbreaks. Experts have worked to establish a common framework for Mediterranean MPAs to guide the development of biodiversity conservation against the threats of climate change and developing monitoring indicators to understand the impacts on the MPA network. It is important to prioritize conservation efforts by identifying and mapping high-priority marine areas for the conservation of cetaceans — particularly those currently experiencing rapid climate impact and those that could act as refugia and are likely to be resilient to climate change and/or support a broad array of species.

19. Sakina-Dorothée Ayata described the pelagic realm of the Mediterranean Sea, especially the complex hydrodynamics that drives its connectivity patterns, the distribution of biogeochemical regions and planktonic ecoregions, and the complex signal of climate change that has been projected for different climate scenarios. She also presented the various possible responses of planktonic species to climate change, with some examples of temporal and spatial adaptations. She informed the participants about a new research project PlankMed. This projects focuses on the impact of climate change on planktonic ecoregions in the Med Sea, using both statistical ecological niche models and dynamical ocean models coupled with biogeochemical models.

20. *Discussion.* It was suggested that it would be helpful to overlay the map of patchy distribution of climate change impacts (based on seawater temperature) in the Mediterranean with the maps of cetacean species distribution, in order to help to better assess the potential impacts of climate change.

3.2 - Climate change impacts on the Black Sea ecosystem

21. Temel Oguz informed the participants that the cetaceans in the Black Sea were limited to three species: the harbour porpoise (*Phocoena phocoena relicta*), the short-beaked common dolphin (*Delphinus delphis ponticus*), and the common bottlenose dolphin (*Tursiops truncatus ponticus*). Their populations collapsed by the mid-1960s due to the long-term fishery over-exploitation and extermination of their populations in the former USSR. The extermination continued in Turkey until 1983 when hunting was finally banned. The numbers of animals hunted were however not recorded, thus the overall population losses have not been estimated properly. Considering the fact that the 1980s have been over-productive in terms of small pelagics, it is likely that the dolphin population might have a tendency to recover to some extent. Following the collapse of the anchovy stocks at the end of 1980s, the cetacean populations experienced a major mass mortality event in winter-spring 1990 due to the pronounced stock depletion of the primary prey species (sprat and anchovy), followed by another mass mortality event during summer-autumn 1994 due to the toxic chemical pollution. In addition, pathogens-toxins, entanglement, commercial harvest, incidental catch/mortality in fishing nets have been reported to be other adverse effects on cetacean populations.

22. Likely impacts of climate change and variability on these cetaceans may be either direct, through physiological changes introduced by temperature changes, or indirect due to the changes in resource supply from the lower trophic food web structure. In highly nonlinear Black Sea ecosystem, the climate change effects however cannot be isolated from other environmental effects. The available data document that climate-induced variability (mostly related to the North Atlantic Oscillations) in combination of the other environmental stressors (e.g. eutrophication, foodweb degradation due to its control by opportunistic species and gelatinous carnivore populations, and fishery overexploitation) continue to introduce a major adverse controls on the cetacean populations.

Item 4. Responses from cetaceans

4.1 - Detecting the effects of climate change on cetacean survival and reproduction: some examples

23. Justin Cooke presented a case study, explaining how effects of climate change had been investigated for southern right whales *Eubalaena australia* using data collected from their wintering grounds on the coasts of Argentina and Brazil. Photo-id (individual identification) data have been collected annually since 1970, such that there is now a time series of over 40 years. Right whales normally have a 3-year breeding cycle (pregnancy, lactation, resting), but when a calf dies around or after birth, the mother can become pregnant again without a resting year. This results in an inter-calf interval of 2 years, if the dying calf is seen, or 5 years if is not seen. The occurrence of 2- or 5-year intervals relative to the usual 3-year interval is a measure of calf mortality. Calf mortality rates were found to be strongly correlated with water temperature (SST) in the main summer feeding ground around Georgia (higher mortality when water is warmer. A similar relationship was found for other krill-eating

predators at South Georgia (fur seals, gentoo penguins). Calf mortality was also correlated with El Niño indices but subject to a time lag. Extrapolation forward of the historical relationship between SST and calf mortality permits prediction of those climate scenarios under which the survival of the population would be threatened. Under some IPPC scenarios the intrinsic population growth rate (r0) becomes negative which implies that the population would not persist long-term. A similar modelling exercise has been conducted using a 20-year time series of data on western North Pacific gray whales (*Eschrichtius robustus*).

24. *Discussion*: In discussing whether these methods could be applied to Mediterranean populations, the following points were emphasized:

    (1) long time series of data (decadal) are important; thus, priority should be given to continuing existing long-term studies;

    (2) time series should be annual: missing years should be avoided, because climatic signals can be strong in one year;

    (3) longitudinal, individual-based studies, where known individuals are monitored over the years, are the most informative on the relationship between demography and climate.

25. The workshop noted that it greatly appreciated Cooke's work and asked for future guidance from him in trying to apply the same kind of approach to the situation of cetaceans in the ACCOBAMS regions, noting that there are many interacting variables here.

4.2 - Cetacean ecology in relationship to oceanographic dynamics

26. Cedric Cotte underlined that understanding cetacean distribution, its variations through an annual cycle, and the oceanographic factors driving this distribution at several scales were crucial challenges at the frontier between oceanography end ecology. He presented his study where he used a multidisciplinary approach to describe the relationships between distribution movements of predators and their environment at several scales, especially at (sub) mesoscale. At large scale, both fin whale and striped dolphin exhibited fidelity to the north-western Mediterranean. Both visual sightings and satellite tracking indicated that most fin whales aggregated in the northernmost part of the basin during summer and spread in the whole northern part in winter, while striped dolphins did not exhibit any seasonal variations of their distribution. Using simultaneous cetacean and oceanographic observations obtained from platform of opportunity (ferries), he characterized scale-dependant habitat of cetaceans. Spatial modelling of cetacean densities includes relationships at large scale and at (sub) mesoscale. His study particularly highlighted and quantified the influence of the (sub) mesoscale oceanographic processes through the interactions of marine predators with eddy and filamentary activities. He hypothesized that the (sub) mesoscale processes stimulate and shape the marine environment and resources, conditioning predator distribution and movements. It is ultimately possible to estimate distribution and relative abundance of cetaceans which are both major objectives of species management and conservation.

4.3 - Foraging shifts in Mediterranean fin whales in a changing environment

27. Ilham Bentaleb presented her study regarding foraging shifts in Mediterranean fin whales. Satellite telemetry and stable isotopes measured on baleen plates of stranded whales provided evidences that some fin whales migrate from the Mediterranean Sea to the Atlantic Ocean; however, most individuals remain within the western basin during fall and winter. This allowed the authors to analyse the isotopic signatures of those Mediterranean individuals stranded between 1975 and 2002. A possible environmental shift was suggested since the 1970s (anthropogenic CO2 and nitrate increase reinforced by climatic changes).

28. She added that since that study, new methods using multi tracers (carbon, nitrogen, lead and mercury isotopes) on new samples of Atlantic and Mediterranean stranded whales have been set up (C,N,Hg,Pb isotopes) in order to improve understanding of whale behaviour and of decadal environmental shift. These methods allow the distinction between Atlantic and Mediterranean Sea populations and confirm the evidence of rare migration by the Strait of Gibraltar highlighting that most of the fin whales stranded in Mediterranean Sea are year-round residents of the Mediterranean Sea. Hence, she recommends the use of these isotopes for future studies. The lead isotopes, impacted by the anthropogenic pollution, are an efficient indicator of the distribution area of individuals.

29. Decadal records of C,N,Pb,Hg isotopes on baleen plates confirm environmental changes, including anthropogenic pollution, and climatic changes. Though, variations of these indicators are not fully understood due to complex biological, chemical and physical interactions, she also recommended systematically applying these measurements to Mediterranean Sea and Atlantic stranded fin whales. The high nitrogen values measured in the stranded fin whale of 1975 are still not understood. Did the *M. norvegica* stock fall that year? These questions of foraging shifts have to be addressed since global warming might alter the distribution of the main *B. physalus* prey (*M. norvegica*).

30. One of the other questions raised from her data set was the high total Hg and Pb levels recorded in some Mediterranean Sea fin whale. The impacts of these pollutants are poorly understood and widely under-studied. Also observed was a decreasing trend of the Δ^{199}Hg since the 1970s. Mercury emissions from coal combustion contribute approximately half of anthropogenic Hg emissions to the atmosphere. Hence the first legally-binding UNEP treaty was implemented aiming at reducing anthropogenic Hg emissions. Results may suggest the response to the reduction of the Hg emissions in Europe.

31. Decadal results of the different isotopes show changes from the 1970s to 2014 attributable to Sea Surface Temperature Increase, global carbon cycle modification and anthropogenic nitrogen inputs. To explore the climate change impacts on cetacean long term high resolution time series and prey survey are needed.

32. *Discussion*. Participants agreed to recommend that more effort should be made to build synergies between scientific researchers, NGOs and IGOs (such as ACCOBAMS, Pelagos Sanctuary) in order to improve understanding of the climatic shifts. Interdisciplinary and/or integrated studies of modern prey and cetaceans and historical dataset using different archives (e.g. baleen plates used to hook piano strings, corsets, museum collection) will help to understand the present state and to predict the future in collaboration with climate modelling.

4.4 - Modelling future trends

33. Chiara Piroddi explained that ecosystem-based approaches explored the dynamic linkages between marine organisms and human pressures. In particular, ecosystem models such as the freely available software Ecopath with Ecosim (EwE; www.ecopath.org) have been suggested to be the most suitable tool to assess direct and indirect effects of anthropogenic stressors on marine mammals and to evaluate possible ecological consequences of their population dynamics.

34. She presented the EwE approach for two different case studies: the Inner Ionian Sea Archipelago, Greece and the whole Mediterranean Sea with a particular focus on cetaceans and their role in the ecosystem. In particular, in the Inner Ionian Sea Archipelago, the combinations of overfishing and environmental changes have negatively impacted the marine biodiversity of the ecosystem causing sharp declines of common dolphins and major fish stocks and weakening the robustness of the marine food web. The implementation of fisheries closures would gradually recover fish stocks, while common dolphins would increase more pronouncedly only if the study area was to be closed to all fisheries. Also in the area, the increase number of fish farms, with associated high productivity near the cages, contributed to explain the trends in bottlenose dolphin numbers. These outcomes suggested that high productivity in waters surrounding fish cages—within a coastal area that is markedly oligotrophic—may attract bottlenose dolphins (by helping them to find prey). The EwE built for the whole Mediterranean Sea reveals that among all functional groups the highest trophic levels were observed for marine mammals and large predatory fish. Results showed a diminished role of pinnipeds and piscivores feeding cetaceans in the ecosystem as consequence of their biomass decline and a negative impact of fisheries either on cetacean food resources or through by-catch.

35. She introduced the new temporal and spatial module and the new habitat capacity model of the Ecopath with Ecosim software to assess the cumulative impact of fishing activity and changes in environmental conditions (e.g., SST, salinity, primary production) on the whole ecosystem. Using the habitat capacity framework, the model is run to evaluate species/functional groups distribution based on fishing impact and changes in the environment. The aim of the study is to quantify, using spatial and temporal dynamic simulations, ecosystem dynamics to assess the exploitation status of the Mediterranean Sea and explore different management policies and future scenarios.

Item 5. Defining key questions and ways forward – Discussion

5.1 - Overview from the morning and defining the way forward: what don't we know and what can we do better

36. Mark Peter Simmonds provided a brief overview of the technical presentations, noting both the negative side (many conflicting issues which make interpretation of a climate change signal difficult) and the positive side (the obvious desirability of building synergies between researchers and organizations and the inspiring enthusiasm of the research community for their work).

5.2 - Research needs – ACCOBAMS recommendations

37. Simone Panigada introduced draft research recommendations and invited participants to made comments in order to approve them under agenda item 5.5 (Annex 3).

5.3 - Liaison between relevant international bodies

38. Daniel Cebrian, SAP BIO Programme Officer in the Regional Activity Centre for Specially Protected Areas (RAC/SPA), informed the participants that UNEP/ Mediterranean Action Plan already made an assessment in 2009 of the information available on the Mediterranean. Sub-regional meetings were organized and sub-regional conclusions/recommendations were elaborated.
    He stressed the importance of liaison with FAO/GFCM on this issue.

39. Iryna Makarenko (Pollution Monitoring and Assessment Officer, Black Sea Commission' Permanent Secretariat) presented the following issues:

    - The Black Sea Commission and ACCOBAMS are observers since 2001; the first MoU was signed in 2002 and revised in November, 2012; the BSC PS is assigned to be a Black Sea Sub Regional Coordination Unit for ACCOBAMS, Work Plan list of activities is annexed to the MoU;

    - Conservation of cetaceans is one of the issues of concern in the Black Sea Strategic Action Plan (BS SAP 2009) and a Biodiversity Conservation (CBD) Protocol to Bucharest Convention, it includes, *inter alia*, a ban on the hunting of marine mammals; regular population assessments of marine mammals; strengthening of national centers and sanctuaries for the rehabilitation of marine mammals; modification of fishing practices and developing a strategy for the reduction of by-catches of marine mammals.

    - The issue of climate changes as a phenomena is <u>not</u> reflected in any of BSC documents, i.e. texts of the Bucharest Convention and its Protocols, BS SAP 2009, Ministerial Declarations, BSIMAP (Monitoring program), etc. therefore, there is an

urgent need to elaborate on it in the Recommendations to the amendments of the BS SAP 2009; Black Sea Ministerial Declaration expected to be signed tentatively in 2015; updated Monitoring program for Black Sea (BSIMAP 2014-2020; relevant documents of BSC-ACCOBAMS cooperation (Annex to the MoU, Draft Conservation Plan for cetaceans for 2014-2018, Draft Road Map for assessment of bottlenecked dolphins etc.);

- At the same time, climate change was a subject of a "Climate Change Vulnerability and Impact Assessment Review for the Black Sea Region - Towards Climate Change Adaptation and Co-Benefits for the Green Economy" produced as part of the Black Sea Climate and Business Initiative (CLIMBIZ), which was implemented through UNDP in partnership with the Black Sea Economic Cooperation Organization (BSEC);

- Unfortunately, the cetaceans were not even mentioned in this report. At the same time, the review considered fisheries sector as such and stated the following challenges for the Black Sea: marine living resources have been greatly affected by alien species introductions, eutrophication, over-fishing, habitats change/damage and pollution; unsustainable fishing practices are still in relatively common use; no bilateral fishery agreement among Black Sea states and no comprehensive assessment of the Black Sea fishery stocks; unsustainable aquaculture; all these issues will be further stressed by the projected increase in water temperatures.

- The review recommended adaptation options (monitor shifts in species, size frequency and distribution to forewarn against possible climate shifts; increase diversity of target species in catch and catch technology; wider use of aquaculture) and opportunities and co-benefits (technological improvements in fishing gear selectivity; investment opportunities for aquaculture).

40. David Osborn, Director of the IAEA, presented the activities of his department, especially nuclear applications in food, agriculture, human health and protecting the marine and terrestrial environments. The use of radioecology for the protection environment and for making contributions to studies concerned with climate change investigations. It can provide scientific information and assistance to international organizations and enhance capacity building of Member States. He stressed that an adaptive management is an informative management.

41. Heidrun Frisch, from CMS, stressed the importance of liaising with the CMS working group on climate change and promoting synergies with ACCOBAMS, particularly through the CMS Resolution in preparation on climate change impact on migrating species.

42. Pauline Boussion, from Pelagos Sanctuary, introduced the Pelagos Sanctuary whose aims to ensure a favourable conservation status of marine mammals by protecting them and their habitat, by direct or indirect adverse impacts of human activities. She added that no activity on climate change was carried out by Pelagos Sanctuary but as Pelagos Sanctuary was a pilot area of ACCOBAMS – if Parties to ACCOBAMS Agreement decided to implement some scientific studies or mitigating measures related to climate change – Pelagos Sanctuary would

be pleased to collaborate and proposes that related actions could be tested or implemented in the Pelagos Sanctuary.

43. Maria del Mar Otero, from IUCN- Centre for Mediterranean Cooperation, stressed the importance of focusing conservation actions on MPAs and key habitats and on Data Deficient cetacean species in order to help Parties to implement measures both in coastal and high seas.

44. Participants agreed to focus on management in open Sea and it was noted that the Convention for Biological Diversity (CBD) have developed a mechanism to facilitate the description of ecologically or biologically significant marine areas (EBSAs).

5.4 - Key messages to governments and others

45. After discussion, participants approved the key messages to Governments and others as they appear in Annex 3 to this Report.

5.5 - Agreement on action points/recommendations

46. After discussion, participants approved the research recommendations and requirements as they appear in Annex 3 to this Report.

Item 6. Closure of the Meeting

47. Mark Peter Simmonds invited participants to provide the Secretariat with relevant references concerning climate change and cetaceans in the ACCOBAMS region in order to complete the bibliography of relevant literature that had been prepared for the meeting (Annex 4)

48. After customary exchanges of courtesies, which included thanking the Oceanographic Museum for the excellent facilities and the Secretariat for the efficient arrangements for the workshop, Mark Peter Simmonds closed the workshop at 6.40 p.m. on Wednesday 11th June 2014.

ANNEX 1 - Agenda

1 - Welcome and practical matters
1.1 - Welcome address from the Oceanographic Museum
1.2 – Tour de table
1.3 - An introduction to ACCOBAMS
1.4 - Review of agenda and an introduction to climate-driven change in the cetacean context
2- Addressing climate change
2.1 - Lessons learnt from other species and the CMS climate change process
2.2 - Comments on the vulnerability of Mediterranean and Black Sea cetaceans
3- Change in the ACCOBAMS area
3.1 - Monitoring the impacts of climate change on Mediterranean Biodiversity
3.2 - Climate change impacts on the Black Sea ecosystem
4- Responses from cetaceans
4.1 - Detecting the effects of climate change on cetacean survival and reproduction: some examples
4.2 - Cetacean ecology in relationship to oceanographic dynamics
4.3 - Foraging shifts in Mediterranean fin whales in a changing environment
4.4 - Modelling future trends
5- Defining key questions and ways forward – Discussion
5.1 Overview from the morning and defining the way forward: what don't we know and what can we do better
5.2 Research needs – ACCOBAMS recommendations
5.3 Liaison between relevant international bodies
5.4 Key messages to governments and others
5.5 Agreement on action points/recommendations
6 – Closure of the Meeting

ANNEX 2 – List of participants

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ANNEX 3 - Recommendations of the ACCOBAMS expert workshop on the impact of climate change on cetaceans of the Mediterranean and Black Seas

BACKGROUND

The Parties to ACCOBAMS have expressed their interest in assessing the impact of climate change on Cetaceans, through the adoption of the Resolution 4.14 (November 2010, Monaco) stating that necessary actions to reduce anthropogenic contributions to climate change and marine acidification have to be taken.

The objective of this workshop was to prepare for adoption at the next ACCOBAMS Meeting of the Parties (November 2016), specific proposals, guidance and/or recommendations to help Parties, the scientific community and other international organizations address the challenges of climate change.

RECOMMENDATIONS

A. Key messages to Governments and others

1. Whilst gaps remain in our knowledge, there is evidence that climate change, especially in combination with other pressures, presents a profound threat to cetaceans in the ACCOBAMS region.

2. More attention needs to be given generally to the effects of climate change in the marine environment, and the Mediterranean and Black Seas are globally amongst the ecosystems most likely to be rapidly impacted, leading to further biodiversity loss.

3. Cetaceans have a value as sentinels of the ecosystem effects of climate change and we recommend their consideration in the development of indicators for environmental status to be used in relation to ongoing international initiatives.

4. Whilst investigations and wider actions continue related to climate change, every effort should be made to address all of the stressors adversely impacting cetaceans in order to help mitigate climate change effects.

5. Significant opportunities exist at this time to develop positive synergies in the work being conducted on climate change across a number of MEAs and we encourage strengthening of cooperation and actions.

6. The workshop supports the draft resolution of CMS “Programme of Work on Climate Change and Migratory Species” and welcomes the opportunities for collaboration. It invites CMS and ACCOBAMS to liaise closely to identify joint activities and synergies.

7. Increasing capacity-building and public awareness activities are of high importance, and we note the importance of marine protected areas in this regard.

8. In addition, we advocate the research recommendations below and encourage their ongoing funding.

B. Research Recommendations and Requirements

B.1 Recommendations directed to the ACCOBAMS Scientific Committee

The ACCOBAMS Scientific Committee should:

1. Proceed with the ACCOBAMS Basin-Wide Survey Initiative, which should be repeated at regular intervals.

2. Look for opportunities for other means for data collection to include cetaceans and physical and chemical data into ongoing data collection (e.g. annual survey in the Black Sea and MISTRALS[1] project in the Med) and contact project coordinators of MEDITS and MEDIAS[2] to provide collected data.

3. Consider the issue of assessing resilience and adaptation of cetaceans to climate change.

B.2. General Research Recommendations

1. Ensure the continuation of existing long term projects (>10 years) relevant to the conservation of cetaceans, and support the initiation of new long-term projects. In such studies, data collection should be at least annual, and
    - Individual-based longitudinal studies should assess the effects on life cycles,
    - Demographic parameters should be correlated with climatic parameters; and
    - Further effort should be made to evaluate the feasibility of demographic studies.

2. Increased use should be made of platforms of opportunities to provide regular data collection (relating to: presence, distribution, relative abundance).

3. More effort should be made to
    - Collect information to improve knowledge about prey and cetaceans (e.g. through acoustic, long term historical data sets, the environmental history of cetaceans etc.);
    - Investigate prey-predator relationships:
    - Overlap maps of cetacean distribution with maps of impacts (including climate change);
    - Overlap maps of geochemical tracers of preys with ISOSCAPE maps;
    - Increase the cetacean differentiation when modelling the Med through Ecopath with Ecosim; and
    - Reinforce the links between the climate modeller community and ecologists.

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[1] *Mediterranean Integrated Studies at Regional And Local Scales.*

[2] *MEDITS is the Mediterranean International Trawl Survey conducted by a number of nations and MEDITS refers to a Pan-Mediterranean acoustic survey made annually by EU States*

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