



Convention on the Conservation of Migratory Species of Wild Animals

Secretariat provided by the United Nations Environment Programme



WORKSHOP:

TOWARDS A CMS PROGRAMME OF WORK ON CLIMATE CHANGE

Guácimo, Costa Rica, 9-11 April 2014

UNEP/CMS/CCWS/4

WORKSHOP REPORT

1. Pursuant to Resolution 10.19 on Migratory Species Conservation in the light of Climate Change, the workshop *Towards a CMS Programme of Work on Climate Change* was held in Guácimo, Costa Rica, from 9 to 11 April 2014. The meeting was convened by the COP-Appointed Councillor for Climate Change, Mr. Colin Galbraith and co-organized by the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and Costa Rica's Ministry of Environment and Energy (MINAE). Generous financial support was provided by the Governments of Germany and Monaco, and in-kind support was provided by SINAC (National System of Conservation Areas) and the GEF/UNDP project Consolidation of Marine Protected Areas in Costa Rica.
2. In line with paragraph 17 of Resolution 10.19, the workshop's objective was to prepare a CMS Programme of Work on Climate Change and Migratory Species. The workshop therefore made provision for participants to discuss views, and share experiences and best practices, with regards to the impact of climate change on migratory species. A full list of participants is annexed to this report.

ITEM 1. OPENING OF THE MEETING

3. The workshop was opened at 9 a.m. on Wednesday, 9 April 2014 by Mr. Colin Galbraith, who welcomed everyone to the meeting and expressed his gratitude to the Government of Costa Rica for hosting it. Mr. Galbraith acknowledged the results of the previous CMS workshop on climate change, held in Tour du Valat, France, in June 2011, and outlined further steps towards a Resolution on Climate Change and an accompanying Programme of Work, via the 18th meeting of the Scientific Council, to be held in Bonn, Germany, from 1 to 3 July 2014, to the eleventh meeting of the Conference of the Parties (COP11), to be held in Quito, Ecuador, from 4 to 9 November 2014.
4. Ms. Gina Cuza Jones, Head of Protected Natural Areas at the Conservation Area "Amistad-Caribe" (SINAC) and CMS National Focal Point, welcomed everyone to Costa Rica on behalf of Mr. René Castro Salazar, Minister of Environment and Energy. Ms. Jones highlighted the provisions in the Costa Rican constitution for environmental conservation and sustainable development. She expressed her hope for the workshop to be productive so that the results and outputs could be adopted at COP 11.
5. Mr. Borja Heredia, Head of the Avian Species Unit of the CMS Secretariat, welcomed the participants on behalf of Mr. Bradnee Chambers, the Executive Secretary of the CMS. Mr. Heredia conveyed the Executive Secretary's appreciation to the Government of Costa Rica for hosting the workshop, and to the Governments of Germany and Monaco for their funding support. Mr. Heredia also made reference to the latest report of the Intergovernmental Panel on Climate Change (IPCC), published on 30 March 2014, which contained further evidence of the impacts of climate change on biodiversity. Mr. Heredia furthermore noted the timeliness of the workshop, highlighting the upcoming Conferences of the Parties to the

United Nations Framework Convention on Climate Change (UNFCCC) in Lima (2014) and Paris (2015).

ITEM 2. ORGANIZATIONAL MATTERS

2.1. Election of officers

6. After the participants introduced themselves, they elected Mr. Colin Galbraith of the United Kingdom of Great Britain and Northern Ireland as the chair of the workshop.

2.2. Adoption of the agenda

7. The participants adopted the agenda as proposed in document UNEP/CMS/CCWS/1.

2.3. Organization of work

8. The proposed organization of work was adopted as contained in the annotations to the provisional agenda (UNEP/CMS/CCWS/2).

ITEM 3. CLIMATE CHANGE AND MIGATORY SPECIES UPDATE

Presentations by participants

9. Ms. Sakhile Koketso of the Secretariat of the Convention on Biological Diversity (CBD) gave a presentation on the CBD's work on climate change. The CBD first addressed climate change in 2000 when its COP highlighted the risks of climate change to coral reefs and forest ecosystems. In 2004, the COP adopted climate change as a cross-cutting issue under the Convention and encouraged Parties to take measures to manage ecosystems so as to maintain their resilience to extreme climate events and to help mitigate and adapt to climate change. Since then the COP had adopted various decisions on climate change aimed at providing guidance to Parties. The COP adopted decision X/33, a comprehensive decision inviting Parties to identify, monitor and assess the impacts of climate change on biodiversity and biodiversity-based livelihoods, reduce the impact of climate change, and climate change mitigation and adaptation activities on biodiversity and biodiversity-based livelihoods, and to implement ecosystem-based approaches to climate change mitigation (including through REDD+) and adaptation. The Strategic Plan for Biodiversity 2011 - 2020, adopted in 2010 included several targets relating to reducing the impact of climate change on biodiversity and biodiversity based livelihoods (Aichi Targets 10 and 15), reducing the impact of climate change responses on biodiversity and biodiversity-based livelihoods (Aichi Targets 10, 14 and 15), using ecosystems to mitigate climate change (Aichi Target 15) and to adapt to climate change (Aichi Target 15).

10. Ms. Eleanora Babij of the United States Fish and Wildlife Service (USFWS) presented an overview of the National Fish, Wildlife and Plants Climate Adaptation Strategy which had recently been developed in the United States. This strategy describes the impacts climate change is having on ecosystems and natural resources, and climate change adaptation goals, strategies and actions that were recommended in the strategy were discussed. These actions could be taken or initiated in the next five to ten years to help fish, wildlife, plants and ecosystems be more resilient and adapt to a changing climate.

11. Ms. Monika Böhm of the Zoological Society of London (ZSL) gave a presentation on ZSL's work on climate change and migratory species. A pilot study carried out by ZSL for the Convention on the Conservation of Migratory Species of Wild Animals (CMS) developed a methodology for vulnerability assessments of CMS-listed species, focusing on the vulnerability of species and habitats to climate change and the adaptive potential of species. The assessments also addressed the effects of climate change on species interactions and the importance of other anthropogenic threats on a species' ability to withstand climate change impacts. Already tested on 44 species listed on Appendix I of CMS (and the Appendix II species narwhal *Latin name?*), there was a need to roll out the assessment process across all Appendix I and other migratory species. The main issue in carrying out this work

was likely to be lack of funding. ZSL and IUCN were currently working together to develop a strategy for future work on climate vulnerability assessments (across taxa including non-migratory species and invertebrates), and it was hoped that through collaboration with members of this working group and other experts this important work could be driven forward.

12. Mr. Grzegorz Rąkowski of Poland gave a presentation highlighting work done in Poland on climate change impacts on biodiversity. According to the national report on present and predicted climate change effects on biodiversity (2012) the main climate change impacts on ecosystems in Poland until 2030 included a general decrease in the country's water resources, soil moisture deficit, changes caused by extreme weather phenomena and an increase of alien invasive species populations. The most visible climate change effects on birds in Poland included: changes in population size and range, changes in phenology and shifts of breeding area ranges. The main factors determining bird species' vulnerability to climate change were: dependence on climate change vulnerable habitats (wetlands, river valleys, seashore, high mountains, etc.), nest exposure to unfavourable weather conditions, narrow range of environmental conditions tolerated, strong decreasing population trend, small population size and low reproductive rate. Migratory birds in Poland were under additional stress from impacts of some mitigation actions, such as construction of wind turbine farms, hydrotechnical engineering, cultivation of plants used as a source of bioenergy and afforestation of open areas. At the same time some non-climate factors, such as changes in land use, intensification of agriculture, fragmentation or loss of bird habitats due to development of transportation networks, urbanization and development of tourism also had negative effects on bird populations. In the light of the Polish experience the reduction of the above-mentioned impacts should be one of the most important issues to be addressed in the CMS programme of work on climate change.

13. Mr. James Pearce-Higgins of the British Trust for Ornithology (BTO) gave a presentation on the impacts of climate change on migratory bird species. Spring arrival times of migratory species to the UK had advanced significantly since the 1960s, although departure times had not changed. Summer migrants were now present for longer. Migrant population declines were most apparent in species that had shifted their arrival the least¹. There were similar patterns of advance in laying dates of long-distance migrants, which could be explained by increases in spring temperature on the breeding grounds². There was strong latitudinal variation in the response of bird populations to temperature and precipitation. At high latitudes, temperature was most limiting, whilst in the tropics, variation in precipitation was most important. Long-distant migrant populations that winter at low latitudes were therefore most sensitive to precipitation³. A multi-species population index of long-distance migrants to the Sahel tracked variation in Sahel precipitation³. There was increasing evidence that large-scale population trends of both UK breeding seabirds and migratory waterbirds could be related to climate change. Future projections suggested many species in both groups would decline with climate change. Despite this, the current SPA network appeared resilient to climate change; sites would continue to support internationally important numbers in the future⁴. Ongoing work was extending this approach to other UK breeding birds⁵, which could be used to inform future vulnerability assessments. In collaboration with others, the BTO had recently led a vulnerability assessment for c. 4,000 species in the UK, based on the approach of Thomas *et al.*⁶.

14. Mr. Gustavo Induni of Costa Rica gave a presentation on the Costa Rican experience. He outlined some observed and projected effects of climate change on Costa Rican species such as shifting of distribution ranges (e.g. of amphibians, birds, bats, ants), diminished growth rates and reproductive capacity (e.g. of plants, amphibians, birds, reptiles), and higher mortality (e.g. of amphibians, plants,

¹ Newson, S.E. *et al.* (submitted) Long-term changes in the phenological strategies of migrants breeding in Britain.

² Ockendon, N. *et al.* (2013) Climatic effects on breeding grounds are more important drivers of breeding phenology in migrant birds than carry-over effects from wintering grounds. *Biology Letters* 9, 20130669

³ Pearce-Higgins, J.W. & Green, R.E. (2014). *Birds and Climate Change: Impacts and Conservation Responses*. Cambridge University Press, Cambridge, UK.

⁴ Johnston, A. *et al.* (2013) Observed and predicted effects of climate change on species abundance in protected areas. *Nature Climate Change* 3, 1055-1061

⁵ Renwick, A.R. *et al.* (2012) Modelling changes in species' abundance in response to projected climate change. *Diversity & Distributions* 18, 865-880.

⁶ Thomas, C.D. *et al.* (2010) A framework for assessing threats and benefits to species responding to climate change. *Methods in Ecology and Evolution* 2, 125-142.

coral reefs). He also highlighted Costa Rica's Ecological Monitoring Programme, as well as the country's actions to develop a National Strategy on Biodiversity Adaptation to climate change.

15. Ms. Houshna Naujeer Banu of Mauritius gave a presentation on the effects of climate change on Mauritius as a Small Island Developing State (SIDS). In her presentation she highlighted that Mauritius was highly vulnerable to the adverse effects of climate change which were expected to worsen in the decades to come and which might present a serious threat to continued prosperity of the island (PCCAM Baseline report Sept 2013). For the past decades, the island had been experiencing extreme weather events in terms of an increase in Mean Temperature (0.16 °C) and Mean Sea Level Rise (1.2mm), more intense tropical cyclones, flash floods and storm surges resulting in inundation of certain low-lying coastal areas affecting livelihoods, coastal wetlands and mangroves (DRR Report 2012). The Rivulet Terre Rouge Estuary Bird Sanctuary was the most important sanctuary and wintering (feeding and resting) ground for hundreds of migratory birds visiting the island during the summer. However, warmer temperatures, high energy waves and storm surges, and intense tropical cyclones would impact these wetland coastal habitats and their ecologically dependent migratory birds. An Adaptation and Mitigation Framework was consequently developed for Improved Resilience of coastal environment against climate change impacts.

16. Mr. Wisdom Mdumiseni Dlamini of Swaziland gave a presentation on climate change and migratory species in Swaziland. Swaziland, like many other areas of the continent of Africa and the world, had observed and continued to experience the adverse impacts on biodiversity. Recent analyses of climate data revealed that there was generally a warming trend with minimum temperatures for June and October showing rates of 0.312 °C and 0.663 °C between 1960 and 2010, respectively, while the maximum temperatures were estimated to be increasing at 0.312°C and 0.507°C, respectively. There was also an observed tendency to increased dryness and frequency of dry periods (droughts) including shifts in temperature and rainfall seasonality. Projections revealed that these trends were likely to continue into the foreseeable future. These changes had brought about subsequent changes in the ecosystems such as increased frequency of wildfires, bush encroachment and decreased vegetation vigour and stimulating land use changes. As a result, the habitats and life cycles of migratory species were affected. Swaziland, as part of the West Asia-Africa flyway, offered important sites for migratory waterbirds whose habitats were altered as a result of climate change. This required that concerted efforts be made to ensure the adaptation of migratory species and biodiversity in general. The country was at initial stages of developing climate change adaptation strategies the lessons from which were used to highlight a few key points for consideration in the development of a climate change work programme under the CMS convention.

17. Mr. Shiv Pal Singh representing India gave a presentation about the unique situation in the context of adaptation of biodiversity conservation in general and migratory species in particular, to climate change. Mr Singh explained the challenges faced by India emerging out of the large population of the country, low per capita availability of the forest, demands of a growing economy and highly diverse landscapes comprising 10 identified biogeographic zones, and a highly diverse society. With regards to adaptation to climate change, it was explained that India had formulated a National Action Plan for Climate Change. The Action Plan comprised eight missions, five of which were adaptive, two mitigative and one related to strategic knowledge. The National Mission for Green India had been designed to respond to climate change by a combination of adaptation and mitigation measures which would help vulnerable species and ecosystems to adapt to climate change. The mission aimed at qualitative improvement in forest cover and ecosystems, creation of new forest cover through reforestation and restoration of degraded habitats and improvement of livelihood for three million households. Apart from the National Mission for Green India, India was in the process of creating eco-sensitive zones around its network of Protected Areas to provide a cushion to insulate them as much as possible against activities which had adverse impact on them including climate change. India also strictly controlled diversion of forest land for non-forest uses which had resulted in drastic reduction of such diversion in the last three decades as compared to decades previous to that. India had also enacted the Companies Act 2014 that provided for utilization of a fixed amount of profits of the companies towards corporate social responsibility including environmental concerns. This was a unique initiative in India which would ensure regular funding for activities related to environmental concerns.

ITEM 4. TOWARDS A CMS PROGRAMME OF WORK ON CLIMATE CHANGE

18. The participants were divided into four task groups (TG) for in-depth discussions and drafting of the text of the Programme of Work. The task groups addressed the following issues:

- (a) TG 1: Management and monitoring of species populations, critical sites and ecological networks
- (b) TG 2: Climate change mitigation and adaptation, and land use planning
- (c) TG 3: Capacity building
- (d) TG 4: Cooperation and implementation

19. The four task groups provided detailed recommendations on these issues. Groups 1 and 4 were facilitated by Mr. James Pearce-Higgins (BTO) and groups 2 and 3 by Ms. Eleanora Babij (USFWS).

20. Results of the task groups fed into the draft Programme of Work, annexed to this report.

ITEM 5. ELEMENTS FOR A COP11 RESOLUTION ON CLIMATE CHANGE

21. Under this agenda item the workshop participants brainstormed possible elements for a COP 11 resolution on climate change, including a recommendation to adopt the draft Programme of Work on Climate Change, annexed to this report. One of the key elements discussed was the interpretation of the term “historic coverage” included in the definition of “favourable conservation status” in Article I (1) (c) (4) of the Convention, in order to take into account species distribution shifts due to climate change. Different options were discussed and it was finally agreed to include an operative point in the draft resolution to that effect, in view of the fact that climate change was not explicitly considered when the Convention text was concluded in 1979.

ITEM 6. SUMMARY AND CONCLUSIONS

22. Mr. Colin Galbraith summarized the discussions of the workshop and thanked the participants for their constructive work. He noted that climate change was a major problem affecting all habitats and that urgent action was needed to mitigate its impacts and help species adapt. He highlighted the need to collaborate on this, e.g. among Multilateral Environmental Agreements (MEAs). Mr. Galbraith also suggested that examples of best practice be compiled to illustrate how Parties and Non-Parties might address climate change and migratory species issues. Given the urgency of action to combat climate change impacts on migratory species, Mr. Galbraith expressed the need to strengthen the CMS Scientific Council working group on climate change, and suggested that the workshop participants should form the core of this working group. Mr. Galbraith also expressed his hope that the Resolution on Climate Change and its accompanying draft Programme of Work would find the support of the Conference of the Parties at its eleventh meeting.

ITEM 7. CLOSURE OF THE MEETING

23. After the customary acknowledgements the workshop closed at 5 p.m. Thursday, 10 April 2013.

24. The workshop was followed by an excursion to Cahuita National Park on Friday, 11 April 2014, where participants could directly see the impact of climate change in the coastline and the progressive reduction of the beaches where marine turtles nest.

ANNEX 1

PROGRAMME OF WORK ON CLIMATE CHANGE AND MIGRATORY SPECIES *(Prepared by the Scientific Council Climate Change Working Group)*

The addressees included in brackets below are to help prioritize actions according to individual circumstances.

Measures to facilitate species adaptation in response to climate change

- Prepare species action plans for those species listed on Appendix I considered to be most vulnerable to climate change (*Parties and the Scientific Council, international, intergovernmental and other relevant organizations*). Action plans should be undertaken at an appropriate level (species or management unit level), but measures may be implemented at the national level. For species already covered by existing CMS instruments, those action plans should be developed under those instruments. For other species, range states should work collaboratively to prepare action plans at an appropriate scale.
- Improve the resilience of migratory species and their habitats to climate change, and ensure habitat availability for the entire lifecycle of the species, now and in the future, *inter alia* through the following actions:
 - Identify and prioritize areas currently experiencing rapid climate impacts that are important to migratory species. (*Parties, scientific community and conservation stakeholders*)
 - Ensure that individual sites are sufficiently large, holding a variety of habitats and topography. (*Parties, scientific community and conservation stakeholders*)
 - Ensure there is physical and ecological connectivity between sites, aiding species dispersal and colonization when distributions shift. (*Parties, scientific community and conservation stakeholders*)
 - Consider the designation of seasonal protected areas or restrictions on land-use in areas where migratory species occur at critical stages in their lifecycle and would benefit from such protection. (*Parties, scientific community, international, intergovernmental and other relevant organizations*)
 - Undertake specific management to eliminate, counteract or compensate for detrimental impacts of climate change and other potential threats that may interact with or exacerbate climate change. (*Parties, scientific community and conservation stakeholders*)
 - Consider expanding existing protected area networks to cover important stop-over locations and sites for potential colonization, and to increase the resilience of vulnerable populations to extreme stochastic events. This may include increasing both the number and size of protected sites. (*Parties, scientific community, international, intergovernmental and other relevant organizations including conservation stakeholders*)
 - Integrate protected areas into wider landscapes and seascapes, ensure appropriate management practices in the wider matrix and undertake the restoration of degraded habitats and landscapes/seascapes (*Parties, scientific community and conservation stakeholders*)

- Establish and maintain a comprehensive, inter-jurisdictional inventory of current protected areas and candidate high priority protected areas in order to coordinate future conservation efforts. (*Parties, scientific community and conservation stakeholders*)
- Cooperate in respect of transboundary protected areas and populations, ensuring that barriers to migration are to the greatest possible extent eliminated or mitigated, and that migratory species are managed under commonly agreed criteria. Where appropriate, this should be done within the framework of applicable CMS instruments. (*Parties, scientific community, international, intergovernmental and other relevant organizations*)
- Identify migratory species that have special connectivity needs - those that are resource, area, and or dispersal limited. (*Parties, scientific community and conservation stakeholders*)
- Consider ex-situ measures and assisted colonization, including translocation, as appropriate, for those migratory species most severely threatened by climate change while bearing in mind the need to minimize the potential for unintended ecological consequences, in line with CBD COP Decision X/33 on Biodiversity and Climate Change, para 8(e). (*Parties, Scientific Council, and conservation stakeholders*)
- Periodically monitor the effectiveness of conservation actions in order to guide ongoing efforts and apply suitable adaptive responses as appropriate. (*Parties and scientific community*)

Vulnerability assessment

- Identify and promote a standardized methodology for evaluating species' vulnerability to climate change that includes the entire life-cycle of the species concerned. This may require the development and communication of new tools as appropriate. (*Parties, Scientific Council, scientific community, international, intergovernmental and other relevant organizations*)
- Undertake vulnerability assessments of Appendix I and II listed species at an appropriate (e.g. regional) scale, as the first priority. (*Parties, scientific community, international, intergovernmental and other relevant organizations*)
- Once completed, undertake climate change vulnerability assessments for other migratory species to identify those most susceptible to climate change. (*Parties, scientific community, international, intergovernmental and other relevant organizations*)
- Determine which species vulnerable to climate change should be listed or uplisted on the CMS Appendices, as appropriate. (*Parties*)

Monitoring and research

- Coordinate research and monitoring efforts in relation to the impacts of climate change across the CMS Family. (*Parties / Signatories to CMS instruments*)
- Undertake research on the status, trends, distribution and ecology of migratory species. This would include identifying knowledge gaps and may require the use and refinement of existing technologies and tools (e.g. remote sensing), the development of new ones, promotion of citizen science, and coordination / knowledge exchange to improve capacity. (*Parties, scientific community*)

- Develop an understanding of migratory routes (e.g. using new tracking technologies) and connectivity between populations (e.g. using genetic approaches) to identify key sites, locations and appropriate management units for particular species. (*Parties, scientific community*)
- Identify key breeding and stopover locations, and key wintering sites (hotspots) for migratory species and focus monitoring of environmental change on these locations. (*Parties, scientific community*)
- Develop and implement monitoring regimes that are adequate for distinguishing declines in populations from transboundary range shifts, for diagnosing causes of decline, and for analyzing the impact of climate change on migratory species, *inter alia* through the following measures:
 - Identify and carry out research on the impacts of climate change on migratory species, including the impact on habitats and on local (human) communities dependent on the ecosystem services provided by these species. Such research should consider impacts across the full life-cycle cycle of the species concerned. (*Scientific community*)
 - Establish appropriate monitoring of habitat extent and quality and the abundance of key resources / interacting species (e.g. keystone prey or major predators) to identify changes and to inform vulnerability assessments. (*Parties, scientific community*)
 - Establish and collate monitoring of other threats, to help identify synergistic threats and correctly attribute observed changes to climate change or to other causes. This may require the use and refinement of existing technologies and tools (e.g. remote sensing), the development of new ones, promotion of citizen science, and coordination / knowledge exchange to improve capacity. (*Parties, scientific community*)
 - Ensure that monitoring is maintained in the long term, using comparative methodologies. This will require significant knowledge exchange and guidance from countries where these techniques have been developed. (*Parties, scientific community, international, intergovernmental and other relevant organizations*)
 - Communicate and share monitoring results regularly with neighbouring and other range states (*Parties, international, intergovernmental and other relevant organizations*)
 - Model projected future impacts of climate change to inform vulnerability assessments and action plans. (*Scientific community*)
 - Continue to identify indicator species and/or composite indicators as a proxy for wider migratory species assemblages, habitats and ecosystems, and regularly report on the state of those indicators. (*Scientific community, Parties, NGOs*)
- Periodically conduct research to test the effectiveness of, and assess the risks associated with, species adaptation measures in response to climate change. (*Parties, scientific community*)
- Continue to fill the information gaps through research and monitoring, in order to make explicit the associated synergies and any trade-offs between biodiversity conservation, mitigation and adaptation efforts. (*Parties, scientific community*)

Climate change mitigation, human adaptation, and land use planning

- Identify, evaluate, prioritize and reduce the additional impacts on migratory species resulting from changes in human behaviour due to climate change (the so-called “tertiary effects”). (*Parties, relevant organizations*)
- Develop and/or revise environmental sensitivity and zoning maps, to include critical and important sites for migratory species, as an essential tool for sustainable land use planning and management and adaptation projects. (*Parties, scientific community, NGOs*)
- Use the environmental sensitivity and zoning maps to inform the selection of sites for climate change mitigation projects, such as renewable energy projects. (*Parties*)
- Develop general guidelines for mitigation and human adaptation projects to ensure that they are not harmful to migratory species. (*Scientific Council*)
- From the general guidelines develop step down guidelines at the national level for mitigation and adaptation projects to ensure that they are not harmful to migratory species. (*Parties, scientific community, NGOs, energy, agriculture, forestry, transport and other sectors*)
- Ensure that an environmental impact assessment is conducted prior to undertaking adaptation and mitigation projects taking into account impacts on migratory species. (*Parties, energy sector*)
- Make the monitoring of environmental impacts a standard requirement for climate change mitigation and adaptation projects and for land use planning. (*Parties, energy sector*)
- Ensure that projects incorporate adaptive management in mitigation and adaptation projects and land use planning, based on the results of monitoring activities. (*Parties*)
- Recognizing that there is considerable uncertainty regarding the potential effectiveness of offsetting as an approach to compensate for detrimental impacts of mitigation and human adaptation, undertake research to inform assessments of the likely role of compensatory or offsetting approaches designed to reduce and prevent detrimental impacts of mitigation and adaptation projects upon migratory species. (*Parties, scientific community*)
- Develop and apply appropriate methodologies to consider potential cumulative impacts of mitigation and adaptation projects across the entire life-cycle of migratory species, including breeding, wintering and stop-over sites, as well as impacts upon migratory routes. These should be applied at regional, national or international population levels, as appropriate. (*Parties, scientific community*)
- Ensure that where impacts on migratory species are significant, renewable energy and other climate change mitigation or adaptation structures are operated in ways that eliminate or minimize negative effects on migratory species (for example, including short-term shutdowns or higher turbine cut-in speeds, with regard to wind farms). (*Parties, energy sector*)
- Ensure that any climate change mitigation and adaptation action has appropriate social and environmental safeguards in place at all stages, taking into account CMS-listed species. (*Parties, multilateral development banks, and energy sector*)
- Ensure that the best available scientific information on the impacts of climate change on migratory species is accessible and useable for planning and decision-making. (*Parties, scientific community*)

Knowledge exchange and capacity-building

- Increase awareness of the impacts of climate change on migratory species. (*Parties, scientific community, international, intergovernmental and other relevant organizations*)
- Utilize the relevant IPCC reports and other reviews for background information on climate change impacts and compile and disseminate relevant information. (*Parties and Scientific Council*)
- Commission technical reviews and best-practice guidelines and encourage the publishing, sharing and distribution of periodic scientific reviews on the following topics (*Parties and scientific community*):
 - the impacts of climate change on migratory species;
 - the potential for conservation management to increase the resistance, resilience and adaptation of migratory species populations to climate change; and
 - the impacts of anthropogenic climate change adaptation and mitigation on migratory species.
- Disseminate the outcomes of these reviews through the CMS website and workspace, where possible translating the results of those reviews into different languages. (*Scientific Council*)
- Establish a series of regional and sub-regional or national workshops involving scientists, NGOs, national focal points for all relevant environmental conventions, policy makers and managers to exchange and discuss information. (*Parties, Scientific Council, scientific community, international, intergovernmental and other relevant organizations*)
- Establish better links between developing country needs and developed country research through CMS family instruments to promote collaboration, coordination and actions. (*Parties / Signatories to CMS instruments*)
- Increase capacity of natural resource managers and other decision makers and enhance their professional abilities to address the impacts on climate change on migratory species, including through the following actions:
 - Undertake a assessment of training needs on climate change and migratory species at the national level. (*Parties*)
 - Develop training on the use of existing and emerging tools for managing impacts of climate change on migratory species (GIS, statistical analysis etc). (*Parties, scientific community*)
 - Explore and build on existing training courses and work with professional societies, academia, technical experts and natural resource agency training professionals to address key needs and augment adaptation training opportunities. (*Parties, NGOs and scientific community*)
 - Identify and engage with key players who have experience in training opportunities for climate change, monitoring and modelling, and share that knowledge. (*Parties, international, intergovernmental and other relevant organizations*)
 - Develop and encourage the use of existing webinars and e-learning courses on climate change and migratory species. (*Parties, NGOs, scientific community*)
 - Increase scientific and management capacity, including through university courses up to the PhD level, to address climate change impacts on migratory species. (*Parties, scientific community*)
- Develop a baseline curriculum for webinars and e-learning courses to build capacity on climate change and migratory species among natural resource professionals and decision makers. (*Secretariat, Scientific Council, scientific community*)

- Contribute technical and scientific information on climate change and migratory species to the national and central clearing house mechanism of the CBD. (Parties, scientific community, NGOs and other relevant organizations)
- Invite the CBD COP to encourage its national focal points to make the national clearing house mechanisms available for information on migratory species and climate change. (*Parties*)
- Monitor the effectiveness of capacity building efforts on climate change and migratory species. (*Parties*)

Cooperation and implementation

- Coordinate measures to facilitate species adaptation in response to climate change across the various CMS instruments. (*Parties / Signatories to CMS instruments*)
- Work closely with and provide national UNFCCC Focal Points with expert guidance and support on how migratory species can be affected by human mitigation and adaptation activities, such as renewable energy and bio-energy development, and to collaborate closely in order to develop joint solutions aimed at minimizing negative impacts on migratory species. (*CMS Focal Points and Scientific Councillors*)
- Promote cooperation and synergies on climate change actions amongst the CMS family instruments, including organizing back-to-back meetings. (*Secretariat*)
- Consolidate the CMS Climate Change Working Group as a means to advise, promote and implement actions. This could include the prioritization and promotion of specific projects to funders. (*Secretariat*)
- Develop mechanisms for the promotion and implementation of best practices of migratory species management in light of climate change, with particular focus on hotspots. (*Parties*)
- Strengthen synergies with the Secretariats of the CBD, UNFCCC, UNCCD, Ramsar Convention, World Heritage Convention, IWC, Arctic Council and CAFF, Bern Convention, and other international instruments and arrangements. (*Secretariat*)
- Engage in and support CMS work related to climate change. (*CBD, UNFCCC, UNCCD, Ramsar Convention, World Heritage Convention, IWC, Arctic Council and CAFF, Bern Convention, and other international instruments and arrangements such as the Inter-American Convention (IAC) for the Protection and Conservation of Sea Turtles, international mechanisms such as the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and other relevant international instruments and arrangements*)
- Make use of available funding mechanisms to support the maintenance of ecosystem services, with the close involvement of local communities, in order to improve the conservation status of migratory species. (*Parties and relevant stakeholders*)
- Take the legislative, administrative, management and other measures necessary to implement the actions set out in this programme of work, including the incorporation of such measures in national climate change strategies, National Biodiversity Strategies and Action Plans (NBSAPs), protected area management plans, and other relevant policy instruments and processes. (*Parties and non-parties*)
- Provide financial, technical, advisory and other appropriate support for the implementation of this programme of work. (*Parties, UNEP, multilateral development banks and other national and international donors*)

ANNEX 2

List of participants

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