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Reinvigorating conservation efforts for the Atlantic humpback dolphin (Sousa teuszii): A brief progress report

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INTERNATIONAL WHALING COMMISSION

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Background

The Atlantic humpback dolphin (*Sousa teuszii*) is endemic to nearshore, tropical waters along the west coast of Africa in the eastern Atlantic Ocean, with a contemporary occurrence documented in 12 range states (Weir and Collins, 2015). Its conservation status has been of significant concern for several decades, with its nearshore habitat preference overlapping extensively with anthropogenic pressures including fishing, habitat degradation and loss, and hunting. The limited available data suggest that by-catch in fishing gear and deliberate hunting are significant causes of mortality in some areas. In recent years, the Atlantic humpback dolphin has been relisted to the Convention on Migratory Species (CMS) Appendix I and to Critically Endangered on the IUCN Red List (Collins et al., 2017) to reflect the increasing concerns over its status. Nevertheless, very little has been achieved to date with regard to progressing effective conservation and management measures for the species. This document briefly summarises several recent initiatives to drive progress, and makes recommendations towards prioritising where conservation efforts should focus in the short-term for *S. teuszii*.

Recent initiatives

CMS Concerted Action

In 2017, a Concerted Action (CA) for *S. teuszii* was adopted by the Convention on Migratory Species (CMS). Activities on the CA included: (1) the formation of a Steering Committee comprising range state stakeholders; (2) the convening of a Conservation Policy Meeting of Range States to define an Action Plan for renewed efforts to halt the decline of *S. teuszii*; and (3) the formulation of a five-year Plan of Action. Progress on these items stalled due to a lack of suitable funding to implement the primary activity, a meeting of *S. teuszii* range state stakeholders. A revised CA with an updated timeframe for delivering the Activities (2020–2023) was adopted at the 13th Meeting of the CMS in February 2020, and Giuseppe Notarbartolo di Sciara is leading the effort to implement it.

ESOCC meeting

In December 2018, a workshop on "Ex Situ Options for Cetacean Conservation" (ESOCC) was held in Heilsbronn, near Nuremberg (Germany), hosted by Zoo Nuremberg, the National Marine Mammal Foundation (San Diego, California) and YAQU PACHA e.V. The main objective of the meeting was to discuss whether ex situ options might contribute to the overall goal of conserving small cetacean species at risk of extinction. The workshop drew on lessons learned from efforts to save the baiji (*Lipotes vexillifer*), vaquita (*Phocoena sinus*), and Yangtze finless porpoise (*Neophocaena asiaeorientalis asiaeorientalis*), reviewed the conservation status of threatened small cetacean species or populations, and discussed available ex situ options that might help prevent extinction of other species on a similar conservation trajectory. The workshop report recommended that species action plans reflect the IUCN One Plan Approach, which integrate in situ and ex situ conservation as well as

prioritising efforts to close information gaps and ensure that the most effective actions are identified (ESOCC, In Press). The Barcelona meeting (see below) was a direct follow up to this workshop, facilitating further discussion of steps towards the development of a comprehensive species action plan.

Barcelona meeting

A meeting was held on 9 December 2019 at the World Marine Mammal Conference in Barcelona to discuss how research and conservation efforts for *S. teuszii* may be reinvigorated and prioritised (meeting minutes in Appendix 1). Extensive and diverse discussion was held regarding the most effective options for implementing effective conservation measures for *S. teuszii* on the ground in Africa, acknowledging the considerable logistical constraints related to infrastructure, and political and economic factors. Following the meeting, Weir and Collins (2020) produced a document outlining potential short- and medium-term targets for the conservation of *S. teuszii* (Appendix 2). The Targets fell under three broad areas:

1. *Increase awareness, capacity building and protection measures*. Including governmental and stakeholder engagement, legislative components, capacity-building, education and awareness.
2. *Fill knowledge gaps*. The collection of the field data relevant to filling in critical data gaps, prioritising those data that are needed to support informed conservation and management decisions.
3. *Implement immediate actions to address threats*. Directed towards those range states where specific threats (e.g. bycatch) have already been clearly identified.

Attendees of the Barcelona meeting, and some invited additional experts, were requested to sign up to Working Groups (WGs) established around the Targets identified by Weir and Collins (2020). These WGs are currently being established (Appendix 3) and their primary short-term output will be to produce prioritised lists of potential actions for each Target and identify potential funding options.

IWC Africa-Focused *Sousa* Task Team

Following the Scientific Committee Meeting of the IWC in Kenya, 2019, a recommendation was made to establish an Africa-Focused *Sousa* Task Team to "*facilitate and coordinate the work recommended by the IWC and to start working towards developing a comprehensive framework of conservation actions*". The Task Team covers both species of *Sousa* that occur in Africa, the Indian Ocean humpback dolphin *Sousa plumbea*, and *S. teuszii*. Invitations to the Task Team were issued at the end of January 2020.

Conclusions

The Barcelona meeting has reinvigorated motivation and collaborative effort for implementing actions for *S. teuszii*. The authors intend to establish an independent expert group, with a committee experienced in working on the west coast of Africa, to initiate and drive some of the Targets identified by Weir and Collins (2020). The overall mission of the group will be to "*Work towards the long-term sustainability of S. teuszii populations on the west coast of Africa through research, communication and action*." Target 1 runs parallel with and aligns well with the CMS CA, but Targets 2 and 3 are not currently being addressed. The aims of the IWC Africa-Focused *Sousa* Task Team are likely to overlap with Targets 2 and 3. However, we recommend that achieving optimal conservation action for *S. teuszii* would be more likely if the existing IWC Task Team was split to separately cover the two African *Sousa* species, or at least divided into separate species-focussed working groups.

Recommendations for the short-term prioritisation of Targets

Over the coming months, the Barcelona meeting WGs will work through each of the Targets, expand on them, potentially add to them, flesh out the details and rank them in order of priority. They will also be tasked with identifying potential sources of funding and if appropriate assist with the application

process. However, given that actions for the species have repeatedly stalled in recent years and that there is expert consensus that urgent action for the species is necessary, the co-authors of this paper have reviewed the Targets to identify those that could most easily be implemented with immediate funding (Table 1). Our assessment is based both on perceived benefit for the conservation and management of *S. teuszii*, and on the practicalities with which Targets are immediately achievable in the short-term on the ground in Africa. We have selected a single high priority Target for each of the three broad areas identified by Weir and Collins (2020):

1. *Increase awareness (at different stakeholder levels from community through to national government), capacity building and protection measures*: Target 1.1 is deemed high priority, and falls under the remit of the CMS CA. The latter was recently elevated from medium to high priority, and received significant support from some range state representatives. Next steps towards convening the range state meeting stipulated in the CA include the development of a draft conservation plan and its circulation for comments among range states stakeholders. This would ensure that an advanced version would be available at the meeting, as and when it can take place. That process is being driven by the CMS, who are seeking funding to support it.

2. *Fill knowledge gaps*: Based on the assessment in Table 1, we have identified the initiation of an assessment survey in Senegal and The Gambia as the highest priority for immediate funding under Area 2, and the one that would have the highest likelihood of success within the two years. Several other Targets could potentially be integrated with such a survey, and the outputs would also directly influence the development of similar work in other range states.

3. *Implement immediate actions to address threats*: The most obvious high priority for funding to implement direct action is in Congo, where a specific bycatch issue has been identified for *S. teuszii* in marine nearshore habitat. We recommend this as the highest priority for funding under Area 3.

The timeframe required to design, promote and implement a bycatch mitigation strategy in Congo is much longer than that required for the former two priority Targets. **We therefore recommend driving forwards the CMS CA and seeking funding for a Senegal/Gambia field study as our immediate short-term, achievable priorities**. In doing so, we recognise that many of the other Targets are equally important for the long-term conservation of *S. teuszii* and we are not suggesting that they are of a lower overall ranking; merely that they require a longer planning and implementation time. In taking this approach, we recognise that we need to avoid previous delays to the conservation of *S. teuszii*, where no action was progressed at all due to lengthy consideration over what was the best action to take. At this stage we believe effort has to start somewhere, gain momentum, and then expand onwards.

We consider it to be crucial that, to optimise ongoing conservation effort for *S. teuszii* (particularly given limited resources), progress regarding the development of conservation and management measures should be communicated in an open and inclusive manner amongst relevant parties (including, but not limited to, the CMS, IWC TT, IUCN CSG, and the Barcelona group). Ideally, this should be coordinated to minimise unnecessary overlap.

Acknowledgements

We are grateful to all participants of the Barcelona meeting (named in Appendix 1) for their input and discussion on developing conservation strategies for *S. teuszii*.

Table 1. List of Targets identified by Weir and Collins (2020). Note that Target 1.3 was introduced following the distribution of the original report, in recognition of the need for general education and outreach in the range states.

TARGET	**RECOMMENDATION**
Target 1.1. Progress the CMS Concerted Action	**High priority**, but being led by the CMS.
Target 1.2. Establish an expert panel to identify priorities and direct funding	The WGs being set up following the Barcelona meeting will work on identifying priorities for funding. Consequently, this Target is not considered to be a high short-term priority. We recommend that discussion should be held regarding overlap with CMS and IWC TT expert groups, and decisions reached on the necessity for multiple expert groups.
Target 1.3. General communication, education and outreach activities at community level	Outreach, education, and barrier assessment (i.e. assessing the barriers to engaging in *Sousa* conservation activities) are fundamental to the long-term conservation of *S. teuszii*. We recommend that these should use outputs from the first field study to promote the species and as a basis for developing outreach programmes to connect local communities and governments with *S. teuszii*, and the broader importance of healthy, balanced marine ecosystems.
Target 2.1. Conduct an abundance-distribution survey of the Senegal-Gambia population	This is currently recommended as a **high priority** for available immediate funding. This population is perhaps one of the largest remaining, and infrastructure is already in place via the African Aquatic Conservation Fund to facilitate a high level of success.
Target 2.2. Extend the Senegal-Gambia approach to other key range states	This was identified as a medium to long term Target. It is recommended that we conduct, and build on the experiences of, an initial field study in Senegal-Gambia before expanding to additional locations.
Target 2.3. Assess genetic diversity and population structure	Additional input from the genetic WG is required to assess the feasibility and urgency of this priority. Tissue acquisition from live animals will inherently have a long run-in time with regard to permitting. An eDNA study could potentially be incorporated into fieldwork in Senegal-Gambia, and its usefulness should be evaluated by the genetic WG.
Target 2.4. Improve the sampling of dead animals	This was identified as a medium-term Target, and will require a moderate run-in time. Dead animals are not frequently encountered in all areas, and it was suggested that this Target may best be implemented in Congo. We recommend that the WG further assess the feasibility and urgency of this priority.
Target 2.5. Assessments of occurrence in other potential range states	This Target was built around interview surveys. It is recommended that the WGs for Targets 2.5 and 3.2 flesh out the details of the validity and methodology to be applied for interview surveys, which is expected to take some months before a budget for work could be developed.

Target 2.6. Carry out preliminary work that will inform future health assessments and invasive work	This Target requires input from the WG, and, in the case of invasive work, would be expected to have a long run-in time with respect to permitting. Some initial ideas that fall under this target (see Appendix 2), such as water sampling, could potentially be accomplished during the first field study if funding for subsequent analysis could be acquired.
Target 2.7. Investigate the potential for acoustic monitoring	An initial acoustic study may be a cheap and easily implemented addition to a funded field survey in Senegal-Gambia and it is recommended that this possibility is discussed with the WG. Otherwise, this is currently considered to be a longer-term Target.
Target 3.1. Fund bycatch mitigation work in the Congo Republic	Since Congo is currently the only country for which we have identified a very specific and ongoing mortality problem for *S. teuszii*, this is currently recommended as a **high priority** for funding. However, implementing it in practice will require additional stakeholder engagement, and the commitment of a new National Park stakeholder (Noé Conservation). Consequently, we highlight this Target as a key priority for direct action, but on a short to medium term timeframe with regard to developing a strategy and acquiring funding.
Target 3.2. Conduct interview surveys to identify other populations for which specific population-level threats likely exist	This Target was built around interview surveys. It is recommended that the WGs for Targets 2.5 and 3.2 flesh out the details of the validity and methodology to be applied for interview surveys, which is expected to take some months before a budget for work could be developed. Developing this Target was considered a priority by the ESOCC workshop participants, who considered that it could yield qualitative information on species occurrence and abundance at relatively low cost.
Target 3.3. Address threat level from commercial coastal development	This Target is not easily accomplished in the immediate future. However, some of it may be addressed through engaging governments during the CMS CA process and the development and regional endorsement of a *S. teuszii* conservation action plan. We therefore identify this as a longer-term Target relative to the timeframe being considered here.

References

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Appendix 1. Minutes from the meeting on the Atlantic humpback dolphin Held at the World Marine Mammal Conference, Barcelona 9th December 2019, 17:30 – 19:00

Agenda

1. Opening statement
2. Introductions
3. CMS Concerted Action (CA)
4. Other processes
5. Reinvigorating effort
6. Closing statements

1. Opening statement

Tim Collins (TC) provided a summary of the current situation and the rationale for this meeting:

- There is not much progress at the moment and nothing concrete in the pipeline, which is a cause for concern.
- The CMS concerted action has stalled due to a lack of suitable funding to implement the primary activity, a meeting of *Sousa teuszii* range state stakeholders. Guinea has offered to host a meeting should it be held, but the offer has not been confirmed.
- There is some information available from certain countries, but for many potential range states there is no information at all. The only abundance information is Caroline Weir's (CW) work in Guinea, Senegal and Angola.
- No activities or field efforts are being sustained for many reasons. These include (but are not limited to) the time/challenges of grant writing and grant management (TC), logistics/challenges/politics that limit potential to work in some countries (TC), some people lack big organization affiliations and the associated support which limits funding opportunities (e.g. CW). Lucy Keith Diagne (LKD) is based in Senegal but been working full-time on manatees and the Senegal Stranding Network. Some work has had to be largely self-funded (e.g. CW in Angola) which limits it, and some has been short-term contractual for commercial clients (e.g. CW in Guinea).
- The recent CR listing should motivate for more work, and ideally more funding.

2. Introductions

A list of Attendees is provided in Appendix 1.

3. CMS Concerted Action (CA)

Giuseppe Notarbartolo di Sciara (GNdS): stated that he was not a *Sousa teuszii* expert, but had seen some years ago the small, isolated population at Dakhla (Western Sahara), recently confirmed to still be there by KvW. He reported that his task as counsellor for aquatic mammals is to take the CA forward. The CA was adopted at the last Conference of the Parties (COP) in Manila during 2017, and

he is currently preparing for the next COP in India 2020. The scientific council recently met in Bonn and a recommendation to renew will be made. Obliged to present at next COP, with some certainty for 3-year renewal of the CA. Opportunity to provide addendum that outlines proposed activities.

GNdS: Provided a brief overview of the 7-page CA, including the proposed activities[1].

1. Formation of a Steering Committee (SC) among stakeholders (governmental, NGO, Secretariat) of the Range States of the Atlantic Humpback Dolphin.
2. Convene a Conservation Policy Meeting of Range States (not earlier than the beginning of 2018) to define an Action Plan for renewed efforts to halt the decline of the Atlantic Humpback Dolphin.
3. Discussion and formulation of a feasible Plan of Action (PoA) for the five-year period 2018-2023, including undertake a status evaluation of Atlantic Humpback Dolphin in each of the Range States.

The COP then outlines a list of immediate, medium-term and long-term expected outcomes, resulting from the activities. GNdS indicated he would have even less time than this brief summary to present the CA at the CMS COP, and that it would be up to this group to push the plan forwards.

Heidrun Frisch-Nwakanma (HFN): confirmed that an addendum can be presented to the COP and timelines adjusted. If a different focus is needed then it can be presented in the addendum, and we can present a proposal for what is envisaged for the next 3 years (timeframe = start of January [document now available here]).

4. Other processes

Doug DeMaster (DD): provided a brief background on the ESOCC workshop which focused on 7 species, all IUCN listed and all shallow water dependent. The workshop provided a framework for discussing a combination of ex situ and in situ conservation options, under the IUCN "One Plan Approach". *Sousa teuszii* was a particular focus of the workshop, and outputs included a useful assessment of information gaps considered necessary for the conservation of the species moving forward.

Mark Simmonds (MS): provided a summary of the IWC task team approach. Discussion at an IWC pre-SC workshop (2019) on aquatic wildmeat in West Africa included a recommendation to form an IWC task team (TT) focused on African *Sousa* sp. (and the Franciscana TT would be a good model). The idea behind the TT approach is to motivate a fast response to completing urgent research in pressing areas. With the Franciscana the TT approach has worked well and some urgently needed research has been completed, alongside the development of a CMP. The TT process provides a valuable opportunity for governments to see what is happening, provides a mechanism for other sponsors to be found. Following the 2019 IWC meeting a list of relevant names (researchers, local practitioners, etc) was resolved and comprised either one or two teams (for each African *Sousa* sp). The process currently rests with Lindsay Porter who will define the needed next steps. Options include meeting for a workshop, but the region is complicated geographically (vast range) and resources for the IWC TT are not automatic. In the case of the Franciscana, Brazil provided a large amount of funding. Rebecca Lent (IWC Exec Secretary) is exploring how IWC can help encourage funding. It was noted that every range state is a CMS signatory, but not all are in IWC, which begged the question of how the IWC will be able to leverage range state involvement. MS stated that it does not really matter, the TT process is plastic, and there is no bar to who can be involved (and not restricted to IWC members).

[1] A copy of the full COP was circulated to all participants prior to the meeting, with the draft meeting agenda.

5. Reinvigorating effort

TC: There have been three years of little action on the CMS CA. Suggested we adopt a dual parallel process:

1. Continue to move towards implementing the CA (probably requiring ~$40,000-$50,000 to hold a meeting) which will happen in its own timeframe. The CA should work to engage the range states/stakeholders, identify new priorities, and agree a plan of action for moving forward.
2. In the meantime, aim to commence actions now to reinvigorate the field research on *Sousa teuszii* that has stalled for various reasons. Small grants are insufficient to make real progress and a sustainable funding mechanism is needed. Actions should work to fill data gaps identified in Nuremberg, the IUCN assessment and elsewhere. Suggested that we find a model that works (e.g. Senegal) and then expand that effort outwards to other range states.

Some open discussion was then had around the second point, regarding opinions on what might be needed and some logistical considerations.

TC: Suggested:

- Initiating some sensible discrete areas of work to push ahead on addressing the broader concerns. For example, establishing abundance estimates - CW has single season snapshots at some sites but then lacks fund to continue.
- Possibility of rapid interview surveys as suggested at ESOCC and used successfully elsewhere (e.g. Turvey). However, there are concerns over success of this method in West Africa given the high spatial overlap of *Sousa teuszii* and *Tursiops*, and the fact that fishers often don't distinguish between them (CW and KvW both encountered this, even when illustrations were used by CW).
- Try to find funding for robust estimates, mark recapture based (line transect would not be efficient), sustained effort is needed.
- Perhaps focus on one or two sites in the first instance. Saloum Delta in Senegal has a seemingly healthy population at present and would be a good focus, and Gabon may also be a possibility since it has good environmental stewardship credentials.

TC: Asked LKD to provide a quick background to her work in Senegal and possibility of logistical support for work in the Saloum Delta.

LKD: Several points:

- Established the African Aquatic Conservation Fund (AACF) as a USA 501c3 (nonprofit) in 2014, with our main office in Senegal. AACF works predominantly on African manatees and turtles (African Chelonian Institute). They also run the Senegal stranding network in a collaboration with the Smithsonian. In the process of registering as a non-profit in Senegal. Sal Cerchio will be joining as a new PI soon. Lucy has limited time to take on another research project, but the AACF has infrastructure in Senegal, and a team that can help with logistics and fieldwork.
- Lucy and Ibrahima sometimes encounter *Sousa teuszii* during manatee surveys and see them in the same areas that CW documented during her study, as well as one location where she did not sight them.
- Highlighted that the permitting process in Senegal is burdensome. They have an existing cetacean permit that is renewed annually that would cover passive research (i.e. photo-ID, interviews, eDNA sampling), but for anything else a more in-depth permit would have to be applied for and it can take a year. It is important that government officials are engaged with early in the process and it would be helpful if TC or CW could join LKD in meeting with them.
- AACF has submitted a proposal, in association with WDC, for a small fund (Darwin) that will facilitate an initial scoping assessment of needs for a larger cetacean, manatee and sea turtle

bycatch project in Senegal. The scoping fund has not yet been awarded. If the project proceeds as planned, then the larger fund, a three-year cycle, could incorporate *Sousa teuszii* research.

- A new paper has just been published on the complete mitochondrial genome of *Sousa teuszii* from a carcass recovered in Senegal. They have also collected some eDNA for a preliminary study and will collect more samples next June.

TC: Ideas for moving forwards:

- This meeting has brought a lot of interested people together and provided background. Moving forwards from this point we need to identify a series of tasks, people who would like to be involved, and start to delegate responsibility for tasks such as writing proposals.
- Perhaps developing a series of focused projects in a few sites (i.e. the Senegalese/Gambian population and then also Gabon/Congo). We need to identify an approach, including priority actions, for what can be done in the field and with respect to the CMS CA and then move it all forwards. Just acquiring abundance estimates would be significant progress.
- There are significant port developments in some areas (referring specifically to Guinea and CW's short survey of *Sousa teuszii* there in relation to construction of another facility). IUCN could be involved in advising/facilitating contacts with these companies, and perhaps help leverage suitable funding if their project activities affect habitats and populations?
- Guinea-Bissau status is unclear but thought to be declining. In Gabon/Congo there is a small population and a simple (bycatch - tiny fishery) problem that could be addressed.
- Ensuring buy-in from government agencies is crucial. In Senegal we may need to fly someone in to provide presentations and talk about the situation with officials [LKD post-meeting note = "If this funding doesn't materialize I can certainly talk to the govt agencies I already work with: Eaux et Forets, Aires Marine Protegees, National Parks."] In Gabon there are already good links with the government agencies via ANPN/WCS and more recently Vincent Ridoux and La Rochelle, which should make it easier to develop and test the rapid interview survey, arrange field support and facilitation etc.

Gianna Minton (GM): With respect to the rapid interview surveys, it may be possible to combine efforts with sawfish surveys which occur in the same range states and for which the IUCN shark specialist group are planning surveys. If interview surveys could be used to demonstrate range state contraction (as per Gill's talk) then that would be useful.

TC: There is also Rima Jabado (new Pew Fellow) who is an elasmobranch expert working in Mauritania/Senegal and identifies animals at markets. It might be more feasible to secure funding for a combined multi-species survey approach, including also turtles.

TC: We need to investigate and lay the groundwork for detailed health assessments (including the temporary capture of animals to collect data). Lessons should be learnt from the vaquita and baiji experiences about making sure that procedures are in place before it is too late. Start by investigating captive care, handling and health assessments of other *Sousa* species? Ocean Park Conservation Foundation could help? CW and TC have some concerns about this process in specific relation to *Sousa teuszii* and its environment. TC noted that the collection of samples from dead (bycaught) *Sousa teuszii* in Congo was often incomplete, and not all potential information was being collected. Skeletal material and samples are stored in various countries and developing an inventory of these would be useful. It would also be useful to determine what additional samples could and should be collected when dead animals are available.

TC: It would be useful to assess whether there may be additional information on the species in unpublished work, particularly in French collections and archives. If appropriate a review should be completed.

TC: We could also use acoustic methods. Some CPOD work has been done in Gabon/Congo. This can be a very effective supplementary method in difficult environments where it is hard to find animals. However, there is currently no way to distinguish between *Tursiops* and *Sousa* using the existing C-PODs. [CW post-meeting note = Chelonia now also make F-PODs which record more of the click characteristics and might potentially be able to distinguish them, but would need some ground-truthing]. [TC post-meeting note = Nick Tregenza (Chelonia) briefly mentioned to TC that he is keen to help with F-PODs, though it would need further discussion]

MS: With regard to furthering the process, one way to continue would be to write up these ideas and submit to the TT to explore how the CMS CA might help (once endorsed). The IWC Secretariat could look into funding to push these ideas forwards.

Peter Corkeron (PC): The mountain gorilla experience has demonstrated that having a research station can be an effective conservation tool. With the baiji there was no specific place with focus. The MPA process in Australia and New Zealand began with research stations, which resulted in groups of interested and skilled people. Perhaps for *Sousa teuszii* in at least one of the known sites there could be a building, with people going out and doing the field research?
LKD: A house could potentially be rented.
TC: In Gabon and Congo there are existing marine centers that could be supplemented, and organizations that could raise funds. We could suggest tools they could develop to help raise money, e.g. educational materials.

TC: Asked CW if there was anything she wanted to add, as she has the most practical experience with (live) *Sousa teuszii*.
CW: Lots of good ideas being suggested but we need to decide the priorities? A building may be a good idea for the future, but for now at the top of the list is to get the necessary baseline data in the core remaining areas? Probably prioritizing the Senegal/Gambia population in the Saloum Delta region, also Guinea-Bissau, and also increased effort in Guinea? We also need to discuss what to do about the small numbers of animals at both extremes of the range, i.e. Western Sahara and Angola, and whether we should be allocating resources to those?
GNdS: Noted that the Western Sahara animals already had some form of protection since they occur in an enclosed system that was well protected.

GNdS: The CMS CA concentrates on action, while the discussion here is about science. All here know that science needs to be targeted to conservation. It seems that available knowledge is patchy. A priority need is to motivate decision makers in the region. Although the importance of science is clear, actions by those who can make a difference for conservation is needed.

Randy Wells (RW): Science-based conservation and capacity building can be done in parallel. RW can continue to provide capacity building and training in field techniques to those people who are potential workers on the ground in the range states.

PC: There has been lots of discussion about assessing the species across its range, starting with a few key areas where abundance estimates are needed. This will not save them immediately, but serves as a precursor for actions needed e.g. removing gill nets. PC suggests that removal of gillnets from impact zones would likely be effective. What we need to do first is save at least one population.

Howard Rosenbaum (HR): Adding to what PC and CW have said, it is a tall order given the large range, and highly fragmented distribution of the species. There are already two institutions working in the area, AACF and WCS, that could be supplemented. CW and others here could work on capacity-building, shoring up actions in two areas, reinforcing commitments, whatever the priority actions are, and then move into other areas as CW suggested.

Sal Cerchio (SC): Adding to what PC said. When work started in Madagascar to obtain species diversity information and abundance estimates for coastal dolphins (spurred by Norbert's work), it was clear that populations were tiny, being hunted unsustainably, and there was no time to get precise data. The immediate need was for conservation actions. There are now three communities that used to take many animals, but which have not hunted now for eight years. So an approach for a range-wide assessment could be focused on where there are dead dolphins, identifying local people who could facilitate, developing capacity within each country where there are significant dolphin mortalities. That would be better than range-wide abundance estimates.

[CW and TC post-meeting comment: *Sousa* in Senegal vs *Sousa* in Congo (for instance) are worlds' apart - the conservation issues are very different. A "one size fits all" approach will not work, but rather we have to emphasise to everyone that the priorities and actions in these different countries are going to necessarily vary. This is a VERY different situation from the vaquita and the baiji where single range states were concerned and with much the same threats throughout.

TC: We probably need to aim for a balance. Abundance estimates would be helpful in areas with significant bycatch. In some parts of the range, dead dolphins are utilized or hidden (see KvW papers), and the scale of the issue is therefore not apparent. Establishing useful beach surveys takes time (2-3 years) to encourage open reporting. Removing the threat of prosecution and paying for carcasses (e.g. Congo), would help facilitate reporting.

Aristide Kamla (AK): Provided a brief overview of current work in Cameroon, where a monitoring program has been started with fishers who were provided with smartphones and a custom app to photograph and report sightings of cetaceans and other wildlife. They have not received reports of *Sousa teuszii* yet. However, this information is being shared with the government, who have recently agreed to protection of additional species including *Sousa teuszii*.

TC: Reiterated that AK is a Fulbright scholar who has just finished his Ph.D. With regard to RW's comment about capacity building, people such as AK are of enormous value to *Sousa teuszii* conservation and we need to support and involve them.

Stephanie Plön (SP): It is worth considering the many good points raised during the wildmeat workshop, the report of which should be released soon. That could be mined to supplement the suggestions and concerns here.

6. Closing statements

TC: Follow-up points:

- We will summarize the discussions from this meeting and distribute them by email as formal Minutes.
- We should aim to agree by email a consensus on the focus and involved personnel moving forwards.
- TC and CW met prior to the meeting, and concluded that a lack of communication and integration between people working on *Sousa teuszii* had been problematic in the past and had probably hindered progress with regard to species conservation efforts. This is acknowledged as something critical to address. Moving forwards, good communication, inclusivity and open exchange of views is needed.
- Finally, someone efficient to organize the process (task team, ad hoc group, many involvements) is needed. CW is a good candidate. We can also consider a small steering group.

MS: The IWC Task Team process is focused on conducting urgent research, which needs to happen right away. It can subsequently be revised. A call for conservation action is a separate, and possibly CMS track. However recommended actions could be cascaded.

TC: There are various other associations and organisations that could be involved, especially for funding support. The IUCN has some influence on the way some huge projects manage their environmental engagement. The updated IUCN assessment (CR) could produce some dividends with respect to some of the larger construction projects (e.g. in Guinea). We should make inquiries about big development plans in the species range states, and bring that into consideration too.

Meeting closed.

Appendix 1. List of Attendees

Tim Collins
Caroline Weir
Giuseppe Notarbartolo di Sciara
Heidrun Frisch-Nwakanma
Tom Jefferson
Doug DeMaster
Mark Simmonds
Tilen Genov
Lucy Keith Diagne
Sal Cerchio
Michael McGowen
Aristide Kamla
Eddy Nganga
Ibrahima Ndong
Gianna Minton
Forrest Gomez
Randall Wells
Peter Corkeron
Nicola Hodgins
Stephanie Plön
Howard Rosenbaum
Gill Braulik
Charlotte Boyd
Ana Amaral
Lorenzo von Fersen
Lorenzo Rojas-Bracho
Paolo Martelli

Invited but could not attend
Cynthia Smith
Vincent Ridoux
Regis Kema Kema
Charley Potter
Lindsay Porter
Sofie Van Parijs
Randall Reeves
Barbara Taylor
Koen Van Waerebeek
Samuel Turvey
Ruth Leeney
Grant Abel

Appendix 2. Potential short- and medium-term targets for the conservation of *Sousa teuszii*

Prepared by Caroline Weir & Tim Collins

Distributed on 29th January 2020

Synopsis

In this document we have identified a number of short- and medium-term targets to progress conservation efforts for *Sousa teuszii*. These targets incorporate objectives identified at the ESOCC workshop[2] in Nuremberg in December 2018, and those identified at the *ad hoc* meeting held at the World Marine Mammal Conference (WMMC) in Barcelona during December 2019. These targets are not prioritised (but ranking them might be a good idea), and should be considered departure points for further discussion and agreement. We also recognize that adopting a longer-term conservation plan, such as the CMS Concerted Action, should remain the overall goal of these efforts.

In contrast to some other small cetaceans of high conservation concern which occur in few or even a single range state (i.e. baiji, vaquita), the contemporary occurrence of *Sousa teuszii* includes (at least) 13 countries: Western Sahara, Mauritania, Senegal, Gambia, Guinea-Bissau, Guinea, Benin, Togo, Nigeria, Cameroon, Gabon, Congo Republic and Angola. A "one size fits all" approach to conserving *Sousa teuszii* is therefore unlikely to be appropriate. It should be recognized that the range states vary in their existing legislative frameworks for protecting dolphins and maintaining biodiversity, in the amounts and types of habitat available for dolphins (*Sousa teuszii* variously occupies exposed marine coasts to river systems in different parts of its range), and in the documented levels of exposure to threats. For example, the population of *Sousa teuszii* in southern Senegal/Gambia is *comparatively* large, uses a variety of marine, estuarine and riverine habitats, and appears to be a *comparatively* low threat population (although some mortality events have been documented). In contrast, in Congo *Sousa teuszii* occurs exclusively along exposed marine coasts, is uncommon, and a significant specific threat has been identified (i.e. bycatch and secondary wildmeat trade). While these examples are over-simplified, they serve to illustrate that the actions required to conserve *Sousa teuszii* need to account for region-specific factors. Additionally, the logistics in range states vary according to resources, infrastructure, remoteness and language, and such practical considerations are relevant to identifying where actions are most likely to succeed.

Overall, most actions required to move forwards the conservation of *Sousa teuszii* can be allocated to three core areas:

4. **Increase awareness, capacity building and protection measures**. Work with the governments and other relevant agencies (including environmental consultancies) of confirmed and potential range states in order to increase awareness, manage threats and improve/implement legislative elements (both for dolphins and the preservation of their habitats). Actively engage the private sector, including developers. Provide education and awareness of dolphins to local coastal communities (especially fishers). Support capacity building via the training and inclusion of local biologists and other wildlife professionals (e.g. rangers).
5. **Fill knowledge gaps**. The collection of the field data relevant to filling in critical data gaps, prioritising those data that are needed to support informed conservation and management

[2] https://tiergarten.nuernberg.de/uploads/tx_news/ESOCC.pressrelease.pdf

decisions. Including baseline abundance estimates (and ongoing trends), distribution, genetic diversity/population structure, mortality causes and rates, life history, and health.

6. **Implement immediate actions to address threats**. Directed towards those range states where specific threats (e.g. bycatch) have already been clearly identified as having significant impacts on contemporary dolphin populations, and therefore where implementing immediate actions can be justified even in the absence of robust scientific data on population size or trends.

With the above synopsis in mind, we propose several short- and medium-term targets that represent realistic and achievable options to reignite conservation efforts for the species.

Short- and medium-term targets

1. Increase awareness, capacity building and protection measures

Target 1.1. Progress the CMS Concerted Action (short to medium term)
Most of the necessary stakeholder engagement would be achieved by furthering the CMS CA. The first two actions require:

1. Establishing a steering committee and organising a meeting of stakeholders. Funding is required.
2. Establishing a task force (TF), which would subsequently develop the 5 year plan of action.

Target 1.2. Establish an expert panel to identify priorities and direct funding (short term)

- This would be a core group formed in the short term to direct immediate needs and push momentum forwards, but may also be integrated with the CMS TF.

2. Fill knowledge gaps

Target 2.1. Conduct an abundance-distribution survey of the Senegal-Gambia population (short term)
This population is perhaps one of the largest remaining and apparently subject to some of the lowest anthropogenic pressures (acknowledging that this does not mean no threats at all). Logistics and government connections in Senegal can be facilitated by the African Aquatic Conservation Fund. It is therefore an ideal population to establish a long-term monitoring programme and whose viability we should seek to secure for the future. The most recent information on distribution and population size originates from Oct/Nov 2015. We initially propose two intra-annual surveys in different seasons, since evidence from interview data suggests spatio-temporal shifts. Then annual monitoring thereafter. Permits/agreement are required from both Senegal and Gambia, since last survey was limited to Senegal only. Allow a one-year run-in for permitting.

Target 2.2. Extend the Senegal-Gambia approach to other key range states (medium to long term)
We highlight Guinea, Guinea-Bissau and Gabon/Congo as three additional key areas supporting contemporary *Sousa teuszii* populations, where abundance/distribution surveys are needed. In particular, there are no recent data from a potentially significant population in Guinea-Bissau.

Target 2.3. Assess genetic diversity and population structure (medium-term)
Clarifying population structure is a key requirement for prioritising long-term conservation. Additionally, we need to understand whether the small populations at the extreme north and south of the distribution range (Western Sahara and Angola) are critical to the maintenance of genetic diversity in the species, in order to prioritise effort. Tissue samples (and associated collection permits and CITES export permits) may be challenging to obtain and require longer timeframes. Investigate eDNA (no CITES requirements for water samples) and whether sampling kits could be sent to contacts in range states to investigate haplotype diversity in different areas. Establish a database of available archived samples, including skulls/skeletal remains from which genetic material could potentially be extracted.

Target 2.4. Improve the sampling of dead animals (medium term)
Identify what types of samples are most critical for life history, health assessment and genetics. Establish basic sampling/necropsy protocols (in relevant languages) that can be followed with simple training and with the resources realistically available in range states. In key range states where suitable personnel exist, implement training and support with sampling equipment. Prioritise sample collection in range states where dead animals are most accessible, e.g. Congo.

Target 2.5. Assessments of occurrence in other potential range states
Baseline assessments via interview surveys[3], especially in confirmed range states with few records (e.g. Nigeria, Togo), those with no recent records (e.g. Ghana), and in countries that are unconfirmed potential range states (e.g. Sierra Leone), to establish presence and distribution. These initial data will inform future monitoring efforts and engage governments. Could be carried out concurrently with surveys on threats (Target 3.2).

Target 2.6. Carry out preliminary work that will inform future health assessments and invasive work (short to medium term)
To prepare for a future informed evaluation of whether it is justifiable to capture animals (for future health assessments or translocations) or carry out invasive research (e.g. biopsying or tagging), we propose several preliminary studies:

- Develop an incremental strategy for health assessment in partnership with appropriate specialists.
- An assessment of water quality in potential target areas to determine levels of human faecal bacteria and other pollutants in the waterways that could infect open wounds. Are open marine coasts lower risk environments in this respect than rivers/estuaries?
- Collaboration with other proposed capture or invasive research on *Sousa* populations elsewhere in the world, via exchange of information and possible training participation of personnel.
- A literature review of existing information on other *Sousa* populations.

Target 2.7. Investigate the potential for acoustic monitoring (medium term)
Acoustic devices can provide good information on cetacean occurrence, but previously it hasn't been possible to distinguish between *Sousa* and *Tursiops* using C-PODs. Newer technologies (e.g. F-PODs, SoundTraps) may be able to accomplish this. A preliminary feasibility study would aid in assessing whether or not acoustic methods could specifically identify *Sousa teuszii* and thus be incorporated into cost-effective long-term monitoring plans.

3. Implement immediate actions to address threats

Target 3.1. Fund bycatch mitigation work in the Congo Republic (short term)
While some mortality of *Sousa teuszii* has been documented in most range states, there are few countries where sufficient data exist in a contemporary context to implicate a direct population-level impact. The Congo is one exception, and bycatch mitigation (with governmental support) could potentially be implemented effectively in the short-term with immediate results. A bycatch mitigation program could also incorporate necropsy and other sampling (health assessments), i.e. re-igniting and expanding on Tim's previous work.

Target 3.2. Conduct interview surveys to identify other populations for which specific population-level threats likely exist (short to medium term)

[3] There are several challenges to the potential success of interview surveys, namely a reluctance for people to speak out about bycatch and other mortalities in some countries, the interviews needing to be conducted in local dialects (many fishers speak local languages rather than French, Portuguese or English), and the experience of KvW and CW during previous interviews that most people were unable to reliably distinguish between *Sousa* and *Tursiops* even when shown illustrations/photos and even having spent considerable time with *Sousa* (e.g. CW's boat driver).

Assessments of mortality and threats via interview surveys, targeting fishing communities and markets. Could be carried out concurrently with surveys on threats (Target 2.5). The same potential limitations are highlighted as for Target 2.5.

Target 3.3. Address threat level from commercial coastal development (short to medium term)
In some countries there is considerable investment by foreign companies in the development of coastal port facilities for exporting minerals (the estuaries of Guinea are highlighted as one such region). While environmental impact assessments are carried out, these are often based on insufficient data. Given the CR status of *Sousa teuszii*, the impacts of such developments on the species and its habitat should be investigated, and companies encouraged to conduct more extensive baseline assessments and fund longer-term monitoring as part of their offsets. An initial letter of concern could be initiated through the IUCN framework.

Appendix 3. Preliminary Working Groups established around the Targets identified by Weir and Collins (2020)

TARGET	WG members (provisional)
1.1 Progress CMS CA	Mark Simmonds Heidrun Frisch-Nwakanma Giuseppe NdS Gianna Minton Howard Rosenbaum Koen Van Waerebeek Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter
1.2 Establish expert panel	Mark Simmonds Tom Jefferson Giuseppe NdS Lorenzo Rojas Bracho Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter
1.3 General outreach/capacity	Tilen Genov Ruth Leeney Mark Simmonds Lucy Keith-Diagne Lorenzo von Fersen Gill Braulik Matt Leslie Sal Cerchio Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter
2.1 and 2.2 Field studies	Randy Wells Tilen Genov Ruth Leeney Lucy Keith-Diagne Ibrahima Ndong Regis Kema Kema Matt Leslie Sal Cerchio Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter
2.3 Genetics	Tilen Genov Lucy Keith-Diagne Michael McGovern Ana Rita Amaral

	Matt Leslie Howard Rosenbaum Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter
2.4 Sampling dead animals	Forrest Gomez Cynthia Smith Tilen Genov Lucy Keith-Diagne Matt Leslie Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter
2.5 and 3.2 Interview surveys	Samuel Turvey Ruth Leeney Tom Jefferson Tilen Genov Lucy Keith-Diagne Gill Braulik Regis Kema Kema Sal Cerchio Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter
2.6 Health assessments	Forrest Gomez Cynthia Smith Randy Wells Tilen Genov Lucy Keith-Diagne Grant Abel Matt Leslie Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter
2.7 Acoustics	Nick Tregenza Randy Wells Ruth Leeney Tilen Genov Lucy Keith-Diagne Peter Corkeron Sal Cerchio Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter

3.1 Bycatch mitigation	Marguerite Tarzia Lorenzo Rojas Bracho Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter
3.3 Coastal development	Tom Jefferson Lucy Keith-Diagne Tim Collins Caroline Weir Nicola Hodgins Lindsay Porter