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Range-Wide Conservation Efforts for the Critically Endangered Atlantic Humpback Dolphin (*Sousa teuszii*)

Gianna Minton ^{1,2,*}, Grant Abel ^{1,2,3}, Tim Collins ^{1,2,4}, Edem Eniang ^{2,5}, Heidrun Frisch-Nwakanma ⁶, Lucy Keith-Diagne ^{2,7}, Judicael Regis Kema Kema ^{2,8,9}, Aristide Takoukam Kamla ^{2,10}, Melanie Virtue ⁶, Caroline Weir ^{1,2,11} and Randall Reeves ^{1,12}

¹ IUCN SSC Cetacean Specialist Group

² Consortium for the Conservation of the Atlantic Humpback Dolphin, 2242 PT Wassenaar, The Netherlands
³ Seattle Aquarium, Seattle, WA 98101, USA

⁴ Wildlife Conservation Society, New York, NY 10460, USA

⁵ Biodiversity Preservation Center, Uyo 520103, Nigeria

⁶ Convention on the Conservation of Migratory Species of Wild Animals, 53113 Bonn, Germany

⁷ African Aquatic Conservation Fund, Joal 23015, Senegal

⁸ Gabon National Parks Agency, Libreville, Gabon

⁹ Centre d'Etudes Biologiques de Chizé, UMR 7372 CNRS/La Rochelle Université, 17031 La Rochelle, France

¹⁰ African Marine Mammal Conservation Organisation, Yaounde, Cameroon

¹¹ Ketos Ecology, Kingsbridge, Devon TQ7 2LU, UK

¹² Okapi Wildlife Associates, Hudson, QC J0P 1H0, Canada

* Correspondence: gianna.minton@gmail.com



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Abstract: The Atlantic humpback dolphin (*Sousa teuszii*) is a critically endangered cetacean species endemic to coastal Atlantic waters of Africa. Its preference for shallow coastal habitat renders it vulnerable to incidental capture (bycatch) in non-selective fishing gears as well as to habitat degradation from all forms of coastal development. Although past and ongoing research has shed light on the distribution and conservation status of the species in a few locations, it is still poorly understood throughout most of the 19 countries in its 7000 km long range. From 2020 onward, international and regional collaboration to increase awareness and promote conservation action has intensified. These efforts, while in the early stages, exemplify the IUCN Species Survival Commission's Assess-Plan-Act Conservation Cycle. While concrete conservation gains have not yet been achieved, efforts are being made to fill knowledge gaps and to broaden and motivate the network of international, regional, national, and local stakeholders that are actively engaged in marine and coastal conservation actions at multiple levels. The authors assess the strengths and weaknesses of the current approaches and identify elements that may be useful for other species with ranges spanning multiple countries where resources and capacity for conservation action are limited.

Keywords: Africa; conservation; management; cetaceans; *Sousa teuszii*; Atlantic humpback dolphin; stakeholder engagement; range-wide assessment; bycatch; aquatic wildmeat

1. Introduction

The conservation outlook for many cetacean populations is of great concern. Although post-whaling recovery is evident for some whale populations [1,2], in 2022 a quarter of the 92 cetacean species assessed for the IUCN Red List of Threatened Species were considered critically endangered, endangered, or vulnerable [3]. The species most at risk are those with habitat requirements that bring them into regular contact with humans [4]. For example, North Atlantic right whales (*Eubalaena glacialis*) are at high and increasing risk of extinction due to high mortality levels from fishery entanglement and ship strikes in their remnant range along the east coast of North America [5,6]. Even closer to extinction is the vaquita (*Phocoena sinus*), a small porpoise with a limited distribution in the upper Gulf of California (Mexico), with a population thought to number fewer than 10 individuals and with recent

precipitous declines driven almost exclusively by entanglement in gillnets used in an illegal fishery for Totoaba (*Totoaba macdonaldi*), a croaker species whose swim bladder fetches a high price in some Asian countries [7,8]. One cetacean species, the Yangtze River dolphin, or baiji (*Lipotes vexillifer*), was lost in the early 2000s, with fisheries bycatch a primary factor in its demise [9]. The calls for rapid and wide-scale intervention to prevent threatened cetacean species from following the path of the baiji and the vaquita are increasingly insistent and somber [4,10]. However, there are only a few examples of truly successful conservation interventions for cetaceans, and it is clear that there is no ‘one-size-fits-all’ strategy that will be effective in the multiple geographical, political, cultural, and ecological contexts in which threatened populations are found [11].

The Atlantic humpback dolphin (*Sousa teuszii*, or AHD) is endemic to coastal Atlantic waters of Africa, with a range extending from Angola in the south to Western Sahara in the north [12] (Figure 1). One of four recognized species in the genus *Sousa*, it has a coastal distribution that is limited to waters typically less than 20 m deep, including various types of habitat ranging from lagoons and mangrove channels to sheltered bays and estuaries, as well as open sandy coastlines with high-energy surf and swell [12]. As with other coastal cetaceans, the AHD’s reliance on habitats that are also intensively used by humans exposes it to a range of anthropogenic threats. Of these, entanglement in non-selective fishing gears, specifically, artisanal gillnets, is the most pervasive, likely causing population declines throughout the species’ range [13,14]. There is some evidence that bycaught dolphins are used as shark bait in some AHD range countries or for human consumption, giving them commercial value, which can motivate targeted hunting [13,15,16]. AHDs and their habitat are also likely to be affected by the construction of ports and coastal infrastructure, vessel traffic, oil and gas development, and inland activities, such as mining and agriculture, that introduce pollutants into river systems that flow into estuaries [13,17].

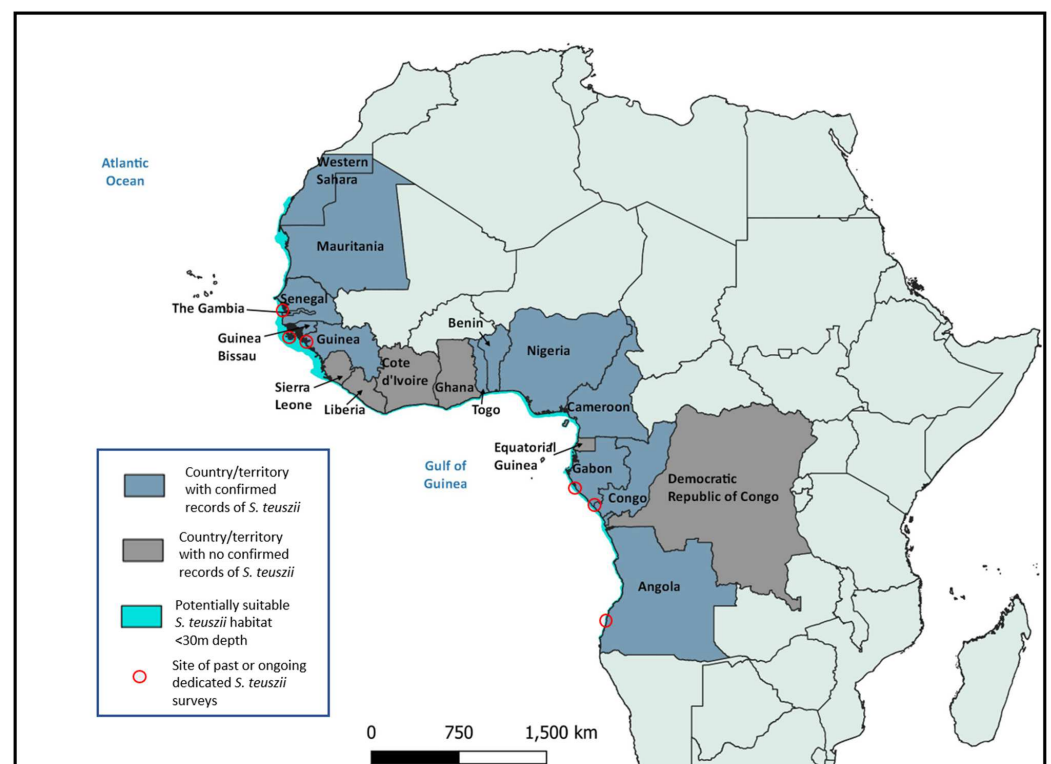


Figure 1. Distribution of Atlantic humpback dolphins (*Sousa teuszii*). Note that confirmed records are only available from 13 of the 19 possible range countries. For those countries where no records have been confirmed, it is unknown whether this is due to a lack of dedicated survey effort or true gaps in the species’ range.

In 2017, the global conservation status of the species was assessed as critically endangered on the IUCN Red List of Threatened Species [14]. In recent years, scientists and conservation organizations have redoubled efforts to move conservation efforts for AHD past the stage of ‘hand-wringing’ and on towards meaningful action to benefit the species. This paper describes how the IUCN Species Survival Commission’s (SSC) Assess-Plan-Act Conservation Cycle [18] has been applied to the AHD at international, regional, national, and local scales. By examining the progress and challenges associated with each element of the Conservation Cycle, we identify practices that may be useful for other cetacean species or taxa with similar distributions and threats.

2. The Conservation Cycle

The SSC hosts numerous Species Specialist Groups and Task Forces focused on the conservation of taxa around the globe. These groups are guided by the IUCN SSC Strategic Plan [18], which advocates an Assess-Plan-Act Cycle for species conservation (Figure 2). The five core elements of the cycle are summarized as follows [18] (pp. 3–4):

1. **Network:** “Enhance collaborations across and beyond IUCN to accomplish species conservation results . . . Develop new and strengthen existing partnerships and sustainable funding mechanisms . . . [and] catalyse actions with governments, IUCN members and other stakeholders . . . ”
2. **Assess:** “Understand and inform the world about the status and trends of biodiversity . . . Improve and publish biodiversity and conservation knowledge . . . [and] Expand the coverage, quality and content of biodiversity assessments.”
3. **Plan:** “Develop collaborative, inclusive and science-based conservation strategies and policies . . . [that] Strengthen and expand species conservation planning efforts at local, national, regional and global scales.”
4. **Act:** “Convene and mobilise conservation actions to improve the status of biodiversity . . . through implementation of effective, collaborative and practical approaches.”
5. **Communicate:** “Drive strategic and targeted communications . . . to increase the visibility of different taxa and species conservation through strategic and innovative communications that attract new audiences.”

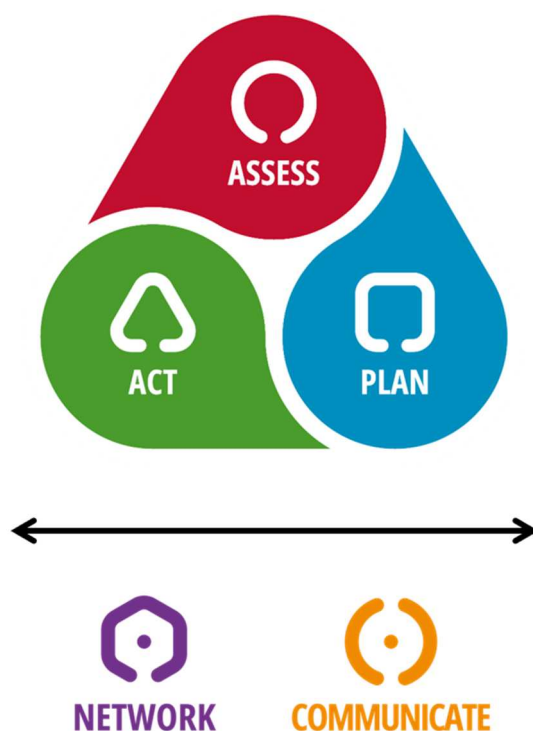


Figure 2. The IUCN SSC Species Conservation Cycle. Reproduced from Rodríguez, et al. [19].

We examine AHD conservation efforts between 2017 and 2022 in relation to the SSC Conservation Cycle, gauging progress and effectiveness at local, national, regional, and international levels. In order to build a narrative that is chronologically consistent with AHD efforts, we have slightly re-arranged the order of presentation of the five elements as follows: Assess, Network, Plan, Communicate, Act.

3. Progress and Results

3.1. Assess

The earliest IUCN Red List assessments for *Sousa teuszii* considered the species insufficiently known in 1991 [20] and data deficient in 1996 [21]. At that time, the only information available for the species had been collected opportunistically and reported by European scientists visiting range countries [22–29]. The first modern dedicated research on *Sousa teuszii* was conducted in the late 1990s and early 2000s under the auspices of the Convention on Migratory Species (CMS) West African Cetacean (WAF CET) program [30]. The results of that work provided early indications that AHDs were sparsely distributed in small subpopulations throughout their range and subject to multiple threats [31]. This provided the basis for assigning vulnerable status to the species on the IUCN Red List in 2008 [32].

From 2009 onward, dedicated small vessel and beach-based cetacean surveys resulted in observations of live AHDs in Angola, Cameroon, Republic of the Congo, Gabon, Guinea, Guinea Bissau, and Senegal [16,33–41]. Coupled with surveys of stranded cetaceans, fish landing site inspections, and interviews with fishers [16,41–43], these studies provided further evidence that AHDs were found in small and potentially isolated sub-populations and that bycatch was occurring at alarming rates throughout the species' range [12,44]. This work formed the basis for a Red List re-assessment of the species as critically endangered (CR) in 2017 [14]. Such a listing was justified by a suspected population decline of more than 80% over three generations (approximately 75 years, following Moore [45]), as well as observed deterioration of the species' habitat and its vulnerability to mortality in artisanal fisheries.

The CR assessment helped to place AHDs in the conservation spotlight and spurred other types of international assessments. For example, the AHD was among the small cetacean species assessed as being pushed to the brink of extinction, by incidental mortality in artisanal gillnet fisheries [10]. In December 2018, a SSC-sanctioned workshop in Nuremberg, Germany, included an assessment of the AHD as one of the seven focal species most likely to require hands-on conservation intervention in line with the IUCN's One Plan Approach [46] (see also The One Plan Approach: The Philosophy and Implementation of CBSG's Approach to Integrated Species Conservation Planning. Available online: https://www.waza.org/wp-content/uploads/2019/02/waza_mag_14.pdf (accessed on 29 July 2022)). Participants from around the world with direct experience in efforts to conserve the vaquita and other endangered or critically endangered species concluded that priority should be given to AHDs because, "they now exist only in low numbers and highly fragmented populations, threatened by increasing entanglement in gillnets and the consumption and trade of their meat." Although the workshop, and later conservation planning exercises (see below), ultimately determined that in situ measures should be prioritized for AHDs, the workshop's assessment of knowledge gaps that would hinder urgent conservation action through ex situ measures in the event of catastrophic habitat loss, live strandings, or other unforeseen circumstances served as an important catalyst for collaborative conservation planning.

In 2021, a petition was submitted to list the AHD as threatened under the US Endangered Species Act, resulting in the publication of a 90-day finding and a full status review by the US National Oceanographic and Atmospheric Administration (NOAA) [47]. This review is expected to further raise the conservation profile of AHDs and increase awareness of the urgency of conservation action to protect them.

In summary, assessments at local scales, in the form of dedicated surveys to document AHD distribution and abundance in a few locations, coupled with local and regional threat assessments, have been used to inform international assessment processes. These, in turn, are driving the other elements of the Conservation Cycle, as described below.

3.2. Network

The increasingly bleak status assessments of AHDs led three international conservation bodies—CMS, the IUCN SSC, and the International Whaling Commission (IWC)—to call for regional and international collaboration to conserve the species. In 2017, the CMS COP approved a “Concerted Action for the Atlantic Humpback Dolphin” [48], that together with its extension in 2020, recommended the formation of a steering committee and the organization of a “Conservation Policy Meeting of Range States to define an Action Plan for renewed efforts to halt the decline of the Atlantic Humpback Dolphin” [49].

At a meeting of the IWC Scientific Committee in May 2019, the sub-committee on small cetaceans suggested that an ‘African *Sousa* Task Team’ be formed to address the pressing conservation concerns for both *Sousa teuszii* and *Sousa plumbea*, the Indian Ocean humpback dolphin [50].

With these calls for collaboration and action in mind, in December 2019, a group of scientists and representatives of conservation organizations attending the Society for Marine Mammalogy’s World Marine Mammal Conference in Barcelona, met to discuss networking and collaboration in relation to AHDs. They defined a set of immediate-priority actions, and this was presented to and endorsed by the IWC Scientific Committee meeting in 2020 [51,52]. These conservation targets formed the basis for establishing the Consortium for the Conservation of the Atlantic Humpback Dolphin (CCAHD, ‘the Consortium’) in July 2020.

The CCAHD began as an informal network with several working groups, each addressing different aspects of the conservation priorities identified by Weir et al. [51]. Participation included representatives of the SSC Cetacean Specialist Group (CSG), a CSG subgroup called Integrated Conservation Planning for Cetaceans (ICPC), the CMS Scientific Council and Secretariat, and the IWC Scientific Committee and Secretariat as well as scientists affiliated with international and AHD range-country NGOs and research institutions.

In September 2020, funding became available to hire a part-time coordinator to facilitate: (1) expansion of the Consortium to include more partners from AHD range countries; (2) creation of a trilingual website (English, French, and Portuguese) with information and resources to support those working to study and protect AHDs; and (3) coordination of the working groups that undertook a systematic evaluation of knowledge, resource, and capacity gaps hindering effective conservation of the species. This work resulted in the production of a report entitled ‘Short- and Medium-Term Priority Actions to Conserve the Atlantic Humpback Dolphin’ [53], which was presented to the 2021 meeting of the IWC Scientific Committee, which subsequently recommended that the CCAHD be the body responsible for advocating for and coordinating the implementation of IWC recommendations concerning AHDs from that point forward [54].

As of June 2022, the CCAHD had nearly 80 partners representing international, national, and local organizations, including representation from 15 of the 19 AHD countries within the putative range. The consortium’s mission statement is: “Working towards the long-term sustainability of Atlantic humpback dolphin (*Sousa teuszii*) populations and their habitats through research, awareness, capacity-building and action.” An email group is used to share news and information, particularly related to funding opportunities for research and conservation action. Between September 2020 and June 2022, the CCAHD raised over USD 500,000 for conservation projects, which have been hosted and implemented by range-country partners (see more on these projects under Sections 3.4 and 3.5 on Acting and Communicating). The formation of the consortium has also facilitated donation of unsolicited funding from parties interested in protecting the species.

In February 2022, the CCAHD Foundation was registered as a legal entity in the Netherlands (the location of the provisional coordinator and also a country with favorable legal and tax frameworks for the establishment of foundations), guided by a board with both international and AHD range-country members, and supported by a (part-time) secretariat. Although this formal status is intended to facilitate fundraising at an international level, the CCAHD Foundation will continue to prioritize supporting and enabling range-country partners in their AHD conservation efforts.

The recent collaborations established for AHD conservation are fostering networking at multiple scales. At an international level, the composition of the CCAHD includes individuals involved in IUCN, IWC, and CMS frameworks and initiatives as well as other international governmental and non-governmental organizations, and conscious efforts are made to encourage synergy and avoid duplication of effort. At a regional level, the CCAHD facilitates communication among range-state partners that include NGOs, government research institutes, and national parks agencies, who share experiences and resources through the CCAHD website and email channels. Regional collaboration has also been achieved through joint projects and exchanges to engage in focused fieldwork, hands-on fieldwork-based training activities, and symposia with partners from Congo, Gabon, Cameroon, Nigeria, Guinea, Senegal, the Gambia, and Mauritania. At a national scale, the CCAHD has obtained funding for and helped to catalyze stakeholder meetings in four range countries (Gabon, Cameroon, Guinea, and Senegal), where representatives of government agencies, universities, and NGOs discussed AHD conservation. In many cases, it was the first time that environment, fisheries, maritime security, research, and national parks agencies met to discuss AHD conservation issues and seek ways to collaborate on conservation actions. Finally, at local scales, CCAHD range-country partners have hosted workshops and ‘dolphin days’ in coastal communities to promote awareness of AHDs and conduct interviews with fishers to elicit local ecological knowledge.

3.3. Plan

The SSC’s Conservation Planning Specialist Group has identified an eight-step process for conservation planning [55], which has guided AHD conservation efforts in recent years. An initial planning exercise by Weir and Collins [56] produced and disseminated a list of priority conservation targets based on their own research in AHD range countries as well as status reviews that they had compiled and published in 2015 [12,44]. The next such exercise built on these targets through extensive reviews of knowledge undertaken by ten CCAHD working groups between September and December 2020. Each group focused on different conservation targets (Table 1) to produce a detailed gap analysis and recommendations for addressing each gap. The results of this review were consolidated by the CCAHD at the end of 2020 in the form of a ‘Priorities Report’ [53] that now guides CCAHD partners in their planning and fundraising efforts.

The 2017 CMS Concerted Action laid the groundwork for a regional conservation planning process through the drafting of a Concerted Action Plan for the AHD [48]. An open tender process hosted by the CMS resulted in CCAHD partners being contracted to draft the Concerted Action Plan, which was in turn reviewed by the CMS Concerted Action Steering Committee. This draft action plan builds on the CCAHD Priorities Report using the same framework to assess gaps in knowledge, resources, and capacity that are currently hindering effective conservation of the species and suggests specific activities to address these gaps. It also includes a detailed country-by-country analysis of the laws and regulations that are in place to protect AHDs as well as a matrix linking conservation objectives to specific actions and their desired outcomes, as promoted by the CPSC.

Table 1. Working groups under the Consortium for the Conservation of the Atlantic Humpback Dolphin and their targets.

Working Group	Targets to Assess/Areas to Progress (Targets Correspond to Weir and Collins, 2020)
1	<i>CMS Concerted Action:</i> Progress the CMS Concerted Action.
2	<i>Outreach/Awareness/Capacity Building:</i> Design and implement tools and activities in communities and with local scientists and governments.
3	<i>Field Assessments:</i> (1) Conduct an abundance-distribution survey of the Senegal–Gambia population; and (2) extend the Senegal–Gambia approach to other key range states; (3) include range-country scientists at all times to ensure capacity building and sustainability of research efforts.
4	<i>Genetics:</i> Assess genetic diversity and population structure throughout the AHD range.
5	<i>Stranding and Carcass Sampling:</i> Improve the detection and sampling of dead animals.
6	<i>Interview Surveys:</i> to (1) assess distribution and occurrence in unstudied areas and (2) identify specific population-level threats.
7	<i>Health Assessments:</i> Carry out preliminary investigations that will inform future health assessments and invasive work where it is deemed necessary as a means to conserve the species.
8	<i>Acoustic Studies:</i> Evaluate and trial passive acoustic monitoring to assess AHD distribution, habitat use, and diurnal/seasonal habits.
9	<i>Bycatch:</i> Promote bycatch monitoring and mitigation throughout the AHD range, with emphasis on a collaborative project with the IWC Bycatch Mitigation Initiative in Congo.
10	<i>Coastal Development:</i> Assess and make plans to mitigate threats from commercial coastal development.
12	<i>Fundraising:</i> Source funding. Assess and advise on potential funding opportunities, and input as needed on funding applications.

Although the process was initiated very recently, this planning at international and regional levels is already spurring planning at national levels. Government stakeholder engagement meetings held in Gabon in June 2021 led to increased prioritization of funding and training for coastal cetacean research and conservation. Small vessel surveys for coastal cetaceans have commenced in two known AHD habitats, and, in July 2022, the first of several three-day long training courses was held for rangers working in the marine and coastal protected areas of Banio and Mayumba (Kema Kema pers. comm.). Surveys and training were conducted by Gabon’s National Parks Agency with support from the CCAHD. In Cameroon and Senegal, similar stakeholder engagement meetings in 2021 increased awareness among different government agencies, resulting in several follow-up meetings at local and national levels to discuss necessary actions to address data gaps and protections for coastal cetaceans. These included two large-scale ‘Streetwhale’ events hosted in 2021 and 2022 in the southern city of Kribi, Cameroon, involving a wide range of public and private sector stakeholders in awareness-raising and conservation planning, and the hosting of several government agents on small-vessel surveys for cetaceans in the Delta Saloum in Senegal.

3.4. Act

In many ways, the ‘Act’ component of the Conservation Cycle is the most difficult to pinpoint and separate from other aspects of the cycle, as Assessing, Planning, Networking, and Communicating are active processes that are undertaken to promote conservation outcomes. As such, many of the processes described in the sections above could also be considered actions for AHD conservation. However, if we define actions more narrowly as activities that have a direct impact on AHD populations and their habitat, this is the element of the Conservation Cycle where efforts to date have fallen short.

Addressing knowledge gaps: Although isolated surveys in a handful of locations have provided insight into AHD populations and threats, for the most part the species is still poorly understood, and robust abundance or trend estimates are not available anywhere

within the species' range. The creation of the CCAHD website and awareness-raising efforts among and by regional partners have led to increased reporting and documentation of AHD sightings and strandings in range states where previous evidence was limited, including Nigeria and Western Sahara (see, for example, Valuable Atlantic Humpback Dolphin Sightings Reported from Lagos, Nigeria. Available online: <https://www.sousateuszii.org/2021/03/05/valuable-atlantic-humpback-dolphin-sightings-reported-from-lagos-nigeria/> (accessed on 29 July 2022) and Last Atlantic Humpback Dolphin in Dakhla Bay? Available online: <https://www.sousateuszii.org/2022/07/06/last-atlantic-humpback-dolphin-in-dakhla-bay/> (accessed on 29 July 2022)). Since 2020, boat-based surveys to document (seasonal) distribution and relative abundance and conduct photo-identification have been (re-)initiated in Congo, Gabon, Senegal, and Guinea. Additionally, interview surveys in coastal communities to document AHD presence and anthropogenic threats have commenced in Congo, Gabon, Cameroon, Liberia, Guinea, Senegal, and the Gambia. While these surveys are starting to yield valuable data and insights, they are expensive to initiate and even more expensive to replicate and continue over a timespan that allows robust assessment of abundance, threats, and trends.

Addressing capacity gaps: Recent boat-based and interview surveys have been coupled with capacity building through virtual and hands-on training as well as the creation of survey and data processing protocols. These are being used throughout the species' range to prevent duplication of effort and to promote consistency and comparability of the data collected. Work is also underway to increase the capacity of coastal communities by equipping community focal points with the tools and training required to report AHD sightings, strandings, and bycatch. In Cameroon and Guinea, for example, community focal points have been given smart phones, phone credit, and detailed instructions on how to take photographs and collect data from a stranded carcass. In Cameroon, a citizen science network composed mainly of fishermen has been created to report opportunistic sightings of aquatic wildlife, including cetaceans. The fishermen use a mobile application called SIREN that helps them to record the time, date, and GPS location as well as a photo of the animal observed. Recently, the SIREN network yielded the fourth documentation of an AHD in Cameroon (ATK unpublished data), following the most recent previously published record from 2012 [16,41]. Similar work is underway to equip marine protected area (MPA) and national park staff in Senegal and Gabon to report strandings and sightings and to adapt the SIREN app so that it can be used effectively to facilitate 'citizen science' reporting of cetacean sightings and strandings throughout the AHD range.

The number of range-country scientists directly involved in field research is growing rapidly. However, the momentum for increased field research is almost outpacing the capacity for more experienced scientists involved in current projects to provide the necessary level of support and guidance for data collection and analysis. There is an urgent need for increased access to funding and scholarships for range-country scientists who wish to pursue higher academic degrees focusing on aspects of cetacean research and conservation so that they can obtain more consistent and formalized institutional and academic support.

Addressing resource gaps: Volunteer contributions and efforts have enabled the CCAHD to develop a number of communication tools and resources for data collectors, managers, and educators in AHD range countries. However, many resources are still lacking, including the equipment that range-country partners need to collect data and samples from stranded specimens or to carry out boat-based surveys. Funding to date has not been able to support other field costs and the human resources required to implement priority actions. The CCAHD has estimated that USD 3.77 million is needed to implement the identified priority actions between 2022 and 2027 [57].

Mitigating threats: The mitigation (or always preferably, the elimination) of the threats to species survival is the most important category of action. Minimal progress has been made to date, but there are some signs of progress. In Cameroon, recent advocacy efforts by CCAHD partners led to the full legal protection of AHD along with four other marine mammal species in 2020 (Arrêté N°0053/MINFOF, passed on 1 April 2020). Another

example is the provisional agreement between the manager of the Mandji Etimboué MPA in Gabon and the local fishing community, which accepted an arrangement whereby beach-seine operations would be conducted only in the presence of MPA staff, so that a quick response (safe handling and release for live animals or appropriate examination and disposal of the carcass of dead animals) could be mounted if dolphins or other marine megafauna were unintentionally entangled. This procedure saved the lives of four AHDs in December 2021 (I. Akendengue pers. comm and Kema Kema personal observation; Figure 3). This limited progress reflects the importance of a multi-pronged approach to threat mitigation, by which strong legal frameworks are in place to regulate potentially harmful activities and local communities and bodies responsible for enforcement are able to work effectively together to ensure that regulations are implemented.



Figure 3. In December 2021, MPA rangers collaborated with fishers in an admirable effort to free four Atlantic humpback dolphins caught accidentally in beach-seine nets near Cap Lopez, Gabon. Such rescue attempts can be difficult and dangerous for both the people and the animals. Circumstances may dictate what can be done to free a dolphin from fishing gear and return it to the water safely. Ideally, the animal should be supported under its body and not pulled by the tailstock. Guidelines for safe handling and release are available from the CMS [58]. Photo courtesy of Igor Akendengue.

A great deal of additional networking, planning, and communicating is required to ensure that policies and programs are in place to mitigate the threat of bycatch throughout the AHD's range. This work will require the involvement of a wide range of stakeholders, including fishing communities, fisheries managers, and scientists who can help design and implement trials of alternative fishing gears that are more selective and less prone than gillnets to catching cetaceans incidentally. It will also require collaboration with multiple government agencies responsible for fisheries as well as legal experts to ensure that national policies, regulations, and legal frameworks provide adequate protections and that the protections are monitored and enforced.

3.5. Communicate

Communication efforts from 2017 onward have helped to gain recognition of AHDs in some international conservation circles as a CR species, one of a growing number in urgent need of conservation intervention. Scientific publications, presentations at international meetings and conferences, and the creation of the Sousateuszii.org website help to further raise the species' profile. Outreach and communication tools have been created to support engagement with government and industry stakeholders in the range countries, including

an infographic (Figure 4) and a ‘master’ slide presentation that can be adapted for use in different countries and settings. Materials available on the website also include regional marine mammal identification cards, fact sheets, coloring sheets, and a searchable library of scientific literature.



Figure 4. An infographic created to support government and industry stakeholder engagement to raise awareness of the AHD and its conservation needs.

While these tools are proving useful, stakeholder engagement in some AHD range countries has revealed that many stakeholders remain unaware of humpback dolphins and/or are unable to distinguish them from other less threatened sympatric species such as common bottlenose dolphins (*Tursiops truncatus*). There is a need to create communication materials that are more specifically targeted at coastal communities and to identify channels for communicating more broadly and effectively with stakeholders that share resources and habitat with AHDs. This will require tailored approaches in the different countries, using local languages and led by range-country partners who can determine which social media platforms or other communication approaches are most likely to be effective.

4. Discussion

4.1. Strengths

The Assess-Plan-Act Conservation Cycle promoted by the SSC (and as reordered to better fit this case study; see Section 2) has proven to be a useful framework for guiding AHD conservation efforts. The results summarized above demonstrate that most of our work to date has consisted of assessing, networking, and planning. This is likely because these elements naturally fall earlier in the Conservation Cycle and because they are less complicated and less resource-intensive than the Act elements of the cycle. However, the emphasis to date on assessing is also likely due to the predominant influence of scientists who have led these processes. A science-led approach is one that is common to most IUCN SSC Specialist Groups, which have traditionally been composed of scientists with the experience and expertise required to conduct robust IUCN Red List status assessments.

All such assessments require some level of hands-on fieldwork to generate relative abundance estimates and distribution maps as well as insight into threats. In the past, much of this fieldwork on AHDs has been in the form of short-term surveys led by scientists

from outside the region. Recent efforts, while still supported by international scientists, are placing greater emphasis on the involvement of range-country scientists and host organizations with the aim of ensuring sustainability of monitoring and embedding assessment efforts in local and national conservation frameworks. These still largely localized efforts are expected to feed into international assessment processes, generating greater awareness, motivation, and support to protect the dolphins. We feel that this interplay has worked well so far to motivate and enable effective networking at local as well as international scales.

Planning at international and regional levels is also proceeding well. The CCAHD Priorities Report [53] provided a first step towards “... collaborative, inclusive and science-based conservation strategies” [18], and the planned meeting of range-state government representatives to provide input to and feedback on the draft CMS Concerted Action Plan should result in a broader and more inclusive plan with buy-in from the range-country stakeholders and a mandate to design, implement, and enforce protections. It is hoped that stakeholders will use the Action Plan to inform national and local conservation planning.

4.2. Challenges

Acting and communicating are perhaps naturally more challenging elements of the Conservation Cycle, especially if the process is being led by wildlife biologists and ecologists who are not necessarily trained in project management, policy, or public relations. While biologists have no difficulty imagining how to address knowledge gaps through more research, it is much more difficult for them to imagine how to gain traction when it comes to mitigating or halting threats to species. Bycatch in gillnets is reasonably assumed to be the most pressing threat to AHDs throughout their range. At the same time, coastal communities in the region rely on small-scale artisanal fisheries for subsistence and livelihoods. Although gillnets are illegal in some AHD range countries, no other method of fishing has yet been demonstrated to yield comparable levels of catch for the same investment of time and effort [59], and authorities often lack the resources and motivation to enforce bans on gillnet use. Twelve of the 19 AHD range countries are ranked as ‘low’ on the Human Development Index [13] and, as such, may have difficulty prioritizing conservation action and/or effectively implementing and enforcing measures to reduce bycatch. Changing fishing practices to reduce bycatch without adversely affecting local communities will require high-level government buy-in, provision of alternative livelihoods, and sufficient will-power and resources to enforce any measures over the long term. Market-based solutions, including nature-oriented tourism as an alternative livelihood, or financial incentives for the use of alternative fishing gears that reduce bycatch and improve sustainability of target fish populations may be realistic, but will require significant initial investment and a much broader range of expertise than is currently represented in the CCAHD. Developing and implementing effective alternative fishing methods or livelihoods for coastal communities will require collaboration between fishermen and fisheries scientists, managers, gear developers, and social scientists who understand the economic and social factors at play in fishing communities, as well as experts in behavior change and communication. While promising examples of these types of collaborations are emerging from places such as Peru [60–63], they have proven more challenging in settings such as Mexico, where efforts to change fishing practices or replace gillnets with alternative gears to prevent bycatch of the CR vaquita have been unsuccessful [8].

The Act element of the Conservation Cycle is also challenging, because it invariably requires significant financial investment and human capital. It is relatively easy to make plans and list recommendations at meetings or workshops, but it is never easy to obtain the resources required to implement robust long-term field surveys, engage with local communities to understand the drivers of behavior, and then develop alternative livelihoods and practices that are less harmful to wildlife. Funding bodies are often unrealistic in expecting quick fixes with demonstrable conservation outcomes in the space of a year or less when, often, years of investment and effort are required to bring about meaningful

change, especially when substantial capacity building is required to ensure that local stakeholders are equipped to continue conservation efforts independently and sustainably over the long term.

4.3. Lessons Learned

The effectiveness of the IUCN Red List as a conservation tool is sometimes called into question, being described as a process that places too much emphasis on assessment and diverts energy and resources away from practical conservation interventions [64]. In the case of AHDs, however, the CR assessment has been a catalyst, prompting and enabling vigorous application of other elements of the Conservation Cycle at international, regional, national, and local scales. The CR designation, made at a time when the world was watching another small, coastal, marine cetacean, the vaquita, slide towards almost certain extinction, has motivated a wide range of stakeholders to invest time and energy into supporting the cause of AHD conservation and inspired further research to help clarify the species' status and build local capacity.

Creating a network dedicated to the conservation of a single target species but open to participation from a wide range of international and range-country stakeholders can help to maximize the expertise and resources available for conservation efforts and facilitate effective transfer of knowledge and experience. Early indications are that such a network should also help to leverage funding for conservation actions, although time will tell whether the communication tools used to solicit funding will be effective enough to raise the amounts needed for all of the identified priority actions.

Effective coordination is essential for range-wide conservation efforts. Without a dedicated coordinator or coordinating team, the members of a collaborative network may diffuse responsibility, or simply be too overwhelmed by day-to-day challenges in their own settings to create the time necessary for effective regional networking. Funding bodies are often more attracted to supporting fieldwork and community interventions that can yield inspiring images and narratives, and it can be comparatively difficult to raise funds for a coordinator role to oversee projects, write grant proposals and reports, and update websites. However, in the case of recent AHD conservation efforts, the financial support for a part-time coordinator from September 2020 onward has been critical to: (a) drive internal communications among conservation partners and external communications to the wider public; (b) identify funding opportunities and support partners with fundraising applications; and (c) guide and support conservation planning [57].

Finally, international and regional collaboration to support the Conservation Cycle in areas where resources and capacity are limited requires a delicate interplay between range-country and external partners to make access to opportunities and resources fair and equitable (see Rodriguez et al. [19] in this issue). A growing body of literature provides advice and models of how such partnerships can be formed and nurtured to benefit not only international and range-country stakeholders but also, and much more importantly, the conservation species of concern [65–71].

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References

1. Thomas, P.O.; Reeves, R.R.; Brownell, R.L. Status of the world's baleen whales. *Mar. Mammal Sci.* **2015**, *32*, 682–734. [\[CrossRef\]](#)
2. Bortolotto, G.A.; Danilewicz, D.; Andriolo, A.; Secchi, E.; Zerbini, A. Whale, Whale, Everywhere: Increasing Abundance of Western South Atlantic Humpback Whales (*Megaptera novaeangliae*) in Their Wintering Grounds. *PLoS ONE* **2016**, *11*, e0164596. [\[CrossRef\]](#) [\[PubMed\]](#)
3. Braulik, G.; Taylor, B.; Minton, G.; Cooke, J.; Notarbartolo di Sciara, G.; Reeves, R. Red List Status of Cetaceans. Document presented to the Scientific Committee of the International Whaling Commission. SC/68D/O/01, Virtual Meeting, 25 April–13 May 2022. 8p.
4. Notarbartolo di Sciara, G.; Würsig, B. (Eds.) Helping Marine Mammals Cope with Humans. In *Marine Mammals: The Evolving Human Factor*; Springer International Publishing: Cham, Switzerland, 2022; pp. 425–450. [\[CrossRef\]](#)
5. Cooke, J.G. *Eubalaena glacialis*. The IUCN Red List of Threatened Species. 2020. Available online: <https://www.iucnredlist.org/species/41712/162001243> (accessed on 14 July 2020).
6. Corkeron, P.; Hamilton, P.; Bannister, J.; Best, P.; Charlton, C.; Groch, K.R.; Findlay, K.; Rowntree, V.; Vermeulen, E.; Pace, R.M. The recovery of North Atlantic right whales, *Eubalaena glacialis*, has been constrained by human-caused mortality. *R. Soc. Open Sci.* **2018**, *5*, 180892. [\[CrossRef\]](#) [\[PubMed\]](#)
7. Gulland, F.; Danil, K.; Bolton, J.; Ylitalo, G.; Okrucky, R.S.; Rebolledo, F.; Alexander-Beloch, C.; Brownell, R.L.; Mesnick, S.; Lefebvre, K.; et al. Vaquitas (*Phocoena sinus*) continue to die from bycatch not pollutants. *Vet. Rec.* **2020**, *187*, e51. [\[CrossRef\]](#) [\[PubMed\]](#)
8. Jaramillo-Legorreta, A.M.; Cardenas-Hinojosa, G.; Nieto-Garcia, E.; Rojas-Bracho, L.; Thomas, L.; Hoef, J.M.V.; Moore, J.; Taylor, B.; Barlow, J.; Tregenza, N. Decline towards extinction of Mexico's vaquita porpoise (*Phocoena sinus*). *R. Soc. Open Sci.* **2019**, *6*, 190598. [\[CrossRef\]](#)
9. Turvey, S.T.; Pitman, R.L.; Taylor, B.L.; Barlow, J.; Akamatsu, T.; Barrett, L.A.; Zhao, X.; Reeves, R.R.; Stewart, B.S.; Wang, K.; et al. First human-caused extinction of a cetacean species? *Biol. Lett.* **2007**, *3*, 537–540. [\[CrossRef\]](#)
10. Brownell, R.L., Jr.; Reeves, R.R.; Read, A.J.; Smith, B.D.; Thomas, P.O.; Ralls, K.; Amano, M.; Berggren, P.; Chit, A.M.; Collins, T.; et al. Bycatch in gillnet fisheries threatens Critically Endangered small cetaceans and other aquatic megafauna. *Endanger. Species Res.* **2019**, *40*, 285–296. [\[CrossRef\]](#)
11. Reeves, R.R. Cetacean Conservation and Management Strategies. In *Marine Mammals: The Evolving Human Factor*; Notarbartolo di Sciara, G., Würsig, B., Eds.; Springer International Publishing: Cham, Switzerland, 2022; pp. 1–29. [\[CrossRef\]](#)
12. Weir, C.R.; Collins, T. A Review of the Geographical Distribution and Habitat of the Atlantic Humpback Dolphin (*Sousa teuszii*). In *Advances in Marine Biology: Humpback Dolphins (Sousa spp.): Current Status and Conservation*; Part I; Jefferson, T.A., Curry, B., Eds.; Academic Press: Cambridge, MA, USA, 2015; Volume 72, pp. 79–117. [\[CrossRef\]](#)
13. Weir, C.R.; Minton, G.; Collins, T.J.Q. Conservation of Africa's Most Imperiled Cetacean, the Atlantic Humpback Dolphin (*Sousa teuszii*). In *The Encyclopedia of Conservation: Reference Module in Earth Systems and Environmental Sciences*; Elsevier: Amsterdam, The Netherlands, 2021; pp. 1–12. [\[CrossRef\]](#)
14. Collins, T.; Braulik, G.T.; Perrin, W. *Sousa teuszii*. The IUCN Red List of Threatened Species. 2017. Available online: <http://www.iucnredlist.org/details/20425/0:E.T20425A> (accessed on 10 December 2017).
15. Ingram, D.J.; Prideaux, M.; Hodgins, N.K.; Frisch-Nwakanma, H.; Avila, I.C.; Collins, T.; Cosentino, M.; Keith-Diagne, L.W.; Marsh, H.; Shirley, M.H.; et al. Widespread Use of Migratory Megafauna for Aquatic Wild Meat in the Tropics and Subtropics. *Front. Mar. Sci.* **2022**, *9*, 837447. [\[CrossRef\]](#)
16. Van Waerebeek, K.; Uwagbae, M.; Segniagbeto, G.H.; Bamy, I.L.; Ayissi, I. New records of Atlantic humpback dolphin in Guinea, Nigeria, Cameroon and Togo underscore fisheries pressure and generalised marine bushmeat demand. *Rev. d'Ecol.* **2017**, *72*, 192–205. [\[CrossRef\]](#)
17. Weir, C.R.; Pierce, G.J. A review of the human activities impacting cetaceans in the eastern tropical Atlantic. *Mammal Rev.* **2013**, *43*, 258–274. [\[CrossRef\]](#)
18. IUCN. *IUCN Species Strategic Plan 2021*; International Union for the Conservation of Nature: Gland, Switzerland, 2021; p. 32. Available online: <https://www.iucn.org/commissions/species-survival-commission/our-work> (accessed on 29 July 2022).
19. Rodríguez, J.P.; Sucre, B.; Mileham, K.; Sánchez-Mercado, A.; De Andrade, N.; Bezeng, S.B.; Croukamp, C.; Falcato, J.; García-Borboroglu, P.; González, S.; et al. Addressing the Biodiversity Paradox: Mismatch between the Co-Occurrence of Biological Diversity and the Human, Financial and Institutional Resources to Address Its Decline. *Diversity* **2022**, *14*, 708. [\[CrossRef\]](#)

20. Klinowska, M. *Dolphins, Porpoises and Whales of the World: The IUCN Red Data Book*; IUCN: Gland, Switzerland, 1991; 429p.
21. Baillie, J.; Groombridge, B. (Eds.) 1996 *IUCN Red List of Threatened Animals*; IUCN Species Survival Commission: Gland, Switzerland, 1996.
22. Kükenenthal, W. *Sotalia teuszii* n. sp. ein pflanzenfressender (?) Delphin aus Kamerun. *Zool. Jahrbücher Abt. Syst.* **1892**, *6*, 442–446.
23. Cadenat, J. Observations de cetaces au Senegal. *Notes Afr.* **1947**, *34*, 20–23.
24. Fraser, F.C. A Specimen of *Sotalia teuszii* Kukenthal from the Coast of Senegal. *J. Mammal.* **1949**, *30*, 274–276. [CrossRef]
25. Cadenat, J.; Paraiso, F. Nouvelle observation de *Sotalia teuszii* (Cétacé, Delphinidé) sur les côtes du Sénégal. *Bull. L'Inst. Français D'Afr. Noire* **1957**, *19*, 324–332.
26. Maigret, J.; Trotignon, J.; Duguy, R. Observations de cetace sur les cotes de Mauritanie (1971–1975). *J. Cons. Int. l'Explor. Mer* **1976**, *4*, 7.
27. Maigret, J. Les mammiferes du Senegal. II. Les mammiferes marins. *Bull. Ass. Avanc. Sc. Nat. Senegal* **1977**, *57*, 13–30.
28. Maigret, J. Les cétacés sur les cotes ouest-africaines: Encore quelques énigmes! *Notes Afr.* **1986**, *189*, 20–24.
29. Maigret, J. *Marine Mammals and the Fisheries along the West African Coast*; Reports of the International Whaling Commission Special Issue 15: Cetaceans and gillnets; International Whaling Commission: Cambridge, UK, 1994; pp. 307–316.
30. Van Waerebeek, K.; Barnett, L.; Camara, A.; Cham, A.; Diallo, M.; Djiba, A.; Jallow, A.; Ndiave, E.; Ould-Bilal, A.O.; Bamy, I.L. Conservation of cetaceans in the Gambia and Senegal, 1999–2001, and status of the Atlantic humpback dolphin. In *WAF CET—2 Report*; UNEP/CMS: Bonn, Germany, 2003; p. 56.
31. Van Waerebeek, K.; Barnett, L.; Camara, A.; Cham, A.; Diallo, M.; Djiba, A.; Jallow, A.O.; Ndiaye, E.; Bilal, A.S.O.O.; Bamy, I.L. Distribution, Status, and Biology of the Atlantic Humpback Dolphin, *Sousa teuszii* (Kükenthal, 1892). *Aquat. Mamm.* **2004**, *30*, 56–83. [CrossRef]
32. Reeves, R.; Collins, T.; Jefferson, T.A.; Karczmarski, L.; Laidre, K.; O'corry-Crowe, G.; Rojas-Bracho, L.; Secchi, E.; Slooten, E.; Smith, B.D.; et al. *Sousa teuszii*. The IUCN Red List of Threatened Species. 2008. Available online: <https://www.iucnredlist.org/species/20425/9198085> (accessed on 30 June 2008).
33. Minton, G.; Kema Kema, J.R.; Todd, A.; Korte, L.; Maganga, P.; Moulet, J.M.; Nguema, A.; Moussavou, E.; Nguélé, G. Multi-stakeholder collaboration yields valuable data for cetacean conservation in Gamba, Gabon. *Afr. J. Mar. Sci.* **2017**, *39*, 423–433. [CrossRef]
34. Weir, C. Atlantic humpback dolphins *Sousa teuszii* in the Saloum Delta (Senegal): Distribution, relative abundance and photo-identification. *Afr. J. Mar. Sci.* **2016**, *38*, 385–394. [CrossRef]
35. Leeney, R.H.; Weir, C.R.; Campredon, P.; Regalla, A.; Foster, J. Occurrence of Atlantic humpback (*Sousa teuszii*) and bottlenose (*Tursiops truncatus*) dolphins in the coastal waters of Guinea-Bissau, with an updated cetacean species checklist. *J. Mar. Biol. Assoc. U.K.* **2015**, *96*, 933–941. [CrossRef]
36. Weir, C. Photo-identification and habitat use of Atlantic humpback dolphins *Sousa teuszii* around the Río Nuñez Estuary in Guinea, West Africa. *Afr. J. Mar. Sci.* **2015**, *37*, 325–334. [CrossRef]
37. Collins, T.; Strindberg, S.; Mboumba, R.; Dilambaka, E.; Thonio, J.; Mouissou, C.; Boukaka, R.; Saffou, G.K.; Buckland, L.; Leeney, R.H.; et al. Progress on Atlantic humpback dolphin conservation and research efforts in Congo and Gabon. Document presented to the Scientific Committee of the International Whaling Commission. SC/65a/SM16_Rev, Seoul, Korea, 3–15 June 2013. 24p.
38. Weir, C.R.; Waerebeek, K.V.; Jefferson, T.A.; Collins, T. West Africa's Atlantic Humpback Dolphin (*Sousa teuszii*): Endemic, Enigmatic and Soon Endangered? *Afr. Zool.* **2011**, *46*, 1–17.
39. Weir, C.R. A review of cetacean occurrence in West African waters from the Gulf of Guinea to Angola. *Mammal Rev.* **2010**, *40*, 2–39. [CrossRef]
40. Weir, C. Distribution, behaviour and photo-identification of Atlantic humpback dolphins *Sousa teuszii* off Flamingos, Angola. *Afr. J. Mar. Sci.* **2009**, *31*, 319–331. [CrossRef]
41. Ayissi, I.; Segniagbeto, G.H.; Van Waerebeek, K. Rediscovery of Cameroon Dolphin, the Gulf of Guinea Population of *Sousa teuszii* (Kükenthal, 1892). *ISRN Biodivers.* **2014**, *2014*, 819827. [CrossRef]
42. Segniagbeto, G.H.; Van Waerebeek, K.; Bowessidjaou, J.E.; Ketoh, K.; Kpatcha, T.K.; Okoumassou, K.; Ahoedo, K. Annotated checklist and fisheries interactions of cetaceans in Togo, with evidence of Antarctic minke whale in the Gulf of Guinea. *Integr. Zool.* **2014**, *9*, 1–13. [CrossRef]
43. Moore, J.; Cox, T.; Lewison, R.; Read, A.; Bjorkland, R.; McDonald, S.; Crowder, L.; Aruna, E.; Ayissi, I.; Espeut, P.; et al. An interview-based approach to assess marine mammal and sea turtle captures in artisanal fisheries. *Biol. Conserv.* **2010**, *143*, 795–805. [CrossRef]
44. Collins, T. Re-assessment of the Conservation Status of the Atlantic Humpback Dolphin, *Sousa teuszii* (Kükenthal, 1892), Using the IUCN Red List Criteria. In *Advances in Marine Biology: Humpback Dolphins (Sousa spp.) Current Status and Conservation*; Part I; Jefferson, T.A., Curry, B., Eds.; Academic Press: Cambridge, MA, USA, 2015; Volume 72, pp. 47–77. [CrossRef]
45. Moore, J.E. *Intrinsic Growth (r_{max}) and Generation Time (T) Estimates for the Cetacean Genera Sousa, Orcaella, and Neophocaena, in Support of IUCN Red List Assessments*; NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-550; U.S. Department of Commerce: Washington, DC, USA, 2015. Available online: <https://repository.library.noaa.gov/view/noaa/5130> (accessed on 29 July 2022).

46. Taylor, B.L.; Abel, G.; Miller, P.; Gomez, F.; von Fersen, L.; DeMaster, D.P.; Reeves, R.R.; Rojas-Bracho, L.; Wang, D.; Cipriano, F. *Ex Situ Options for Cetacean Conservation: December 2018 Workshop, Nuremberg, Germany*; Occasional Paper of the IUCN Species Survival Commission; IUCN: Gland, Switzerland, 2020; Available online: <https://iucn-csg.org/wp-content/uploads/2021/08/SSC-OP-066-En.pdf-WEB.pdf> (accessed on 29 July 2022).
47. NOAA. Endangered and Threatened Wildlife; 90-Day Finding on a Petition to List the Atlantic Humpback Dolphin as Threatened or Endangered Under the Endangered Species Act. *Fed. Regist.* **2021**, *86*, 68452–68456.
48. CMS. Concerted Action for the Atlantic Humpback Dolphin (*Sousa teuszii*). Concerted Action 12.3. In Proceedings of the Conference of Parties at Its 12th Meeting: Convention on Migratory Species, Manila, Philippines, 23–28 October 2017; pp. 1–7. Available online: <https://www.cms.int/en/document/concerted-action-atlantic-humpback-dolphin-sousa-teuszii> (accessed on 29 July 2022).
49. CMS. Concerted Action for the Atlantic Humpback Dolphin (*Sousa teuszii*): Concerted Action 12.3 (Rev.COP13). In Proceedings of the Conference of Parties at Its 13th Meeting, Gandhinagar, India, 17–18 February 2020; Available online: <https://www.cms.int/en/document/concerted-action-atlantic-humpback-dolphin-sousa-teuszii-0> (accessed on 29 July 2022).
50. IWC. *Report of the International Whaling Commission's Scientific Committee: IWC/SC/68A*; International Whaling Commission: Cambridge, UK, 2019; p. 93. Available online: <https://archive.iwc.int/pages/view.php?ref=9570&k=4990dc18ad> (accessed on 29 July 2022).
51. Weir, C.; Leeney, R.H.; Collins, T. Reinvigorating conservation efforts for the Atlantic humpback dolphin (*Sousa teuszii*): A brief progress report. Document presented to the Scientific Committee of the International Whaling Commission. SC/68B/SM/07, Virtual Meeting, 12–24 May 2020.
52. IWC. *Report of the Scientific Committee of the International Whaling Commission: SC/68B*; International Whaling Commission: Cambridge, UK, 2020; p. 133. Available online: <https://archive.iwc.int/pages/view.php?ref=17766&k=> (accessed on 29 July 2022).
53. CCAHD. Short- and Medium-Term Priority Actions to Conserve the Atlantic Humpback Dolphin *Sousa teuszii*. Report of the Consortium for the Conservation of the Atlantic Humpback Dolphin. 2020, p. 145. Available online: <https://www.sousateuszii.org/wp-content/uploads/2021/02/CCAHD-Priorities-for-Sousa-teuszii-FINAL.pdf> (accessed on 29 July 2022).
54. IWC. *Report of the Scientific Committee of the International Whaling Commission: SC/68C*; International Whaling Commission: Cambridge, UK, 2021; p. 200. Available online: <https://archive.iwc.int/pages/view.php?ref=19276&k=> (accessed on 29 July 2022).
55. CPSG. *Species Conservation Planning Principles & Steps Ver. 1.0.*; IUCN SSC Conservation Planning Specialist Group: Apple Valley, MN, USA, 2020; Available online: <https://www.cpsg.org/our-approach/cpsgs-species-conservation-planning-principles-steps> (accessed on 29 July 2022).
56. Weir, C.R.; Collins, T. Potential Short- and Medium-Term Targets for the Conservation of *Sousa teuszii*. (Unpublished Report: Consortium for the Conservation of the Atlantic Humpback Dolphin). 2020. 3p. Available online: <https://www.sousateuszii.org/scientific/potential-short-and-medium-term-targets-for-the-conservation-of-sousa-teuszii/> (accessed on 29 July 2022).
57. CCAHD. *Consortium for the Conservation of the Atlantic Humpback Dolphin Foundation: Strategic Plan 2022–2027*; Consortium for the Conservation of the Atlantic Humpback Dolphin: The Hague, The Netherlands, 2022; p. 25. Available online: <https://www.sousateuszii.org/wp-content/uploads/2022/06/CCAHD-5-year-Strategic-Plan-FINAL.pdf> (accessed on 29 July 2022).
58. Hamer, D.J.; Minton, G. *Guidelines for the Safe and Humane Handling and Release of Bycaught Small Cetaceans from Fishing Gear*; CMS Technical Series; CMS Secretariat: Bonn, Germany, 2020; Volume 43, 50p, Available online: https://www.cms.int/sites/default/files/publication/TS43_Safe_Handling_Release_Guidelines.pdf (accessed on 29 July 2022).
59. Northridge, S.; Coram, A.J.; Kingston, A.; Crawford, R. Disentangling the causes of protected-species bycatch in gillnet fisheries. *Conserv. Biol.* **2017**, *31*, 686–695. [[CrossRef](#)]
60. Clay, T.; Alfaro-Shigueto, J.; Godley, B.; Tregenza, N.; Mangel, J. Pingers reduce the activity of Burmeister's porpoise around small-scale gillnet vessels. *Mar. Ecol. Prog. Ser.* **2019**, *626*, 197–208. [[CrossRef](#)]
61. Bielli, A.; Alfaro-Shigueto, J.; Doherty, P.; Godley, B.; Ortiz, C.; Pasara, A.; Wang, J.; Mangel, J. An illuminating idea to reduce bycatch in the Peruvian small-scale gillnet fishery. *Biol. Conserv.* **2019**, *241*, 108277. [[CrossRef](#)]
62. Bartholomew, D.C.; Mangel, J.C.; Alfaro-Shigueto, J.; Pingo, S.; Jimenez, A.; Godley, B.J. Remote electronic monitoring as a potential alternative to on-board observers in small-scale fisheries. *Biol. Conserv.* **2018**, *219*, 35–45. [[CrossRef](#)]
63. Clay, T.A.; Mangel, J.C.; Shigueto, J.A.; Hodgson, D.J.; Godley, B.J. Distribution and Habitat Use of a Cryptic Small Cetacean, the Burmeister's Porpoise, Monitored from a Small-Scale Fishery Platform. *Front. Mar. Sci.* **2018**, *5*, 220. [[CrossRef](#)]
64. Knight, A.T.; Bode, M.; Fuller, R.A.; Grantham, H.S.; Possingham, H.P.; Watson, J.E.M.; Wilson, K.A. Barometer of Life: More Action, Not More Data. *Science* **2010**, *329*, 141. [[CrossRef](#)]
65. Vos, A.; Schwartz, M.W. Confronting parachute science in conservation. *Conserv. Sci. Pract.* **2022**, *4*, e12681. [[CrossRef](#)]
66. Johnson, A.; Saypanya, S.; Hansel, T.; Rao, M. More than an academic exercise: Structuring international partnerships to build research and professional capacity for conservation impact. *Conserv. Sci. Pract.* **2022**, *4*, e539. [[CrossRef](#)]
67. Genda, P.A.; Ngoteya, H.C.; Caro, T.; Mulder, M.B. Looking up and down: Strong collaboration is only the first step in tackling parachute science. *Conserv. Sci. Pract.* **2022**, *4*, e12677. [[CrossRef](#)]
68. Asase, A.; Mzumara-Gawa, T.I.; Owino, J.O.; Peterson, A.T.; Saupe, E. Replacing “parachute science” with “global science” in ecology and conservation biology. *Conserv. Sci. Pract.* **2022**, *4*, e517. [[CrossRef](#)]

-
69. Rayadin, Y.; Buřivalová, Z. What does it take to have a mutually beneficial research collaboration across countries? *Conserv. Sci. Pract.* **2022**, *4*, e528. [[CrossRef](#)]
 70. Vos, A. Stowing parachutes, strengthening science. *Conserv. Sci. Pract.* **2022**, *4*, e12709. [[CrossRef](#)]
 71. Peter, C.; Mustika, P.L.K.; Acebes, J.M.V.; Chansue, N.; Dolar, L.; Ham, G.S.; Hines, E.; Hte, W.; Minton, G.; Ponnampalam, L.S.; et al. Commentary on Coram et al. (2021) on the use of Facebook to understand marine mammal stranding issues in Southeast Asia. *Biodivers. Conserv.* **2022**, *31*, 1987–1994. [[CrossRef](#)]