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Progress report from the Arabian Sea Whale Network

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8. *Plan for the Land Society, Iran*
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Abstract: Over the past year the Arabian Sea Whale Network (ASWN) has maintained communication between members and with external organisations through a website and an email group. Many ASWN members helped to identify Important Marine Mammal Areas (IMMAs) by writing proposals and participating in the IMMA workshop held in Oman in March 2019. IMMAs for the Southwest Indian Ocean and Arabian Seas were published in December 2019 and now available for use in conservation management strategies. The Network has launched a regional online data platform, that facilitates standardized data archiving in the region, and matching of photo-identification catalogues between research projects in the Arabian Sea. Members in Oman have started to use this platform to conduct data comparisons and analyses. The report also highlights national/project level work conducted by members in Oman, Pakistan, India, Sri Lanka, Iran and the UAE, and provides an overview of progress against the actions set forth in the CMS Concerted Action for Arabian Sea humpback whales. This Concerted Action was extended for another three years, and contains many of the elements that would be incorporated into a Conservation Management Plan.

1. Introduction and Background

The Arabian Sea Whale Network (ASWN) represents an informal collaboration of researchers and conservation bodies interested in the conservation of whale populations throughout the Northern Indian Ocean. The Arabian Sea humpback whale (ASHW) serves as the flagship species, but all large whale species are of interest to the network. Formed at the conclusion of a January 2015 workshop in Dubai, it does not have formal legal status or governmental recognition. A [website](#) and a logo create a sense of unified purpose and facilitate communication, fund-raising, collaborative research and data management and analysis. [Members](#) include independent researchers and consultants, researchers linked with academic institutions, and representatives of local, national and international NGOs, IGOs and government bodies. More information and background on the network are available through the website, [2015 inaugural workshop report](#), and other documents submitted to this and [past meetings](#) (see below). While the on-the-ground research and conservation work in the Arabian Sea region is conducted by individual members at a project or national level, the network helps to promote exchange of information and to place the knowledge and experience gained in local contexts into a regional framework. It also helps to ‘champion’ the work conducted by individual members.

2. Contributions to the IWC SC from Arabian Sea Range States

In 2019 the ASWN submitted a brief progress report to the IWC Scientific Committee meeting (SC_68A_CMP_09_rev1), and ASWN members submitted a range of papers to the CMP and other subcommittees. These contributions demonstrated considerable progress in data collection and capacity building in relation to whale research and conservation throughout the Arabian Sea. This report represents an update on activities conducted since May 2019. A number of additional documents are being submitted to this year's meeting that are relevant to whale conservation in the Arabian Sea. They include:

Document Number	Lead Author or ASWN representative in author list	Title
Oman		
SC/68B/CMP/XX	Christiansen et al.	Assessing the body condition of the world's only non-migratory humpback whale population, the endangered Arabian Sea humpback whale
SC/68B/CMP/XX	Minton et al.	Visual Health Assessment and evaluation of Anthropogenic threats to Arabian Sea Humpback Whales in Oman
Pakistan		
SC/68B/CMP/XX	Moazzam Khan and Nawaz	Whale Distribution in the Northern Arabian Sea along Coast of Pakistan in 2019 based on the information obtained through Fisheries Crew-Based Observer Programme
SC/68B/HIM/XX	Moazzam Khan and	Bycatch of deep-diving cetaceans in subsurface gillnets offshore from Pakistan
Regional		
SC/68B/PH/XX	Holmberg et al.	Flukebook – Continuing growth and technical advancement for cetacean photo identification and data archiving, including automated fin, fluke, and body matching
SC/68B/ForInfo/XX	Cerchio et al.	A new blue whale song-type described for the Arabian Sea and Western Indian Ocean
SC/68B/INFO/14	Anderson et al.	Cetacean bycatch in Indian Ocean tuna gillnet fisheries

3. Regional-level activities and developments

The ASWN coordinator role has not been funded since April 2019. As such, less time has been available to dedicate to some of the core functions of the network. However, a dedicated group of individuals has worked to maintain momentum on a number of initiatives described below.

3.1 Network communication

ASWN members remain in regular contact through an group email list, which is used to share news between members, as well as announcements of important meetings, funding opportunities, new publications and resources, etc.

The [ASWN website](#) is updated regularly (roughly once a month) with [news items](#), ranging from new publications, to results of workshops, and newsworthy developments in ASHW range states (unusual sightings of ASHW or other species in the Arabian Sea, matches made between whales observed in Oman and India, etc).

3.2 Regional database

In January, the Arabian Sea Whale Network continues to test and refine its **regional online database** developed using the [Flukebook](#) platform and funded in part by the IWC SC. This is accessible through a new [dedicated page](#) on the ASWN website. This page includes instructions for obtaining an account, as well as links to videos demonstrating how to conduct data searches and matching on the platform. The ASWN volunteer coordinator participated in workshops hosted by the Indian Ocean Network for Cetacean Research ([Indocet](#)), that is also collaborating with Flukebook for its regional online humpback matching platform. The Indocet and ASWN coordinators have been collaborating closely on work with Flukebook to ensure that new elements developed under funding obtained by Indocet are beneficial to both regional networks and facilitate future potential collaborations/matching between regions, as well as within regions.

While the Platform is expanding in its functionality and many of the initial bugs are being ironed out, it has not yet been used to conduct within-region or between-region matching. In the case of the ASWN, this is due mainly to the fact that there are not yet humpback whale photo-ID datasets available from anywhere other than Oman. In the case of Indocet, research groups are still refining their data and the online matching protocols. It is hoped that the Oman catalogue can be matched to some of the Indocet Catalogues in the near future.

See SC/68B/PH/XX for more details on recent developments of the Flukebook Platform.

3.3 Systematic analysis of photographs for indications of health and threats

During IWC SC 67B, the CMP subcommittee supported a research proposal titled ‘A quantitative assessment of threats to Arabian Sea Humpback Whales using existing photographic and UAV data’. While it was hoped that this project could include photos from ASWH range states other than Oman, to date photos from other range states are limited to those that have been opportunistically collected from fishing, coast guard or dive vessels, and are not of suitable quality for detailed scarring and health analysis. As such, the analyses focused exclusively on photographs from Oman, and results are presented in SC/68B/CMP/XX.

3.4 Participation in regional conservation meetings and initiatives

In December 2019, 20 ASWN members participated in the World Marine Mammal Conference in Barcelona. An opportunistic meeting was held to discuss progress and research and conservation priorities for the Arabian Sea humpback whales and other whale species in the region.

Also in December 2019, the IUCN published a series of new Important Marine Mammal Areas (IMMAs) from the Western Indian Ocean and Arabian Seas. These are now available for viewing and consultation through the IMMA [e-Atlas](#). A number of the IMMAs identified in the Arabian Sea focus on ASHW as the species for which IMMA criteria are met. These new IMMAs can now be used for conservation planning in the region.

In February 2020, ASWN members helped to prepare and submit a proposal for the extension of the [Concerted Action for humpback whales of the Arabian Sea](#). This three-year [extension](#) was endorsed by the CMS Conference of Parties. The extension focuses on completing the actions that were set out in the original Concerted Action, with a focus on continuing to address knowledge gaps and monitoring of the ASHW

population, raising awareness and capacity in the region, and working toward more formal government participation and support in regional conservation initiatives. Progress on each of the proposed activities of the CMS Concerted Action is summarized in Annex 1.

Discussions are still ongoing regarding the objective of working toward an IWC Conservation and Management Plan jointly endorsed by IWC and CMS as a contribution to and a complement of the Concerted Action. This may be facilitated by a capacity building workshop for industry and government stakeholders in Oman, to be followed by a regional workshop for government stakeholders. However, as with many other initiatives, any future progress is dependent on resumption of ‘normal’ functioning for the parties involved following disruption from COVID-19.

4. Project-based or national level progress

ASWN members continue to conduct important research and conservation activities throughout the ASHW range, making important contributions to progress on the CMS Concerted Action.

4.1 Environment Society of Oman: Awareness raising and Outreach

The Environment Society of Oman (ESO) released two awareness-raising videos, an animation and a short documentary, both produced in collaboration with Renaissance Services SAOG. The animation vividly illustrates the hazards that ghost gear presents to marine wildlife and the marine ecosystem at large, with potentially negative impacts on target fisheries and livelihoods. It is narrated in Arabic, Urdu, English, Hindi and Bengali, in order to reach a wide audience of fishers in Oman.. The short documentary showcases ESO’s awareness raising activities with the local fishing community of Masirah with a focus on the impacts of ghost gear and marine debris on marine fauna, including cetaceans. Both these materials are part of a wider community outreach and conservation campaign aiming to engage with fishermen and the local communities of Masirah Island, which hosts a large artisanal fishing fleet that operates in one of the identified core habitats for ASHW in Oman

They videos can be viewed on the following links:

Animation: www.youtube.com/watch?v=PGYVi5SUgVA

Video: <https://www.youtube.com/watch?v=PUvd181dXU8&t=11s>

4.2. Pakistan

WWF Pakistan’s fisheries crew-based observer programme has continued to yield valuable data on cetacean bycatch in the tuna gillnet fleet based out of Karachi, as well as documented sightings of ASHW and other whale species. These sightings are summarized in SC/68B/CMP/XX, which includes a map of all the ASHW sightings reported through this project from 2015-2019. The report highlights the precarious future of this valuable project, which has reached the end of its current funding cycle, and is now relying on volunteer participation from a number of the trained observers. WWF Pakistan is seeking funding to continue the programme, as these sightings provide the only current data on ASHW distribution in the northwest portion of the Arabian Sea, and can be used to inform future cetacean research efforts off the coast of Pakistan.

WWF Pakistan also obtained funding to conduct a dedicated cetacean survey in the waters between Karachi and in January 2020, but security and permitting issues prevented this from taking place as planned.

4.3. India

In September 2019, the Goa State Forest Department in collaboration with independent researchers (some of whom are members of the India Marine Mammal Research and Conservation Network and ASWN) carried out a State level training on ‘Marine Biodiversity and Conservation’, for ground level staff (rangers and forest officers/guards) that included a component on ASHWs and marine mammal stranding Response.

In October 2019, a similar training for rangers and forestry staff was hosted by the Karnataka State Forest Department, in collaboration with Sutaria, Sule, Mankeshwar and Jamalabad (members of the India Marine Mammal Research and Conservation Network and ASWN).

In November 2019, a Soundtrap was placed off Netrani island, Karnataka, a location confirmed as a potential ASHW hotspot by Sutaria et al (2017; 2018). It was placed on a 24 day cycle and has been retrieved thrice as of March 3rd, 2020. Although the acoustic files from these retrievals are yet to be formally analysed by the team in India, the first two retrievals revealed the presence of singing humpback whales. Following the March retrieval, the soundtrap was not re-deployed, pending necessary repairs.

Visual observations of whales were also made in the Netrani area. One of the two observed whales was confirmed to be OM11-010 from the Oman ASHW catalogue. First photographed in Oman in 2011, this whale has severe injuries that allowed it to be recognised even from low-resolution photos obtained opportunistically by divers (see [this article](#) for more details).

In January 2020, another Soundtrap was procured and to be placed in Kanyakumari, on the southern tip of India. The site was chosen based on the recorded movements of a female ASHW that was tagged off the coast of Oman in November 2017, and spent several weeks off the southern tip of India in December-January 2017/18. This unit will be deployed as soon as possible once COVID-19 measures allow safe travel and fieldwork.

Finally In February 2020, as part of their ASHW National Species recovery program, The Karnataka State Forest Department, in collaboration with Sutaria, procured equipment to initiate a vessel-based cetacean survey coupled with acoustic monitoring of the Karnataka coast. The survey was scheduled for March 2020, but has been postponed in relation to COVID-19.

4.4. Sri Lanka

Oceanswell has continued its research on the whale-watching industry off southern Sri Lanka. The study comprises multiple components including surveys with tourists and operators, and boat-based and drone-based observations of interactions between whale-watching boats and whales. The data, some of which were gathered over 2019 and 2020 is currently being analysed. An information session based on preliminary findings for all stakeholders including coastguard and Department of Wildlife personnel was scheduled for March 2020 but had to be postponed due to COVID 19.

In 2019 Oceanswell also commenced a long-term research project on sperm whales off the northwest of Sri Lanka in collaboration with Dr. Shane Gero from the Dominica Sperm Whale Project. This research focuses on the acoustics, diet, and social structures of the sperm whale groups observed in the area. Unfortunately, the 2020 field season was cancelled due to the prevailing situation.

Further, the project's photo-ID database has now been expanded from blue whales to include Bryde's whales, Omura's whales, sperm whales, pilot whales, and bottle-nose dolphins observed in the waters around Sri Lanka.

4.5. Passive Acoustic Monitoring for Blue Whales

During the 2018 Scientific Committee meeting, paper SC/67B/SH/24 briefly reported on the discovery of a new blue whale song-type, recorded off Oman and less extensively off northwest Madagascar during one year of acoustic monitoring off each site. In February 2020 a manuscript was submitted describing the discovery and implications in greater detail, and expanding the dataset to include documentation from a second year of monitoring in Madagascar, and from five years of monitoring off the Chagos Archipelago (see SC/68B/ForInfo/XX). The paper proposes that this song-type is diagnostic to a previously unrecognized population of blue whales that ranges in the western Indian Ocean with an affinity for the Arabian Sea, and has been historically conflated with the Sri Lanka acoustic population. This population would have been most heavily impacted by the illegal Soviet whaling of the 1960's, and therefore its definition is of great significance for the conservation of blue whales in the Arabian Sea.

As a follow up to this work, a bottom-mounted archival acoustic recorder was placed off Dofar, Oman, in March 2020, as part of a collaboration between the Environment Society of Oman, Five Oceans Environment Services, African Aquatic Conservation Fund, and NOAA Fisheries. It was placed on the continental slope at a depth of 300m, specifically to monitor for blue whales and other deep water cetaceans. The recorder has the capacity to record for up to 341 days, and the hope is to retrieve and redeploy every 6 to 8 months for at least 1-2 years. At this depth, the recorder will be able to detect blue whale song at a much higher fidelity and longer detection range than the shallow water recorders used in the previous study off Oman. Therefore, this effort will provide a much more detailed and clear assessment of blue whale presence off Oman, in addition to the presence of other cetaceans.

4.6. Iran

Plan for the Land society

Plan for the Land society (P4L) has been conducting a research and conservation project on Indian Ocean humpback dolphins in Nakhiloo coastal waters since 2014. Their last survey documented a new population of humpback dolphins in the Bushehr province in Feb 2020. In the new phase of the project, P4L has developed a conservation action plan of *Sousa plumbea* with stakeholders and is planning boat survey to compare humpback dolphin population in Nakhiloo coastal area with other population in Persian gulf, Iran but it has been postponed due to COVID-19.

Although current research focuses on coastal dolphin populations, P4L has established a marine mammal national stranding network in the Persian Gulf and Oman Sea, Iran. From 2010 onward the network has been conducting educational workshops for a range of stakeholders in coastal villages and provinces (fishermen, government employees, etc). The reporting network also includes government agencies and oil and gas companies, and P4L also makes use of social media to identify reports of cetacean sightings and obtain more details from those who post photos or videos. Reports of live and dead cetacean observations, are recorded in a database that is shared with various stakeholders, with baleen whale identifications confirmed by experts associated with the ASWN network.

Qeshm Environmental Conservation Institute (QECI)

The Qeshm Environmental Conservation Institute (QECI) has been conducting research on the bottlenose dolphin (*Tursiops aduncus*) community in the narrow channel between Qeshm and Hengam Island in the Straits of Hormuz. The population is the focus of the only commercial dolphin watching operation Iran. Abundance estimates, home range and threats to the community were reported in a poster at the WMMC in Barcelona in December 2019 (Rezaie-Atagholipour and Van Waerebeek, 2019). This research team is also well-positioned to learn about whale sightings in Iranian waters and share them with the network.

4.7. Fujairah Whale Project

The Fujairah Whale Project has not conducted any new field activity in the past year, but funding and plans are in place to conduct new surveys as soon as COVID travel restrictions are lifted. In the meantime the project continues to receive third party records from the area and post these (in English and Arabic) on the project's social media pages (see www.fujairahwhales.com and follow the social media links). The most recent post is of a video showing a pair of Brydes whales sighted in the week of April 21st, 2020.

4.8 UAE Dolphin Project (United Arab Emirates)

The UAE Dolphin Project (www.uaedolphinproject.org) has continued monitoring the Indian Ocean Humpback dolphin population occurring along Saadiyat Island Abu Dhabi for the first part of the year and then concentrated the effort in extending collaborations with the local Universities, authorities and private stakeholders, principally focussing on developing capacity and working towards developing a stranding network in the country. The UAEDP was invited to the 21th Sharjah International Conservation Forum for Arabia's Biodiversity (February 2020) presenting on Marine mammal stranding response and data collection. The UAEDP has fostered a citizen science programme to collect data on sightings reported by the public, among those, one sighting of whale (species unidentified) and one sighting of a false killer whale (*Pseudorca crassidens*). The latest remarkable sighting (April 2020) was the first documented occurrence of Indo-Pacific bottlenose dolphins in Dubai waters since 2013, likely following the total ban of motorised traffic due to the COVID emergency measures. A second unusual sighting was of a group of Indian Ocean humpback dolphins approximately 18km inland in the Al Raha Canal, Abu Dhabi.

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Annex 1 progress on the activities identified in the CMS Concerted Action for Arabian Sea humpback whales

Arabian Sea Humpback Whale Concerted Action: Priority Activities and Outcomes		
Activity	Expected Outcome	Progress as of April 2020
<i>Addressing knowledge gaps</i>		
The development of a marine mammal reporting smartphone App and citizen science tools, to allow the crews of fishing, coast guard and whale-watch vessels and ferries to record and report whale and dolphin observations.	Improved data and models of current humpback whale distribution throughout the Arabian Sea	ASWN members in Oman are testing apps that can be used by shipping companies, and other members are investigating and testing other Apps that can be used by tourism companies and members of the public, as well as for research (e.g. Spotter Pro , Whale Alert , Seafari). However, none are yet in regular use, or translated into the languages used by range states. Funding would be required to make these more widely accessible and in use, and may be ideal for the WWF-Pakistan-trained fisheries observers.
Collaborative boat-based research to continue photo-identification studies, collect genetic samples, and identify critical habitat. The involvement of local scientists in this research will build capacity for future conservation in the region.	Improved data on whale distribution, habitat use, population identity and connectivity between regions, and increased number of qualified cetacean researchers in the region.	Boat-based research has continued in Oman. A survey was planned in Pakistan, but cancelled at the last minute due to permitting and security issues. Funding was also secured to conduct boat surveys in the Karnataka province of India. Equipment was procured, and surveys were due to commence in March-April 2020, but were postponed due to COVID-19. Funding has not yet been obtained for large-scale collaborative research efforts.
Use of passive acoustic recorders to detect the presence of whales and monitor human introduced noise in areas that are logistically difficult or dangerous to survey.	Improved understanding of whale distribution in Eastern Arabian Sea (e.g. Gujarat and Rann of Kutch)	Recordings made in Oman in 2012-13 have been analyzed and the valuable results have presented at the IWC (Cerchio et al., 2016; Cerchio et al., 2018). A manuscript on blue whale song recorded offshore from Oman has been submitted, and a new PAM effort to record in deep water off Oman commenced in March 2020. Opportunistic recordings have also been analyzed from India (Mahanty et al., 2015; Madhusudhana et al., 2018). Two Soundtraps have been procured by IWC funding by Sutaria and one had been placed off Netrani island, Karnataka, India from November 17th 2019 to March 3rd 2020 on a 24 day cycle. Humpback whale songs have been recorded on two of three retrievals, but not yet analysed. The Soundtrap is currently being repaired to download third dataset. Funding and logistics Two more Soundtraps have been ordered for India by the Karnataka State Forest Department and MoEF-CC. In 2020-21, a Soundtrap will be placed off Dwarka, India; two along the coast of Karnataka including Netrani, and one along the coast of Kanyakumari, India. Funding and logistics. Funding and logistics have not yet been in place to conduct larger scale passive acoustic surveys off of Pakistan.
Genetic analysis of samples collected from strandings and during dedicated whale surveys to determine whether Arabian Sea humpback whales comprise a new sub-species.	Likely designation of ASHW as new species or sub-species, understanding of kinship and relatedness of sampled whales	The type specimen for <i>Megaptera indica</i> was sampled at the Paris Museum of Natural History in November 2019. However, issues related to COVID-19 have prevented its shipment from France to New York, and thus prevented analysis. This is also a factor in the delay of analysis of additional samples from Oman to better understand taxonomy of ASHW.
		Although not listed as one of the targeted activities in the Concerted Action, the rationale refers to the need to monitor humpback whale health and threats through . An IWC grant facilitated a visual health assessment of all humpback whale images collected off the coast of Oman from 2000 onward. These provide updated indications of health and anthropogenic scarring, and contribute to the updating of key indicators for the population's status. IWC support also facilitated modelling of abundance and trends for the ASHW population based on photo-identification and genetics data from Oman.
		Regional ASHW ecological niche modeling work previously presented to the IWC (Willson et al. 2017) has been updated with results of more recent satellite telemetry work and a refined method. The habitat suitability layers are currently being prepared for a ship strike risk assessment by looking at co-occurrence between identified whale habitat together with shipping traffic density mapping (derived from

		satellite based AIS data). Completion of this study is expected by late 2020.
Information sharing and awareness raising		
The development of a regional shared online data platform to promote standardization, comparability and timely analyses of data collected throughout the region. This will be used to facilitate the creation of sensitivity maps and assist stakeholders in the design of local, national and regional conservation strategies, including protected areas	Improved understanding of ASHW distribution and connectivity between study areas.	Three years of collaborative development between ASWN members, Flukebook , and Indocet , have resulted in the completion of an ASWN online database that uses the Flukebook Platform. This new data platform allows uploading, archiving, and analysis of cetacean sightings data, as well as use of 'computer vision' to conduct automated matching of humpback whale tail flukes within, and between research projects in the Arabian Sea and wider Western Indian Ocean.
An improved website that provides a portal to the shared database (see above), informs the general public of whale conservation needs, and provides members with a range of outreach tools to engage governments and other stakeholders in their region and involve them in Whale conservation efforts	Increased awareness of ASHW conservation needs among stakeholders	The Arabian Sea Whale Network website has undergone some improvements, and is maintained with updates and news items , as well as a page dedicated to the new data platform . The ASWN has produced an infographic to use in reaching out to stakeholders, as well as three issues of a newsletter . However, more could be done to create a wider variety of outreach tools, including power-point presentations, videos, or other tools in multiple languages.
Capacity building and development and implementation of mitigation strategies		
Organization of targeted regional workshops, meetings and training opportunities that will involve local and national government agencies as well as young scientists, build capacity and develop multi-stakeholder mitigation strategies and conservation measures in key range states.	More effective stranding/entanglement response leading to better survival of affected cetaceans, improved data on bycatch/entanglement rates throughout the region, increased government participation	A workshop was held in Oman, in January 2018, focusing on the final stages of development of the ASWN Flukebook data platform, as well as the issue of data collection from fisheries in the region. The full workshop report can be downloaded here . Many of the researchers working with Arabian Sea humpback whales were also involved in the IUCN Important Marine Mammal Areas workshop for the Western Indian Ocean and Arabian Seas . While organized with different aims, it also involved opportunities for regional capacity building and stakeholder engagement particularly with the Oman government representatives who were present.
Replication of ship strike mitigation strategies from Oman, and by-catch mitigation from Pakistan to other parts of the Arabian Sea.	Reduced risk of ship strike throughout region, improved chance of survival of entanglement	It is hoped that ASWN participation in the IWC hosted workshop focusing on bycatch in the Indian Ocean , and a possible IWC Pilot project in Pakistan will lead to more effective monitoring, reporting and mitigation of bycatch in the region. ASWN members are also working closely with the IOTC to report results from Pakistan. Development of a region- wide approach to ship strike mitigation is expected to be partly informed by the ship strike risk assessment currently in progress (and discussed in the section on addressing knowledge gaps above).
Development of a range-state endorsed regional ASHW Conservation and Management Plan	Regional Conservation and Management Plan to promote long-term coordinated and collaborative conservation and management across the ASHW range participation	Discussions are still underway between the CMS Appointed Councilor for Aquatic Mammals, the regional representative of CMS Office - Abu Dhabi, and the various representatives of the International Whaling Commission and its member states focused on initiating development of an IWC ASHW Conservation Management Plan that if finalized would be jointly endorsed by IWC and CMS. Government-level endorsement from both India and Oman, the only two ASHW range states that are IWC members, remains to be confirmed and discussions are still ongoing.