

REGIONAL MEETING ON SCIENCE AND MANAGEMENT FOR DUGONGS OF THE ARABIAN GULF

Khalidiya Palace, Abu Dhabi, 2nd – 4th May 2023

MEETING REPORT

(Prepared by the CMS Dugong MOU Secretariat)

Day 1, 2nd May 2023

1. Introduction and Welcome

HE Dr Shaikha Al Dhaheri, Secretary General of the Environment Agency - Abu Dhabi (EAD), welcomed participants to the workshop, noting that this opportunity to welcome so many regional and international dugong experts in one room has been long awaited, and that it is a great opportunity to learn more about Arabian Gulf dugongs and benefit from international expertise.

HE stated that the Arabian Gulf is home to the second largest dugong population in the world, hosting an estimated 3,000 individuals. The workshop is an opportunity for participants to share their experience and expertise in the research and protection of dugongs in the region.

HE explained that the Government of UAE has sponsored the CMS Office – Abu Dhabi since 2007 and thanked the CMS Dugong MOU for organizing this significant workshop.

Ms Rouba Abou-Atieh, Executive Coordinator of the Convention for Migratory Species (CMS) Office – Abu Dhabi, also welcomed participants to the meeting on behalf of CMS Office – Abu Dhabi and highlighted the opportunities for collaborative research in the region.

2. Introduction to CMS Dugong MOU

Mr Gabriel Grimsditch presented on the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the Dugong MOU, explaining the latter is the most important international agreement that promotes internationally coordinated conservation of dugongs.

Mr Grimsditch presented on the various governance mechanisms and activities related to the CMS Dugong MOU, including its Conservation Management Plan, its Technical Advisory Group, its Meeting of Signatories, the main pillars of work (research, conservation actions, business models, awareness raising), the IKI Seagrass Ecosystem Services Project, the Small Grants Programme, the Dugong & Seagrass Hub.

Mr Grimsditch also highlighted that one of the main activities ahead for the CMS Dugong MOU is the update of the Global Status Report on dugong populations in partnership with James Cook University (JCU) and Prof Helene Marsh.

3. Dugong Populations in United Arab Emirates: Science and management

Dr Hind al Ameri, EAD, provided an overview of dugongs in the UAE, highlighting historic and current research and conservation efforts.

Research into Arabian Gulf dugongs was initiated with aerial surveys in the 1980s by the Saudi Arabian government and Australian researcher Dr Anthony Preen, who identified large herds of dugongs in the Gulf, and which led to the recommendation of 3 protected areas, including the Marawah marine protected area.

EAD has so far carried out aerial surveys, surveys by rangers, vessel-based surveys, and drone surveys to monitor dugong populations. The Marawah Marine Biosphere Reserve continues to support the highest density of dugongs in Abu Dhabi waters followed by the Al Yasat Marine Protected Area.

During Q&A, EAD noted that the satellite tagging experiment on dugongs had not been a success – due to the high saline levels of the sea, the tag detached within 2-3 weeks. Dr Chris Cleguer (JCU) added that there are similar issues with GPS tagging in Australia and new tags are being developed. Dr Cleguer also stressed that deploying satellite trackers on dugongs requires the capture of wild adult dugongs which can be a stressful process for the animals and -a limited number of- dugongs have been known to die due to the stress induced during tagging. Dugong tagging studies should be conducted in partnership with experts in this field including scientists but also veterinarians. To identify patterns in the movements of an entire dugong population would require a very large number of individuals to be tagged.

The impact of marine heatwaves was raised by Prof Marsh. EAD explained that a recent spike in summer 2021 resulted in increased occurrence of turtle and dugong deaths. This heatwave was experienced in Bahrain and Qatar as well, and it was suggested that it is important to monitor the impact regional marine temperature fluctuations are having on dugongs. Prof Marsh recommended to pay attention to signs of starvation, especially in calves, in the months following heatwaves due to the potential dieback of seagrass meadows.

Dr Das (EAD) also provided a short summary of the UAE seagrass restoration programme which is currently in pilot stage and focuses only on areas where seagrass is present but degraded. These two sites are so far successful, showing signs of rejuvenation. EAD is currently trying to scale up the programme. The importance of seagrass and the ecosystem services it provides is now evident and EAD hopes to start identifying areas to replicate the project soon.

4. Dugong Populations in Saudi Arabia: Science and management

Mr. Tareq al Qahtani, National Center for Wildlife Development (NCW), provided an overview of dugongs in Saudi Arabia, highlighting historic and current research and conservation efforts.

In 2018, the CMS Dugong Catch & Bycatch Questionnaire was carried out at 220 sites along the Red Sea and Arabian Gulf to estimate the dugong populations and threats. 39 questionnaires were collected from Arabian Gulf sites. Jubail, Uqair and Salwa were identified as the three important sites in the Arabian Gulf.

Megafauna surveys aboard the OceanX were conducted in 2022 in the Red Sea. Saudi Arabia will implement the same survey in 2023, and start a new one in the Arabian Gulf this coming winter (October - November 2023) and will repeat the surveys annually for the next three years. The surveys will use standardized timings and Saudi Arabia wishes to coordinate the surveys with the UAE to avoid double counting of individuals. The data collected will inform the potential establishment of MPAs in the Gulf of Salwah and Yasat, with the vision to work together with neighbouring countries.

Bahrain, Qatar, UAE, Saudi Arabia expressed great interest in coordinating aerial survey timings and methodologies for future surveys.

During Q&A, NCW explained that the low dugong mortality data recorded so far is because prior to 2013 there was limited recording of data. The center now has a standardized mortality register and is working with coast guard and stakeholders to collect data.

5. Dugong Populations in Qatar: Science and management

Dr John Wong, an independent expert, provided an overview of dugongs in Qatar, highlighting historic and current research and conservation efforts.

The NW area of Qatar is known to have the largest herds of dugong (approximately 700 dugongs have been counted in one aerial image). However, it is possible that SE Qatar, previously not studied due to proximity to the Saudi Arabia border, oil and military installations, is a summer breeding site due to the discovery of four neonate dugong strandings in 2022.

In 2015-2018 the Government supported a three-year study on dugongs in NW Qatar (Qatar University with Texas A&M university). The report is expected soon, and research will resume in May 2023 with a view to establishing an MPA in the Gulf of Salwah.

Dr Nicolas Pilcher (NCW) confirmed that Saudi Arabia may also establish an MPA in the Gulf of Salwar in late 2023.

In 2022, the Ministry of Environment and Climate Change (MoECC) prepared the Qatar National Action Plan for Conservation and Management of Marine Resource which suggested the establishment of the Qatar West MPA, to protect dugongs and seagrass. The MoECC is preparing a management plan for dugong conservation, including laws to control human activity within the MPA, and establishing a dugong rehabilitation centre. From 2022, MoECC started actively monitoring and recording stranded marine mammals.

Dr Wong described the efforts made to sustain the rescued live-stranded calves, all of which were released back to the wild. The discussion that followed highlighted the need for regional collaboration and assistance when handling live-stranded juvenile dugongs.

Dr Das stressed that in future cases of stranding, colleagues should request help and contact the regional experts present at this meeting. In the case of EAD, a lot was learned from the Phuket Aquarium in 2019 when they handled a stranded dugong calf. If a dugong survives, the decision to keep it in captivity is a government level decision that needs a professional aquarium and guaranteed long-term investment. Prof Marsh highlighted the advice provided by a recent CMS publication on 'Options for Handling a Stranded Orphaned Dugong Calf - Advice to Policy Makers and Managers': <https://www.cms.int/en/publication/options-handling-stranded-orphaned-dugong-calf-advice-policy-makers-and-managers>.

6. Dugong Populations in Bahrain: Science and management

Dr Abdulqader Khamis, an independent expert representing the Arab Regional Centre for World Heritage (ARC-WH), provided an overview of dugongs in Bahrain, highlighting historic and current research and conservation efforts.

In 2017, Bahrain started surveys to determine whether the seas around the Hawar islands hold special status for dugongs, with a view to filing an application for a UNESCO World Heritage Site. A research question of particular interest was the response of dugongs and seagrass to high water temperature and salinity.

The surveys used a multidisciplinary approach, including historical records, structured interviews, citizen science, boat surveys, towed video surveys, water quality monitoring, in-water ecological surveys, in-water experiments, drone surveys, helicopter surveys, and remote sensing. The results show that the dugong population and density has likely remained stable since the surveys of 1986. It was concluded that there is a need to conduct more aerial surveys, as this is the most accurate way of estimating dugong herd size.

It is proposed that the MPA of the Hawar Islands be expanded to include all the known dugong sites in the area.

7. Expert Panel 1: A Global Report on the Status and Trends of Dugong Populations: Arabian Gulf as an exemplar.

Prof Marsh introduced the panel discussion, explaining that the CMS Dugong MOU and JCU are discussing the preparation of a global report on the status and trends of dugong populations, with the aim of presenting it at the Dugong MOS in 2024.

JCU will work with experts around the world to produce a report incorporating new information on dugong populations obtained over the last 20 years. The CMS Dugong MOU Technical Advisory Group (TAG) will act as expert reviewers, and local contributors will have co-authorship of regional chapters.

The Arabian Gulf will constitute an important regional chapter for the report. The panellists were asked to provide potential information sources on the following for each of their countries:

1. Distribution and abundance of dugongs
2. Distribution and status of seagrass
3. Threats to dugongs and their habitats
4. Current conservation measures

UAE indicated that they could potentially provide: (1) information on dugong distribution in UAE; (2) a seagrass map, satellite imaging, field survey reports, water quality assessments; (3) qualitative and quantitative data on threats, mortality and strandings data from the last 15 years; and (4) information on a dugong herd dynamic from a drone study.

Saudi Arabia indicated that there is currently has limited data on the Arabian Gulf coast but will begin aerial surveys in the winter of 2023. Information from dugong bycatch questionnaires is available.

Dr Wong indicated that Qatar could potentially provide: (1) research on dugongs of NW Cost of Qatar and other research collected by Qatar University and Government, (2) an Integrated Coastal Management Report and sensitivity mapping, (3) an Action Plan for Management of Marine Resources (including dugong and seagrass).

Bahrain indicated that they could provide: (1) aerial survey results from 2000 & 2006 and structural interviews; (2) data on water and sediment quality; (3) mortality data, results from an ongoing project studying dugong responses to vessels, and a map of boating areas; (4) MPA plan.

Prof Marsh stressed that the Arabian Gulf may be the most important region in the whole dugong range in terms of cross boundary collaboration to understand and protect dugong population. The Global Status Report will also include trans-boundary information collected as part of a regional collaboration.

Dr Pilcher suggested that this would be a great opportunity for the Arabian Gulf dugong range states to agree to conducting coordinated dugong surveys. This would be a stand-out example of how range states can work together.

8. Expert Panel 2: The use of dugong bycatch questionnaires for science and management

Dr Pilcher provided background to the development of the Dugong Catch & Bycatch Questionnaire. The questionnaire has evolved since it was conceived in 2010 by a group of 10 international experts, including representatives from EAD, MRF, the CMS Dugong MOU and JCU. The questionnaire includes an instruction manual and an automated Excel spreadsheet, designed to standardize the data collected. There is also a 1-page, 10 question follow up questionnaire.

To date, 11,441 questionnaires have been completed throughout the dugong range, all of which add to our understanding of dugong distribution and hotspot mapping and are useful in identifying dugong conservation management priorities.

Day 2, 3rd May 2023

9. Welcome to Day 2 and overview of agenda for the day

Mr Grimsditch opened the day thanking participants for their participation during the previous day and wishing all a successful second workshop day.

10. Expert panel 3: Aerial surveys: objectives, platforms, and use of Artificial Intelligence

Expert Panel 3 started with a short presentation by Dr Cleguer about 'Aerial surveys: objectives, platforms, and use of Artificial Intelligence'.

Dr Cleguer explained that detecting dugongs was easier to undertake from air-based surveys than vessel-based ones. Like other survey methods though, air-based counting also presented limitations. A particular one was its limited ability to detect animals swimming beyond certain depths.

In Australia, aircraft performing dugong surveys typically carried one pilot and four observers. These crafts also generally carried three cameras that recorded the entirety of the area surveyed. Dugong data collected in this way could be used to assess various population parameters, including abundance, distribution, trends, habitat use, and 'potential for biological removal'.

Dr Cleguer noted that estimating dugong abundance was a complex task. The quality of the data collected could, nevertheless, be considerably improved by following standardised survey protocols and conducting appropriate training of surveyors. Dr Cleguer recommended always having an experienced coordinator at the front of the aircraft to guide and coordinate the work of the other team members. Lastly, he reminded the audience of the importance of ensuring detailed reporting of the rationale and methodology of the work.

Explaining why one should use drones to survey marine mammals, Dr Cleguer noted that the method could reduce the risk of observer injury or mortality, increase spatial data accuracy, reduce the carbon footprint and costs associated to the work, reduce human error, and reduce the risk of species misidentification for

certain taxa. He also added that automation would be a necessary subsequent step for processing large volumes of data collected.

Following his presentation, Dr Cleguer asked the panellists what they considered to be the challenges and opportunities of a collective approach to surveying dugongs in the Arabian Gulf.

Dr Khamis considered that there was a need to recognise to what extent transboundary assessments are necessary before any such efforts were mobilised.

Ms Maitha Al Hameli (EAD) pointed out that the various countries in the region did not follow the same methodological approach to surveying and that this posed an issue in terms of data standardisation. She also noted that countries had different survey frequency needs. Ms Al Hameli, therefore, considered it important for range states to start negotiating a common approach to surveying.

Dr Wong added that Qatar used helicopters and drones in its surveying work, but that helicopters, due to their noise, often scared away the animals being counted.

Dr Pilcher recommended that range states always identify the main objectives being pursued when collecting survey data. He also recommended that they identify at preliminary stages how the data collected will be used for conservation.

Prof Marsh agreed with the need to think about why surveys are undertaken. She considered that a relevant goal to pursue would be to understand the status of the population in the region by establishing robust baseline data. If countries agreed that such baseline data would be the goal, then it would make sense for countries to coordinate. Dr Das agreed that good baseline data required transboundary work.

Participants agreed that coordinating survey training and logistics are particularly important ahead of starting any transboundary efforts. They requested that the CMS Dugong MOU help range states come together to achieve a common approach to surveying. Mr Grimsditch indicated that the Dugong MOU could provide a platform for this in a follow-up workshop by bringing together technical experts to discuss the specifics of how a collective approach to monitoring could be realised in the region. Some participants suggested that such workshop take place before the upcoming winter surveys.

11. Presentation on necropsies

Dr Daniela Denk (SeaWorld Abu Dhabi) provided a presentation on necropsies. Dr Denk explained that necropsies were useful procedures for gathering data on dugongs, beyond solely understanding their causes of death (e.g., due to exposure to toxins, bycatch, food competition, habitat loss).

Necropsies could provide insight into the status of wild populations (e.g., information on life history, genetics, stock structure, habitat, predisposition to pathology diseases), enable the assessment of effects of anthropogenic activities, allow the recording of cumulative effects, and contribute to long-term data collection. Dr Denk noted that marine mammals were excellent bioindicators and that the information obtained from studying them could be used to influence policymaking for conservation and to promote a 'One Health' approach.

With regards to general considerations needed to be considered when performing necropsies, staff should be careful to guarantee that appropriate capacity would be available to ensure safe handling, containment, disinfection, and disposal.

With regards to the planning side of the work, Dr Denk advised on the need to be systematic, have an aim, be aware of the various possible diagnosis options, be aware of the potential of the research, and have adequate samples. Dr Denk highlighted the importance of scientifically sound reporting of all work performed, to maximise the usability of any findings uncovered.

12. Expert panel 4: Opportunities for insights from live-stranded and necropsied dugongs

Prof Marsh opened Expert Panel 4 with a short presentation about biological lessons from necropsies. She explained that there were different options for handling stranded live dugongs, and that the best choice would depend on the condition of the animal when encountered. Prof Marsh cited a [new publication](#) where she has outlined the options for handling live-stranded orphaned calves. Prof Marsh also explained that the analysis of stranded dead animals could provide information on their genetics, life history, general biology,

pre-stranding diet, and exposure to pollutants. Prof Marsh recommended that, before any necropsy, staff determine the exact information whose collection would be needed.

13. Rehabilitation and management of orphaned dugongs

Dr Paola Unda Marrón (Worldwide Zoo) stated that the number of stranded dugongs that survived and recovered was very low. She explained that particular care needed to be taken when caring for any such rescued animal (e.g., respiratory airways need to be clear, respiratory rate and effort need to be measured, biological samples need to be collected).

Collecting biological samples on the animal as early as feasible when rescuing would provide a baseline medical status against which a treatment plan can be developed accordingly and monitor the progress. Dr Marrón shared lessons from her experience attempting to rescue stranded and injured calves, including experience relating to milk formula, the use of fruits to train husbandry behaviours while under human care, and the most common medical conditions calves develop during rehabilitation.

During the Q&A, one participant asked how she would decide whether an animal was too sick to be rehabilitated, to which she responded that she would always attempt it. Another participant asked whether dugongs grew depending on the space of their enclosures, to which Dr Marron answered that both the amount of food and the size of the enclosure will have a factor.

Mr Tommy Wilken (Worldwide Zoo) indicated that mental stimulation and enrichment were key for the wellbeing of animals in under human care. He added that his and Dr Marrón's rehabilitation experience indicated that the sensory importance of the eyesight of dugongs could be more important than thought.

Participants agreed that if animals were transferred within the region, stabilisation would be required and that cooperation would be key. Temporary facilities would also be useful before moving animals between sites. In closing, a participant remarked that having the technical expertise on caring for dugongs appeared to be the main challenge in rehabilitating the animals.

14. Lessons learnt and next steps

Closing the day, Mr Grimsditch asked all participants what they had learnt from the workshop and what next steps they would plan to take.

The representatives from Bahrain were encouraged to learn about what other countries were doing in the region and were able to collate ideas for their own capacity-building efforts. The information shared strengthened their confidence in their own work and on its importance, including on the need to protect dugong habitats. Their perception before the workshop was that keeping dugongs in captivity was an easy task, but the information shared by colleagues truly proved the great complexity of this action. The representatives closed indicating their interest in continuing to collaborate with the CMS Dugong MOU. They hoped that the collaboration stemming from the workshop would be a push for Bahrain to protect dugong and seagrass habitats.

Dr Wong was grateful for the opportunity to be part of an event that brought together so much expertise. He indicated that Qatar was planning to set up a marine protected area for dugongs in the northwestern waters of the country. He encouraged the CMS Dugong MOU Secretariat to invite Qatar to join the Dugong MOU, as well as the IOSEA Marine Turtles MOU.

The representative of Saudi Arabia reflected that it would be productive to host a workshop like the present one every year, as to keep momentum on the subject in the region. He was equally pleased to realise that there was a lot of dugong expertise in the region and beyond it. He suggested that Saudi Arabia could potentially host the next regional dugong workshop in 2024, subject to approval from the NCW leadership.

The representatives of the United Arab Emirates were also glad to learn about updates in the region and looked forward to seeing the results of the global report soon to be published. Learning deeply about the processes required for taking care of dugongs had been eye-opening. They stressed the need for regional collaboration and that it would be productive to identify research gaps in relation to the species. Lastly, they added that standardising monitoring protocols for seagrass was as important as doing so for dugongs.

Mr Grimsditch closed the meeting thanking all participants for their commitment to dugong conservation and for taking active participatory roles during the workshop.

“In terms of research and science, the Arabian Gulf can set the example of how important and effective regional cooperation can be.”

(Prof. Helene Marsh)

Day 3, 4th May 2023

15. Field Trip to Sea World Abu Dhabi for a dugong necropsy:

Workshop participants were generously invited to SeaWorld Abu Dhabi by Dr Elsburgh Clarke to observe a dugong necropsy conducted by Dr Daniela Denk.

16. Action Points & Main Take Aways:

- CMS Dugong MOU to send an official invitation to Qatar to join the CMS Dugong MOU
- Collaboration between range states is key to successful conservation and management of dugongs and their habitats within the Arabian Gulf:
 - The CMS Dugong MOU will set up a targeted regional Technical Working Group to agree on coordinated dugong aerial surveys across the Arabian Gulf range states with an agreed, standardized methodology to improve transboundary understanding of Arabian Gulf dugong populations.
 - Saudi Arabia suggested holding Arabian Gulf Dugong Workshops annually and raised the potential of hosting the next meeting in 2024. The CMS Dugong MOU is invited to contact them regarding this.
 - Bahrain is currently implementing a project in partnership with CMS and Amanda Hodgson (Edith Cowan University) to understand the impact of vessels on dugong movement. They are interested to know if any other neighbouring states would like to cooperate on similar projects. The ARC-WH is the main contact for the project.
 - Representatives of the Arabian Gulf dugong range states agreed to coordinate and communicate on cases of live-stranded dugongs. Seaworld Abu Dhabi has a custom-made research and rehabilitation facility and aims to offer services and expertise to the region for rescue and rehabilitation for all marine mammals, including dugongs.
- The success of the Arabian Gulf regional workshop highlighted the benefits of bringing range states together and provides a template for how the CMS Dugong MOU Fourth Meeting of Signatories could be designed to encourage regional collaborations.
- Potential for a regional side event or workshop for the Arabian Gulf at the Marine Mammal Conference, November 2024, Perth Australia.

**ANNEX I
LIST OF PARTICIPANTS**

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