UNITED
NATIONS

EP

Distr. LIMITED

UNEP(DEPI)/CAR WG.42/INF.29
2 March 2021

Original: ENGLISH

Ninth Meeting of the Scientific and Technical Advisory Committee (STAC) to the Protocol Concerning Specially Protected Areas and Wildlife (SPAW) in the Wider Caribbean Region

Virtual meeting, 17–19 March 2021

IMPLEMENTATION OF THE ACTION PLAN FOR THE CONSERVATION OF MARINE MAMMALS (MMAP) IN THE WIDER CARIBBEAN: TECHNICAL ANALYSIS AND PROGRAMMATIC OVERVIEW:

HIGHLIGHTS

For reasons of public health and safety associated with COVD-19, this meeting is being convened virtually. Delegates are kindly requested to access all meeting documents electronically for download as necessary.

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ACRONYMS

CaMPaM	Caribbean Marine Protected Area Management Network
CARI'MAM	Caribbean Marine Mammals Preservation Network
Carib-Coast	Caribbean network for prevention of coastal risks arising with climate change
CEP	Caribbean Environment Programme
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLME+	Caribbean and North Brazil Shelf Lage Marine Ecosystems Project
COP	Conference of the parties
CRFM	Caribbean Regional Fisheries Mechanism
CSN	Caribbean Stranding Network
ECMMAN	Eastern Caribbean Marine Managed Areas Network
FAD	Fish Aggregating Device
FAO	Food and Agriculture Organisation
GCFI	Gulf and Caribbean Fisheries Institute
IMO	International Maritime Organisation
IWC	International Whaling Commission
LBS	Land-Based Sources Protocol
MMAP	Marine Mammal Action Plan
MoU	Memorandum of Understanding
MPA	Marine Protected Area
NGO	No Governmental Organisation
RAC	Regional Activity Center
RAN	Regional Activity Network
SPAW	Specially Protected Areas and Wildlife Protocol
STAC	Scientific and Technical Advisory Committee of the SPAW protocol
IUCN	International Union for Conservation of Nature
UNEP	United Nations Environment Programme
WCR	Wider Caribbean Region
WWF	World Wildlife Fund

IMPLEMENTATION OF THE ACTION PLAN FOR THE CONSERVATION OF MARINE MAMMALS (MMAP) IN THE WIDER CARIBBEAN: TECHNICAL ANALYSIS AND PROGRAMMATIC OVERVIEW
-
HIGHLIGHTS

This document is not an executive summary of the document "Implementation of the action plan for the conservation of marine mammals in the Wider Caribbean: a scientific and technical analysis" but an analytical synthesis for operational purposes aimed at highlighting the main information and recommendations which result from it within the context of the broader marine mammal programmatic work within the SPAW programme and SPAW-RAC.

1. CONTEXT AND OBJECTIVES

1. The Wider Caribbean Region (WCR) hosts a highly diversified community of marine mammals, with more than 35 species currently identified (comprehensive list). The conservation status of these species varies but some have been listed in the IUCN (International Union for Conservation of Nature) red list of threatened species as well at the national level by countries in the WCR. Currently, seven marine mammal species of the WCR have been classified as Critically Endangered, Endangered or Vulnerable, two are designated as nearly threatened, and at least eight are considered data deficient.

2. Marine mammals also hold a unique place in the collective psyche and economies of the WCR. As a breeding and calving ground for some marine mammal species, the warm waters of the Caribbean see the perennial return or residency of a diversity of marine mammal species and populations that serve as a drive for tourism, as well as a natural resource to be consumed or utilized by others. Most marine mammal species are highly mobile and are therefore a shared natural heritage among all SPAW Contracting Parties. All marine mammal species are protected under the Specially Protected Areas and Wildlife (SPAW) Protocol (*i.e*., all are currently listed on Annex II of the Protocol).

3. For these reasons, a Marine Mammal Action Plan (MMAP, UNEP 2008)[1] was drafted and adopted by SPAW Parties in 2008. The Action Plan was meant to guide and inspire national species recovery plans as regional cooperation to protect marine mammals and their habitats in the WCR. In November 2019, the SPAW-RAC contracted the Lightkeepers Foundation to complete a scientific and technical analysis evaluating the implementation of the MMAP since its endorsement in 2008. This work consisted of: 1) the assessment of actions conducted by countries to address the 11 categories of threats identified in the original MMAP; 2) the compilation of actions completed under the SPAW workplan relevant to marine mammal protection; 3) a review of the major threats to marine mammals in the region; and 4) a proposed roadmap for prioritized implementation of MMAP measures at the national and regional levels.

4. This document is not an Executive Summary of this technical report. It was prepared as a stand-alone document and made available in English, French and Spanish to facilitate awareness and dissemination of broader marine mammal programmatic work to assist in prioritizing future initiatives the SPAW Protocol. It is aimed at presenting the highlights of the comprehensive technical review. To support the comprehension of the important original document (over 150 pages), some results have been synthesized and presented in a different way, although the primary messages and conclusions remain the same. However, readers are encouraged to refer to the full document for a more comprehensive and detailed review[2] (UNEP(DEPI)/CAR WG 42/INF.29, Addendum 1.

1 MMAP as adopted in September 2008 at COP5. UNEP(DEPI)/CAR IG.29/INF.4 (November 2008)
2 *https://car-spaw-rac.org/IMG/pdf/mmap_caribbean_report_final_published_1-4-21.pdf*

2. METHODOLOGY

5 . The outcomes of the scientific and technical analysis of the 2008 MMAP implementation are based on the collection, synthesis, and evaluation of a diverse array of data, not only pertaining to the 17 countries which are currently Contracting Parties to SPAW, but to the Wider Caribbean Region (WCR). Data for the analysis were collected from regional and local technical and scientific publications as well as from interviews with SPAW focal points, experts, and other collaborative organizations.

6. A set of 13 indicators was devised to assist in evaluating progress towards implementation of the 2008 MMAP. It comprised the 11 threat categories identified within the original 2008 SPAW MMAP, along with two additional indicators relating to country legislation and national action plans. These 13 threats or need indicators are:

1) existence of national legislation relating to marine mammal conservation and/or welfare,
2) existence of marine mammal species-specific recovery plans and/or a national marine mammal action plan,
3) fisheries interactions,
4) habitat degradation and coastal development,
5) pollution and marine mammal health,
6) protected areas and other management regimes,
7) research,
8) whale watch and associated activities,
9) strandings,
10) captivity,
11) acoustic disturbance and underwater noise,
12) vessel strikes,
13) climate change.

7. In order to evaluate progress towards the implementation of the MMAP for the current 17 SPAW Parties, each threat or need indicator was assigned a categorical designation based on the relative level of intensity (Low, Moderate, High, Unknown). A similar scheme was utilized to represent the countries' response to that threat (Low, Moderate, High, Unknown). These categories were then presented visually to focus priority areas of concern, as presented below (Table 1):

- red color: threat or need that should be addressed in priority (high threat/need intensity + low or unknown country response),
- grey color: threat or need that require knowledge regarding intensity and country response (unknown threat/need intensity + unknown/low country response),
- green color: major threats or needs that were addressed by countries (high threat/need intensity + high intensity country response).
- Yellow color: represent the other combinations between the threat level and the country's response level. These combinations should be considered lower priority than red, black or grey color categories.

8. Limitation: It is important to note that this review was not intended to single out insufficient country effort. Rather, purpose is to help to identify areas that could benefit from attention. In addition, given the relative lack of consolidated or harmonized regional data, the challenges inherent to the evaluating progress should be acknowledged and considered as a limitation of this study. Furthermore, the assessment of the adequacy or effectiveness of measures, initiatives, or programmes reviewed was beyond the scope of this study. However, the technical review was able to identify major gaps and general trends and highlight future priority actions.

3. RESULTS AND DISCUSSION

3.1 Country assessments

9. The country-by-country assessment conducted in the Technical Report suggested that, although some of the major threats and needs have been addressed (Table 1, green color), for the vast majority of countries several areas would benefit from attention (red color). It is also interesting to note that in some cases, the implemented measures have been insufficient to mitigate threats. For example, in several countries, although integrated coastal zone management plans and policies have been implemented, marine mammal habitat degradation remains a major threat. The results also highlighted the areas that were of concern for several countries and hence may be considered a management priority at the regional scale. In terms of threat mitigation, these areas are: **interaction between marine mammals and fisheries, pollution, and acoustic disturbance. Regarding needs, the development of marine mammal national action plans as well as the implementation of research and monitoring programs** dedicated to marine mammals should be considered a priority. Finally, two areas were found to be of high priority for knowledge **enhancement: acoustic disturbance and vessel strikes.**

Table 1: Progress towards the implementation of the MMAP for the 17 SPAW Parties. Summary of country threat or need indicators assessment (according to the color code described in chapter 2).

	Needs				Threats								
	Existence of national legislation relating to MM conservation	Existence of national MM/species specific action plan(s)	Research and monitoring	Protected areas	Fisheries interactions	Habitat degradation	Pollution	Marine mammal watching	Strandings	Captivity	Acoustic disturbance	Vessel strikes	Climate change
Bahamas													
Barbados													
Belize													
Colombia													
Cuba													
Dominican Republic													
France													
Grenada													
Guyana													
Honduras													
Netherlands (Aruba, StMaatern, Curaçao)													
Netherlands (BES Islands)													
Panama													
St. Lucia													
St.Vincent and the Grenadines													
Trinidad and Tobago													
United States													
Venezuela													

Threat or need intensity	**Country response level**	**Recommendation**
High	Low or unknown	Needs/threats to be addressed in priority
Unknown	Low/unknown	Priority area for knowledge enhancement
High	High	Major threat adressed by countries
Other combination		lower priority than red, black or grey color

3.2 A summary of SPAW initiatives to implement the 2008 MMAP

Table 2: Major initiatives implemented under the SPAW Protocol by the Caribbean Environment Programme Secretariat and SPAW-RAC to address major threats and needs related to marine mammal conservation in the WCR.

Threats/needs indicators	Major Initiatives
National legislation dedicated to MM conservation/management	Since the adoption of the MMAP in 2008, Guyana (2010), Grenada (2012) and Honduras (2018) have become new Parties to the SPAW Protocol. The SPAW RAC conducted a survey in 2019, under the auspices of the Caribbean Marine Mammals Preservation Network Project (CARI'MAM), to gather marine mammal-focused legislation implemented in SPAW countries[3]. MoU is under discussion with the IWC.
Marine mammal national action and/or species recovery plans	The Regional Management Plan for the West Indian manatee (1995-2010) was updated[4]. A manatee reintroduction project was implemented in Guadeloupe (2016-2019).
Fisheries interactions	A manatee bycatch review was produced[5]. MoU was signed with the CRFM (2018). Collaborations are being developed with FAO (through its Western Central Atlantic Fishery Commission) and GCFI.
Habitat degradation	MoUs were signed with the Sargasso Sea Commission (2017). A report was produced on the state of nearshore marine habitats and a framework was developed for a Regional Strategy and Action Plan for the Valuation, Protection and/or Restoration of Key Marine Habitats in the Wider Caribbean 2021 – 2030.[6]
Pollution and marine mammal health	Cooperation has increased between SPAW and Land-Based Sources Protocol (LBS).
Protected areas	The Lifeweb project resulted in the identification of important areas for marine mammal conservation in the WCR[7]. A tool to strengthen Marine Mammal inclusion in MPA management plans has been developed[8]. Various initiatives are being implemented under CaMPaM (updated MPA database, training of trainer courses, small grant and mentorship programmes). The Eastern Caribbean Marine Managed Areas Network project (ECMMAN) was developed. The Sister Sanctuary initiative is being implemented through five designated sanctuaries in the Region.
Research	CARI'MAM boat transect survey and acoustic monitoring are being implemented. Lifeweb Project resulted in species distribution maps. A sighting data collection platform was developed (OBSenMER)[9].

3 SPAW-RAC, 2020a. Current Status of national legislation on marine mammals protection in countries and territories of the WCR - Survey report.

4 https://www.fws.gov/caribbean/PDF/ManateeManagementPlan.pdf

5 http://www.car-spaw-rac.org/IMG/pdf/manateebycatch_finalversion.pdf

6 Report on the State of Marine Habitats in the Wider Caribbean & Regional Strategy and Action Plan for the Valuation, Protection and/or Restoration of Key Marine Habitats in the Wider Caribbean 2021 – 2030. UNEP(DEPI)/CAR IG.40/INF.3

7 http://www.car-spaw-rac.org/?Interactive-mapping

8 SPAW RAC, 2020.Improve consideration of MM in MPA management plan: regional study and tracking tool proposal. 6 p.

Whale watch and associated activities	Regional whale watch workshops/guidelines have been developed (Panama, 2011). Workshops have been convened and a toolkit for responsible marine mammal viewing is being developed under CARI'MAM.
Strandings	Three stranding training workshops were convened (Curaçao 2009; Guadeloupe 2010 and Panama 2011) A stranding guide (2013) was published, and national guides were developed[10].
Captivity	The inventory of captive facilities has been completed under the LifeWeb project in 2010.
Acoustic disturbance and underwater noise,	An analysis of the different mitigation measures used during seismic surveys in the Northern part of South America has been completed (2015).[11]
Vessel strikes	Three workshops to improve awareness of, collect data on and mitigate effects of ship strikes and entanglements were convened.[12]
Climate change	A regional Strategy and Action Plan for the valuation, protection and/or restoration of key marine habitats in the CLME+[13] was developed. An Italian-funded project "Biodiversity for Sustainable Development in the Caribbean" was implemented. The European funded project "Caribbean network for prevention of coastal risks arising with climate change (Carib-Coast)" in currently being executed in collaboration with the SPAW-RAC[14].

3.3 Regional threats and needs highlights

3.3.1 Fisheries Interactions

Entanglement and bycatch

10. Artisanal and small-scale fisheries comprise the majority of fisheries in the Caribbean region. From currently available data, by-catch by coastal fisheries appears to be a significant threat. **Because of a lack of data on marine mammal population status and bycatch numbers, the impact of bycatch remains unquantified but the few data available, international trends, and scientific documentation suggest that it likely a major threat**. Large whale entanglements do occur in the region, including increasing documentation of entanglements in FADs (Fish Aggregating Device), but this threat remains unquantified. The level of engagement in addressing marine mammal bycatch is low for most fisheries organizations in the region. **Marine mammal references and data are missing from regional fisheries reports and action plans and the implementation of bycatch mitigation measures are rare**. However, there has been long-term positive work conducted in some countries, such as the collaboration between WWF and the Fishery Committee in French Guiana that resulted in the deployment of modified fishing gear to reduce bycatch. In addition, there has been an increased and positive cooperation of fisheries regional organizations with the SPAW Programme over the last decade.

9 https://www.obsenmer.org/
10 https://www.dcbd.nl/sites/www.dcbd.nl/files/documents/ECCN-MarineMammalStrandingGuide.pdf
11 MamaCocoSea Project. (2015). A review of seismic mitigation measures used along the coast of northern south America, from north Brazil up to Colombia, Reference document for the MamaCocoSea Steering Committee. 76pp.
12 Report of the Joint IWC-SPAW Workshop to Address Collisions Between Marine Mammals and Ships with a Focus on the Wider Caribbean [Panama 2014]
13 http://gefcrew.org/carrcu/SPAW/RSAP15.4.2020-en.pdf
14 http://www.car-spaw-rac.org/?CARIMAM-news,741

Directed take and hunting

11. Available data suggest that some SPAW Parties and other countries in the WCR continue to take (hunt, capture) a significant number of marine mammals annually, and specifically cetaceans, in violation of the Protocol.[15] At the most recent SPAW COP 10 in Roatan, Honduras, Contracting Parties adopted a series of recommendations relating to cetacean protection, including the promulgation of national legislation prohibiting the take, capture, killing and harassment of marine mammals.[16] Parties called upon member states to report the numbers and species of cetaceans taken in hunts and identify research needs and opportunities to collect and share data relating to the distribution of cetaceans in the Region. **Currently, no Parties are reporting the directed takes (hunting) of marine mammals**. Dependent upon the nature of these hunts, these takes may require an Exemption Report under Article 14 of the SPAW Protocol. Unlike for Article 11(2) exemptions, guidance has not been articulated for Parties for actions that might be pertinent under Article 14. Those countries seeking an exemption for traditional marine mammal hunting activities under Article 14 would need to conduct population assessments to determine that such activities do not "cause either the extinction of, or a substantial risk to, or substantial reduction in the number of, individuals making up populations of species of fauna, particularly migratory species and threatened, endangered or endemic species."[17] B**ecause no baseline data is being collected on targeted populations, the impact of these hunts on local or regional marine mammal populations is unknown.**

3.3.2 Habitat Degradation and Coastal Development

12. Most countries have adopted and are implementing tools and strategies for the conservation and maintenance of goods and services by coastal and marine habitats, such as integrated coastal management plans. However, coastal development and habitat destruction remain a significant challenge for many countries within the WCR as is basic wastewater disposal, including the disposal of raw sewage. Countries often do not include marine mammal protection when conducting environmental impact assessments as fundamental to all coastal and deep-water planning and development projects and permitting. **SPAW Contracting Parties are currently not reporting or seeking STAC review for all significant coastal development projects** prior to approval for assessment of pertinence under the Exemptions provision of the SPAW Protocol (Article 11(2)) **to enhance environmental review and assessments regarding marine mammal considerations**. The influx of sargassum into the WCR since 2011 has become a significant management and potential health and safety issue that requires better understanding and expertise regarding disposal and prevention.

3.3.3 Pollution and Marine Mammal Health

13. While there are **considerable efforts in the region, particularly under the LBS Protocol**, regarding various land-based and marine-based pollutants, including action plans and initiatives to address such pollution, **no continuous monitoring programme is in place to determine and mitigate impacts of pollution on marine mammal health and on their critical habitats and prey**. Pollutants that are of importance include excessive nutrient loads, marine debris, wastewater, oil, mercury and other heavy metals. **Oil and gas exploration and exploitation is increasing in some parts of the Region**, posing a growing threat to the marine environment. Basic wastewater disposal, including the disposal of raw sewage, continues to challenge some Parties in the Region. Stranding networks are a viable and underutilized resource to support the collection of information and samples to assess pollution impact on marine mammals.

15 Animal Welfare Institute (AWI). (2019). Briefing Paper: Summary of Prohibited Acts Under The SPAW Protocol Related to Small Cetaceans. Presented to the SPAW Conference of the Parties, Roatan, Honduras, December 2019.

16 UNEP. (2019). Decisions of the 10th Conference of the Parties. Item 9. UNEP(DEPI)/CAR IG.40/3, June 3, 2019, Roatan, Honduras.

17 Article 14. SPAW Protocol. Exemption for Traditional Activities.

3.3.4 Protected Areas and other Management Regimes

14. Apart from five sanctuaries that include marine mammals in their mission or management plans, **the majority of MPAs in the Region do not consider marine mammal protection in their management plans.** However, tools are being developed in collaboration with international programmes that could serve to guide MPA managers in the Region (*e.g.*, TransAtlantic marine mammal tool). In addition, despite several SPAW projects and programmes to promote network-type collaboration (such as the Sister Sanctuary initiative, CaMPaM, and CARI'MAM) **the ecological connectivity and common conservation/protection goals issues have been poorly taken into account among SPAW Protocol Contracting Parties' protected areas.**

3.3.5 Research Programmes

15. To date, the LifeWeb Project application and mapping tool remains the most comprehensive regional assessment of temporal and spatial scale of marine mammal occurrence and species distribution that may inform the designation of marine mammal critical areas for research focus and/or conservation. Despite small scale, long-term citizen-based science initiatives being implemented in the region, in particular with platforms of opportunity (*e.g.*, ecotourism vessels), and the existence of some long-term marine mammal monitoring programmes, **species distribution and population-level assessments at the regional and local level are still severely lacking**. There is no **single network of researchers, and a variety of online data platforms** (*e.g.*, Flukebook, OBSenMER, Observation.org) are currently being utilized, **limiting the availability and sharing of data and the development of collaboration.** In addition, much of the research in the region is conducted without the participation of government or regulatory authorities, hampering information exchange and integration into management policies.

3.3.6 Whale Watching and Associated Activities

16. Whale watching initiatives have been implemented in some areas, including the marine mammal sanctuary in the Dominican Republic. However, currently, **marine mammal watching rules (legislation or voluntary guidelines) have been developed in less than half of the SPAW Protocol countries**. In addition, in these countries, limited resources often result in **poor compliance with and enforcement of the guidelines**. Outreach surrounding the Regional best-practices guidelines that were developed through the Whale Watch workshop conducted by the SPAW RAC and partners in Panama in 2011 is lacking, although the International Whaling Commission (IWC) has included these guidelines in their online worldwide handbook.[18] Finally, there is a global lack of research and monitoring of long-term impacts associated with persistent and unregulated vessel traffic associated with marine mammal viewing and especially within the WCR.

3.3.7 Marine Mammal Strandings

17. Strandings serve as an underutilized source of data regarding marine mammal biology/ecology and anthropogenic impacts (pollution, bycatch, etc.). Effective stranding networks have been developed in several SPAW countries and capacity building and training workshops have been held in the region in the past. However, **strandings remain unattended and unprocessed in many countries and territories and regional collaboration is weak**: there is no centralized database, no centralized regional coordination or regional focal point/ implementing agency. Other initiatives have been launched, such as the development of a Caribbean Stranding Network (CSN) and a Marine Mammal Stranding Guide (CEP Technical Report 74, developed by the Eastern Caribbean Cetacean Network in collaboration with SPAW) but they need updating and being more effectively promoted.

18 https://wwhandbook.iwc.int/en/responsible-management/guidelines-and-regulations

3.3.8 Marine Mammals in Captivity

18. A significant number of marine mammals exist in captive facilities within the Region and proposals for the establishment of new facilities and operations involving dolphins in captivity continue to occur. **There are very limited data on dolphin population assessments in the WCR, hence the impact of live captures and their potential harm to local wild populations remains unknown**. **The development, adoption, and monitoring of the application of regulations and/or guidelines governing the acquisition, care and maintenance of marine mammals in captivity, irrespective of the type of facility, is a challenge in the Region**. To date only one SPAW party (the Kingdom of the Netherlands) has presented an exemption to the Protocol with the STAC for captures, exports or imports of marine mammals for public display or research purposes. A comprehensive list of all facilities holding cetaceans in the Region is provided in the full technical report.

3.3.9 Acoustic disturbance and Underwater Noise

19. Stranding events and behavioral responses of cetaceans to anthropogenic sources of underwater noise, including seismic surveys, active sonar and vessel traffic, have been documented in the scientific literature and in the Region. **However, anthropogenic underwater noise sources, including noise associated with sonars and maritime/coastal traffic are not monitored in the Region and long-term impacts on marine mammal populations are not assessed.** Local mitigation initiatives have been developed, such as the review of mitigation measures for seismic operations along the coast of Northern South America (Green Heritage Fund Suriname and WWF) but no regional mitigation measures are being implemented.

3.3.10 Vessel strikes

20. Some countries are deploying technological tools to attempt to mitigate collisions between whales and vessels, including REPCET[19] in the French West Indies. In addition, a variety of mariner platforms exist within the Caribbean that can serve as data collection points for vessel strike data. However, **in most areas, data are lacking to quantitatively assess the impact of vessel strikes on marine mammals and identify areas of potential high overlap of shipping and cetacean occurrence.** In addition, there is **a lack of a standardized and simple reporting format for vessel strike data collection and centralization, a tool that could be used is the IWC Global Ship Strike Database.** [20].

3.3.11 Climate Change

21. Climate change is expected to exacerbate existing threats to marine mammals such as through habitat loss, disease, pollution, and interactions with human activities. This is particularly true in the WCR, where the health and productivity of coral reef and mangrove ecosystems are highly correlated with sea surface temperature. Sea level rise impacts will primarily be experienced by coastal, estuarine and riverine populations in the lower parts of rivers. Possible marine mammal responses to climate changes include shrinkage of distribution and preferred habitat utilization leading to increased density. Loss of supporting habitat for coastal/estuarine species will impact prey availability, as well as a potential higher demand for marine resources in drought-prone counties. While many countries in the Region are working to reduce their carbon footprints and have committed to comply with lower greenhouse gas emission targets, **specific considerations for marine mammal protection are generally absent from planning strategies.** In addition, **long-term marine mammal data sets are lacking to support and contribute to on-going research on modeling and predictions for scenario development, mitigation, and adaptation measures in the WCR**.

19 REPCET: Real-time tracking of cetaceans device - http://repcet.com/en/home/
20 https://iwc.int/ship-strikes

4. RECOMMENDATIONS: A ROAD MAP FOR PRIORITIZED IMPLEMENTATION OF MMAP MEASURES AT THE NATIONAL AND REGIONAL LEVEL

This chapter is based on the report" Scientific and Technical Analysis of the Implementation of the 2008 MMAP" but was reorganized, synthesized and enhanced by the SPAW RAC to reflect broader programmatic workplans and priorities (based on table 1).

Table 3: Recommendations to strengthen marine mammal conservation in the WCR. The high-level recommendations proposed to address major threats identified previously are in bold type (base on table 1).

General Objective	Recommendations
Strengthen regional coordination	• **Revitalize the Implementation on of the Regional Marine Mammal Action Plan, by validating and/or building upon the findings and recommendations of the « Scientific and technical analysis of the Implementation of the 2008 MMAP ».** • **Create a sustainable technical body, such as a Marine Mammal Regional Activity Network (RAN) in the continuity of CARI'MAM, strengthening existing regional institutional frameworks, partnerships, and collaborative data sharing.** • **Provide the RAC and RAN with technical support for the MMAP implementation via the creation of a technical advisory committee and/or issue specific working groups** • **Strengthen collaboration with regional and global organizations working on marine mammals (IWC, IUCN…) and related fields such as fisheries (FAO, CFRM…) to integrate marine mammal considerations into their regionally important or relevant action plans.**
Prevent habitat degradation and coastal development	• Increase collaborative regional efforts to support and enhance protection, ecological integrity, and function of critical habitats to marine mammals and their prey • Enhance the consideration of marine mammal species in SPAW projects related to the management of coastal and marine ecosystems • Enhance capacity among stakeholders to prevent significant damage to critical marine mammal habitats • Encourage parties to report and seek STAC review for all significant coastal development projects
Strengthen national legislation and **develop national action plans**	• **Support Contracting Parties towards the development of their own national strategy and frameworks for marine mammal conservation (guides, workshops, model national species recovery or action plans…)** • **Support the parties in the development of national marine mammal action plans** • Encourage parties to enact legislation and enforce measures to implement the prohibitions in Article 11.1(b) (taking, possession, killing, commercial trade, disturbance)

Strengthen protection via MPAs	• Promote the inclusion of marine mammals in MPA management plans and enhance managers' capacities on marine mammals' conservation • Strengthen the cooperation regarding marine mammals' conservation among the network of SPAW MPAs and WCR sanctuaries • Liaise and collaborate with other organizations involved in marine mammal protected area research and development, including the IUCN Marine Mammal Protected Areas Task Force/Important Marine Mammal Areas (IMMAs) and IWC • Increase the surface area dedicated to marine mammal critical habitats, including the consideration of a Caribbean-wide marine mammal sanctuary
Enhance knowledge and monitoring of marine mammal populations in the WCR	• **Assess the conservation status and knowledge gaps of marine mammal populations in the WCR via the creation of a regional 'Red List'** • Promote collaboration between regional stakeholders/organizations involved in marine mammal research and monitoring • **Enhance capacity among regional stakeholders for marine mammals' study and monitoring** • Value and disseminate available scientific data to increase scientific interest (and funding) in the Region. • **Promote and provide support to citizen-based initiatives** • Prioritize the recommendations of preceding programs and develop research programs accordingly
Strengthen WCR strandings networks	• Enhance collaboration between existing stranding networks, building upon the current regional Caribbean Stranding Network (dissemination of the WCR stranding guide, creation of a centralized a regional database and reporting mechanism…) • Enhance capacity among regional stakeholders on marine mammals strandings procedures, data/sampling collection and storage
Assess and mitigate bycatch, entanglement and directed take	• **Assess local and regional marine mammal population status as well as bycatch and entanglement numbers in order to assess quantitative threat** • **Increase collaboration with regional and global fisheries organizations (FAO, CFRM…) and IWC** • **Strengthen capacity in bycatch and entanglement assessment and mitigation among regional stakeholders (workshops, training, guides, website…)** • **Encourage parties to enact the legislations that requires the reporting of marine mammal direct take and bycatch in fisheries operations.**
Assess and mitigate pollution impacts	• **Assess contaminant concentrations in marine mammal resources that are harvested for human consumption, including the consolidation of contaminant data in a regional node, such as the Minamata Convention coordinating mechanism on Antigua** • **Assess the impact of contaminants on marine mammals** • Strengthen capacity in oil spill response dedicated to marine mammals among regional stakeholders • Develop partnerships and increase dialogue with oil and gas industries in the region

Support the development of a sustainable marine mammal watching in the region	• Enhance outreach, distribution and implementation of the SPAW regional marine mammal viewing guidelines • Support the development of tools (certification, permits, training, etc.) to develop a sustainable marine mammal observation activity in the region. • Encourage SPAW Parties to develop their own national guidelines and legislation • Strengthen collaboration with global organizations involved in the development of sustainable whale-watching • Strengthen collaboration between stakeholders involved in the development of sustainable marine mammal watching
Assess and mitigate **acoustic disturbance and vessel strikes**	• **Assess vessel strikes numbers and identify "hot spots" in the WCR** • **Identify acoustic disturbance "hot spots"** • Propose new or revised routing schemes or speed restriction in acoustic and vessel strikes "hot spots" • Increase cooperation with/between IMO and regional/local maritime traffic sectors • Raise mariners' and regulators' awareness of the issue of collisions with large cetaceans. • **Develop regional guidelines for seismic survey operations**
Enhance assessment and mitigation of climate change impacts on marine mammals	• Strengthen the integration of marine mammal considerations into national and regional climate change action plans and strategies. • Enhance the consideration of marine mammal species by SPAW parties' projects related to climate change • Identify and monitor key data that can be used as indicators of warming waters impacts on marine mammals

5. CONCLUSION

22. A Marine Mammal Action Plan (MMAP) was drafted under the SPAW protocol and adopted by Parties in 2008. After more than a decade of MMAP-related programmatic work, the SPAW-RAC led a scientific and technical analysis of the MMAP implementation. This work consisted of: 1) the assessment of actions conducted by countries to address the 11 categories of threats and needs identified in the original MMAP; 2) the compilation of actions completed under the SPAW workplan relevant to marine mammal protection; 3) a review of the major threats to marine mammals in the region; and 4) a proposed roadmap for prioritized implementation of MMAP measures at the national and regional levels.

23. Some of the high-level recommendations include:

- Revitalize the Implementation on of the Regional Marine Mammal Action Plan, by validating and/ or building upon the findings and recommendations of the « Scientific and technical analysis of the Implementation of the 2008 MMAP ».
- Establish a sustainable and coordinated regional mechanism (build upon CARI'MAM network) that will serve to connect and enhance expertise, resources, and data.
- Strengthen collaborations with regional and international organizations involved in marine mammal conservation (IWC, IUCN, MPAs, sanctuaries…) and in activities with major impact on marine mammals (CFRM, FAO, IMO, oil and gas industries…).
- Enhance capacity among regional stakeholders for marine mammals' populations study, threat assessments and monitoring.
- Support the parties towards the development of their own national strategy and frameworks for marine mammal conservation (model action plan, workshops…)
- Encourage parties to enact the legislation that requires the reporting of marine mammal direct take and bycatch in fisheries operations.
- Assess the conservation status of marine mammal populations in the WCR as well as knowledge gaps via the creation of a regional 'Red List'.
- Quantitatively assess the major threats to marine mammals in the WCR (bycatch, entanglement, contaminants, acoustic disturbance and vessel strikes numbers and "hotspots").
- Enhance the consideration of marine mammal species in SPAW programs and strategies dedicated to: MPAs, coastal and marine habitats, pollution, and climate change.
- Lastly, it is necessary to provide the human and financial resources necessary to coordinate and support the implementation of the marine mammal action plan at the regional scale.