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

Virtual, 30 January – 1 February 2023

UPDATE OF THE ACTION PLAN FOR THE CONSERVATION OF MARINE MAMMALS IN THE WIDER CARIBBEAN REGION

5 Year Action Plan

February 2023

This meeting is being convened virtually. Delegates are kindly requested to access all meeting documents electronically for download as necessary.

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Summary

The Marine Mammal community of the Wider Caribbean Region (WCR) is diverse and unique, and has a significant ecological, aesthetic and economic value to the countries and territories of the region. All cetaceans and manatees are listed in Annex II of the Specially Protected Areas and Wildlife Protocol of the Cartagena Convention. An Action Plan for the Conservation of Marine Mammals in the Wider Caribbean Region (MMAP) was developed and adopted in 2008 by Contracting Parties under the SPAW Protocol. After more than a decade of MMAP-related programmatic work under the Protocol, at their 10th Conference of the Parties (COP), Contracting Parties to SPAW decided to revise and update the MMAP, considering new information and developments since 2008. The general goal of the revised MMAP is to identify 1) the priority threats to marine mammals in the region, 2) actions that governments, organisations, and other partners from the WCR should take to develop and improve marine mammal conservation policies and practices in a 5-year timeframe, and 3) the available resources and expertise of marine mammal networks established by the SPAW Programme. While the original MMAP focused on eleven 'threat' categories, the priority threats have been recategorized as: fisheries bycatch, directed hunts and captivity, habitat degradation, pollution and marine mammal health, whale watching and associated activities, acoustic disturbance, vessel strikes, and climate change. Within each priority threat category, action areas may include: assessment, which includes increased scientific knowledge and enhanced public understanding; mitigation, which includes protective measures and policy development, and improvement of law and its application; capacity building, which includes efforts to develop regional networks, infrastructure, and information and technology sharing to achieve the conservation outcomes necessary to mitigate the threat. For each threat, a short summary of available information is presented, followed by a table identifying objectives, actions, and potential partners, and a second table presenting expertise and other resources available in the region.

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ACRONYMS

ALDFG	Abandoned, lost, or otherwise discarded fishing gear
AMEP	Assessment and Management of Environmental Pollution
BMI	Bycatch Mitigation Initiative
CARI'MAM	Caribbean Marine Mammals Preservation Network
CARPHA	Caribbean Public Health Agency
Cartagena Convention	Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region
CEP	Caribbean Environment Programme
CLME	Caribbean Large Marine Ecosystem
CMED-CEPEC	Cetacean Conservation Medicine Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
COP	Conference of the Parties
CRFM	Caribbean Regional Fisheries Mechanism
CSN	Caribbean Stranding Network
EBM	Ecosystems-Based Management
FAO	Food and Agriculture Organisation of the United Nations
GCFI	Gulf and Caribbean Fisheries Institute
GEF	Global Environment Facility
GIS	Geographic Information System
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
ICRW	International Convention for the Regulation of Whaling
ICZM	Integrated coastal zone management
IMMAs	Important Marine Mammal Areas
IMO	International Maritime Organisation
IUCN	International Union for the Conservation of Nature
IWC	International Whaling Commission
IWCAM	Integrate Watershed and Coastal Area Management
LBS	Protocol Concerning Pollution from Land-Based Sources of the Cartagena Convention
MMAP	Action Plan for the Conservation of Marine Mammals in the Wider Caribbean Region
MMOA	Marine Mammal Observer Association
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NGO	Non-Governmental Organisation
PAHs	Polycyclic Aromatic Hydrocarbons
RAC-REMPEITC	Regional Marine Pollution Emergency, Information and Training Centre
RAP	Rapid Assessment Program
SIDS	Small Island Development States
SBNMS	Stellwagen Bank National Marine Sanctuary
SPAW	Specially Protected Areas and Wildlife Protocol of the Cartagena Convention
SPAW RAC	SPAW Regional Activity Centre
STAC	Scientific and Technical Advisory Committee
UNCLOS	United Nations Convention on the Law of the Sea
WCR	Wider Caribbean Region
WECAFC	Western Central Atlantic Fishery Commission

ACTION PLAN FOR THE CONSERVATION OF MARINE MAMMALS IN THE WIDER CARIBBEAN REGION

1. INTRODUCTION

1. The marine mammal community of the Wider Caribbean Region (WCR) is diverse and unique, and has significant ecological, aesthetic and economic value to the countries and territories of the region. At least 35 species of marine mammals have been identified in WCR, including seven species of baleen whales (Mysticeti), 26 species of toothed whales (Odontoceti), and two sirenians (the West Indian manatee, *Trichechus manatus*; and the Amazonian manatee, *Trichechus inunguis*) (See Appendix I). Five of these species are endemic to the WCR and Brazil. For many of these species, the WCR serves as primary habitat for critical activities that include feeding, mating, and calving. Marine mammal species are highly mobile and are therefore a shared natural heritage among all countries and territories of the WCR. Although some species have been studied extensively elsewhere, data are scarce concerning the population abundance, biology, life history, distribution and behaviour of most cetacean and manatee populations in the Caribbean Sea and Gulf of Mexico. However, nine species identified in the WCR are classified in the IUCN global Red List of Threatened Species. The region is also the one of only two regions in the world to have experienced the extinction of a marine mammal species (the Caribbean monk seal, *Neomonachus tropicalis*) in the past 250 years.

2. Taking a preventive approach to marine mammal protection is paramount, given that all marine mammal species show notoriously low resilience (capacity to restore a degraded situation) and long restoration times, and considering it is nearly impossible to develop post-hoc regulations to prevent undue impacts to marine mammals and their environment. All cetaceans and manatees are listed in Annex II of the Specially Protected Areas and Wildlife Protocol of the Cartagena Convention. Regional success in managing and conserving marine mammals will ultimately depend on countries' commitment to build their internal capacities and to implement national and regional collaborations by establishing national conservation priorities, standards, and strategies for marine mammal conservation and education. Hence, the general goal of the MMAP is to identify 1) the priority threats to marine mammals, 2) actions that governments, organisations, and other partners from the WCR should take to develop and improve marine mammal conservation policies and practices in a 5-year timeframe, 3) the available resources and expertise of marine mammal networks established by the SPAW Programme.

2. GLOBAL AND REGIONAL CONTEXT

3. Several species of marine mammals found in the Caribbean Sea and the Gulf of Mexico are listed in Annex 1 of the United Nations Convention on the Law of the Sea (UNCLOS, 1982). Article 64 of UNCLOS requires the cooperation of coastal states and countries harvesting these species in the region to cooperate 'directly or through appropriate international organisations with a view to ensuring conservation and promoting the objective of optimum utilisation of such species throughout the region, both within and beyond the exclusive economic zone'. Article 65 allows coastal states and international organisations to 'prohibit, limit or regulate the exploitation of marine mammals more strictly' and requires them to 'cooperate with a view to the conservation of marine mammals.' In the case of cetaceans, states are required to 'work through the appropriate international organisations for their conservation, management and study'. Article 194(5) of UNCLOS states that 'measures must be taken to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species. Article 244(2) encourages states to 'actively promote the flow of scientific data and information and the transfer of knowledge resulting from marine scientific research.'

4. The elevated protection status of marine mammals is reflected in global agreements, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973), the Convention on the Conservation of Migratory Species of Wild Animals (CMS, 1979, also known as the Bonn Convention) and the International Convention for the Regulation of Whaling (ICRW, 1946).

5. Some baleen whales, the sperm whale (*Physeter macrocephalus*), manatees and some species and populations of small cetaceans have been classified in the International Union for the Conservation of Nature (IUCN) Red List of Threatened species, where 'Threatened' includes Critically Endangered, Endangered, and Vulnerable species. Of the 90 species, 12 subspecies, and 28 subpopulations of cetaceans that have been identified and assessed to date, 22 are listed as 'Critically endangered', 22 as 'Endangered' and 16 as 'Vulnerable'. Nine species identified in the WCR are classified in the IUCN global Red List: notably the sperm whales (Vulnerable), the West Indian and Amazonian manatee (Vulnerable), the Endangered Tucuxi (*Sotalia fluviatilis*) and the Amazon River dolphin (*Inia geoffrensis*). The Bryde's whale (*Balaenoptera edeni*) is considered 'Data Deficient' meaning that insufficient information exists to assess its risk of extinction (owing in part to taxonomic difficulties; e.g., there are at least two species of Bryde's whales).

6. During the past two decades, awareness of marine mammals and their habitats in the Caribbean Sea and the Gulf of Mexico has increased. The Specially Protected Areas and Wildlife (SPAW) Protocol, under the Convention for the Protection and Development

of the Marine Environment of the Wider Caribbean Region (Cartagena Convention), was adopted in 1990, came into force in 2000 and is to date the only regional agreement for the advancement of the conservation and protection of the marine environment in the Wider Caribbean Region.

7. Articles 11 and 21 of the SPAW Protocol call for the development and implementation of programmes for protected species, as well as guidelines and criteria for the management of protected species, including migratory species. Article 14 recognises traditional use to satisfy cultural and subsistence needs. All species of cetaceans and sirenians of the Wider Caribbean Region are listed in Annex II of the SPAW Protocol.

8. Given that two terrestrial species - the giant otter (*Pteronura brasiliensis*) and the neotropical otter (*Lontra longicaudis*) - are listed in the Annexes of the SPAW Protocol (Annex II and III, respectively), the scope of the MMAP is not strictly limited to marine species, but also includes those that inhabit estuarine waters and beyond to the limits of freshwater and ecologically connected watersheds. Article 1(c) of the SPAW Protocol defines 'Wider Caribbean Region' as having "the meaning given to the term 'the Convention area' in Article 2 (1) of the Convention, and in addition, includes for the purposes of this Protocol: "(i) waters on the landward side of the baseline from which the breadth of the territorial sea is measured and extending, in the case of water courses, up to the freshwater limit", and "(ii) such related terrestrial areas (including watersheds) as may be designated by the party having sovereignty and jurisdiction over such areas".

9. In this context, the Action Plan for the Conservation of Marine Mammals in the Wider Caribbean Region (MMAP) was developed and adopted in 2008 by Contracting Parties under the SPAW Protocol. After more than a decade of MMAP-related programmatic work under the Protocol, Contracting Parties to SPAW decided to update the original 2008 MMAP at their 10th Conference of the Parties (COP).

10. Therefore, in producing the revised MMAP, Contracting Parties of the region have reviewed and considered the following information documents which outline the status of marine mammal conservation in the region, propose priorities for action, and form the basis of the proposed activities in the revised present MMAP. They are available from the UNEP website at: https://www.unep.org/cep/resources.

- Elements for the development of a Marine Mammal Action Plan for the Wider Caribbean: A Review of Marine Mammal Distribution (UNEP (DEC)/CAR IG.20/INF.3);
- Marine Mammals of the Wider Caribbean Region: A Review of their Conservation Status (UNEP(WATER)/CAR WG.22/INF.7);
- Regional Management Plan for the West Indian Manatee, *Trichechus manatus*. CEP Technical Report No. 35, 1995 and its updated version CEP Technical Report No. 48, 2010;
- Implementation of the Action Plan for Marine Mammals in the Wider Caribbean Region: A Scientific and Technical Analysis (UNEP(DEPI)/CAR WG.42/INF.29 Add.1, 2020); and

- Implementation of the Action Plan for the Conservation of Marine Mammals (MMAP) in the Wider Caribbean: Technical Analysis and Programmatic Overview (UNEP(DEPI)/CAR WG 42/INF.29, 2020).

11. Contracting Parties have also considered and endorsed a number of marine mammal focused decisions at Scientific and Technical Advisory Committee (STAC) and COP meetings, reflecting support for the prioritisation of marine mammal protection in the WCR. For example, Decision 9 of COP10 (2019) calls on parties to comply with the Protocol by implementing national legislation prohibiting the hunting of cetaceans and taking enforcement and conservation measures to aid their protection and recovery, among others (UNEP (DEPI)/CAR IG.40/4).

3. OBJECTIVES: WHAT IS THE MMAP INTENDED TO ACHIEVE AND HOW?

12. The general goal of the MMAP is to identify 1) the priority threats to marine mammals; 2) actions that governments, organisations, and other partners from the WCR should take to develop and improve marine mammal conservation policies and practices in a 5-year timeframe; and 3) the available resources and expertise of marine mammal networks established by the SPAW Programme**.**

13. The Plan is intended to provide a framework for activities at the national and regional level, encouraging international cooperation, while acknowledging the sovereign rights of the participating governments and mandates of other international organizations. While not all governments of the WCR are presently Contracting Parties to the SPAW Protocol, the MMAP may also serve as a framework to encourage enhancement of marine mammal conservation by all countries in the region**.**

14. The short-term expected output of the MMAP is:

- The development and implementation of national-level conservation assessment and management measures to address each of the priority threats in each nation where they occur.

15. The long-term expected outputs of the MMAP are:

- The establishment of regional cooperation programmes to increase scientific, technical, and educational exchange among relevant national, regional, and international organisations;
- the development of national marine mammal action plans or marine mammal recovery plans;
- and ultimately, the conservation and recovery of all marine mammal species and populations, and protection of their habitats in the region (e.g., feeding, breeding, and calving grounds, as well as migratory corridors).

16. Although the SPAW Protocol provides a general mandate for the total protection and management of marine mammals in the WCR, the MMAP focuses on the following two major issues with priority action areas to address each:

17. 1) The management of human interactions and use:

- Identify and assess all significant threats to marine mammals (in general and as species and populations);
- address and mitigate human-related threats to marine mammals and the viability of their populations and habitats;
- manage the taking of, holding, and trade in marine mammals; including live stranded animals and;
- address risks and uncertainty when making decisions and consistent with a precautionary approach.

18. 2) Species knowledge and protection

- Improve understanding of the biology of all marine mammals, especially those that are currently threatened, are or that have been affected by human activities;
- maintain, and where appropriate, seek to restore, the distribution, abundance and diversity of marine mammals in the WCR;
- protect habitats in the WCR that are '"significant'" to marine mammals; and,
- seek to ensure that there are self-sustaining populations of all marine mammals throughout their natural ranges.

19. While the original MMAP focused eleven 'threat' categories, the SPAW Species working group has recategorized the priority threats as: **Fisheries interactions, directed hunts and captivity, habitat degradation, pollution and marine mammal health, whale watching and associated activities, acoustic disturbance, vessel strikes, and climate change.** Within each priority threat category, action areas may include:

- Assessment, which includes increased scientific knowledge and enhanced public understanding;
- Mitigation, which includes protective measures and policy development, and improvement of law and its application; and
- Capacity building, which includes efforts to develop regional networks, infrastructure, and information and technology sharing to achieve the conservation outcomes necessary to mitigate the threat.

20. These actions use tools such as research, stranding data, and designation of or improvements to marine protected area management and networks. Research (including surveys, monitoring, and information management) should form an integral part of any conservation or recovery plan for a species or population. In the WCR, research efforts have not been adequate to identify conservation units (e.g., management stocks), assess their status, or characterise and quantify effects of human activities on them. Socioeconomic research, including costs of mitigation measures, is needed to ascertain

how local communities can benefit from the conservation process and be encouraged to protect marine mammals and their habitat. Data collection protocols should be standardised across the WCR so that meaningful comparisons can be made of current and future research results. All non-lethal but 'invasive' research that can cause injury or disturbance should meet with internationally accepted standards. Scientific researchers should be encouraged to make the results of their research publicly available and disseminate them through relevant scientific and public forums in the WCR and internationally.

21. Marine mammal strandings provide scientists opportunities to obtain certain basic information, data and samples, as well as to identify, and assess the impact of various threats to marine mammals such as pollution, disease, fisheries interactions, acoustic disturbance and vessel strikes. Tissue samples obtained from stranded animals can be used for a variety of scientific purposes including to monitor levels of anthropogenic contaminants (pollution) in marine systems. The monitoring of chronic relatively low levels and causes of mortality and morbidity can provide insight into ocean health if there is timely on-the-ground response and relevant data are properly collected and analysed.

22. The designation and improvement of marine protected areas (ranging from multiple-use parks to no-take reserves) is a tool increasingly used to pursue conservation goals[1]. Protected areas that regulate or even exclude certain types of human activity can be economically costly in the short term but may also provide substantial immediate and long term economic and ecological benefits, ranging from fishery enhancement and recreational and educational opportunities for the public, to mitigation or reversal of habitat degradation and loss of critical coastal ecosystems. The Sister Sanctuary Programme developed under SPAW has facilitated the effective management and conservation of species, such as the humpback whale, across jurisdictional boundaries and throughout its migratory range, as a foundation for a marine mammal protected areas network (UNEP(DEPI)/CAR WG.38/INF.16). To date, five member nations - Dominican Republic (Santuario de Mamíferos Marinos de la República Dominicana), Bermuda (Marine Mammal Sanctuary), the French Antilles (Agoa), the Caribbean Netherlands (Yarari) and the United States (Stellwagen Bank National Marine Sanctuary) - support the initiative which has forged the foundations of a marine mammal protected areas network[2]. A recent analysis of existing management plans for marine protected areas, conducted by the CARI'MAM Project, indicates that most of the MPAs in the region are small and coastal, and do not include marine mammals in their management goals and objectives, or operational and financial planning of these areas.

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[1]MaMPAN https://www.marinemammalhabitat.org/building-transatlantic-partnerships-among-mpas-whales-dolphins/

[2] UNEP(DEPI)/CAR WG.38/INF.16 The Sister Sanctuaries Program for Marine Mammals in the Wider Caribbean – A US/NOAA, Dominican Republic, France and the Netherlands Initiative. Miami, Florida, 2 - 4 November 2016

23. To implement these actions, it is essential to have effective institutions (*e.g.*, systems and administrative structures) in place, staffed by competent and trained managers and scientists, as well as systems for reporting information and monitoring progress toward the management goals (*e.g.*, reporting and monitoring progress). In this context, adequate financial resources are necessary, requiring the cooperation and commitment of governments, relevant organisations, and donors.

24. All actions within the framework of the MMAP are intended to be implemented by governments, in collaboration with organizations and other partners, where possible and appropriate, including the Secretariat of the Cartagena Convention SPAW Sub-Programme. Countries should implement actions within the context of their national priorities and capabilities.

4. THREATS AND ACTIONS

25. Threats to marine mammals and marine ecosystems persist and new threats are emerging. Most marine mammals face multiple and cumulative threats. Conservation measures that already are in force must be evaluated and re-evaluated, and new approaches developed to address emerging threats. Hence, the MMAP should be considered a dynamic and evolving document guiding national actions and regional collaboration. The issues addressed in the present document are arranged in their approximate order of priority for conservation action based on the:

- abundance, range and conservation status of the species,
- biological and ecological impact,
- need for active protection and management,
- need for knowledge,
- potential for improved protection and threat mitigation.

26. As more information is obtained and the status and vulnerability of the various species become better understood, the general ranking of threats to marine mammals in the WCR may change. **In terms of threat mitigation, regional priorities identified by the 2020 scientific and technical analysis[3] are: interaction between marine mammals and fisheries, hunting, pollution, and acoustic disturbance**. Also, countries may choose to address their own specific priority issues through the development and implementation of National Marine Mammal Action, Management or Recovery Plans, and guided by country threat assessments presented in both UNEP (DEPI) CAR WG 42 INF.29 (Technical Review Highlights) and UNEP (DEPI) CAR WG 42 INF.29 Addendum 1 (Technical Review).

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[3] SPAW RAC (2020) Implementation of the Action Plan for Marine Mammals in the Wider Caribbean Region: A Scientific and Technical Analysis (UNEP(DEPI)/CAR WG.42/INF.29 Add.1, 2020).

27. For each threat, a short summary of available information is presented, followed by a table identifying objectives, priority actions, expected outputs, and potential partners, and a second table presenting expertise and other resources available in the region. This table serves as a starting point for Parties to facilitate collaboration and partnerships, enhance knowledge, and review and consult existing tools.

4.1. Fisheries Bycatch

28. Marine mammals are vulnerable to mortality and injury as a direct function of incidental capture (bycatch) in marine fisheries (e.g., commercial and artisanal). Their migratory behaviour exposes them to multiple fishing gear types and fishing practices, and efforts to understand the rates of interaction between marine mammals and fishing operations requires analysis of data over large spatial areas (ocean-basin) and multiple types of fishing activities.

29. It is estimated that more than 500,000 marine mammals (excluding polar bear *Ursus maritimus* and walrus *Odobenus rosmarus*) are incidentally captured in a range of fisheries every year[4,5]. Such bycatch is generally acknowledged as a principal threat to the persistence and recovery of many marine mammal species[6,7].

30. Not all marine mammal species are under threat from bycatch and directed fisheries targeting specific marine mammals can be found in some regions. Nevertheless, the bycatch of marine mammals is not desirable in most fisheries. Where marine mammals are caught incidentally as bycatch, this negatively affects the fishing operations and resulting revenues.

31. Therefore, the interaction between fisheries and marine mammals may result in the mortality or injury of marine mammals in commercial and artisanal fisheries; contribute to or cause declines in marine mammal species or populations; can lead to the direct harvest of and use of marine mammals as bait or food; and cause displacement from and damage to important marine mammal habitat.

32. Marine mammal bycatch is an issue of concern for the WCR, although the population level significance of such interactions is still generally unknown. At least 16 species of marine mammals have been documented as bycatch in artisanal and commercial fishing

1. _____

[4] Read, A.J., Drinker, P., Northridge, S. (2006) Bycatch of Marine Mammals in U.S. and Global Fisheries. *Conservation Biology* 20(1): 163-169.
[5] Gray CA, Kennelly SJ (2018) Bycatches of endangered, threatened and protected species in marine fisheries. *Rev Fish Biol Fisheries* 28:521-541.
[6] Reeves, R.R., McClellan, K., Werner, T.B. (2013) Marine mammal bycatch in gillnet and other entangling net fisheries, 1990 to 2011. *Endangered Species Research* 20:71-97.
[7] Brownell, R.L. *et al*. (2019) Bycatch in gillnet fisheries threatens Critically Endangered small cetaceans and other aquatic megafauna. *Endangered Species Research* 40:285-296.

gear, in particular in longlines, gillnets, and trawls[8]. Bycatch in Fish Aggregation Devices (FAD) is also a growing concern. Some populations are particularly threatened, such as the Guiana Dolphin in French Guiana[9] or the Eastern Caribbean Sperm Whale population[10]. To address this threat, governments must assess the magnitude and impact of bycatch in fisheries in the WCR and investigate questions such as:

- How do marine mammals become entangled in fishing gear? What is the impact of bycatch on marine mammal populations in the WCR?
- Are particular species or demographic groups within species (e.g., females with calves) particularly vulnerable?
- What is the nature, distribution and magnitude of fishing effort in relation to the distribution of marine mammals in the region?
- How can the magnitude of marine mammal bycatch in fisheries be effectively estimated?
- How can bycatch be avoided or mitigated? Are there specific gears, modifications or alternative fishing techniques that can avoid or reduce bycatch while still allowing economically feasible fishing?

1.

[8] Bjorkland, R. H. (2011). An assessment of sea turtle, marine mammal and seabird bycatch in the Wider Caribbean Region. PhD Dissertation, Department of Environment, Duke University.
[9] Bordin et al. (2022) Study and conservation of the Guiana dolphin (Sotalia guianensis) (Van Bénéden, 1864) in French Guiana. Latin American Journal of Aquatic Mammals 17(1)
[10] Gero S, Whitehead H (2016) Critical Decline of the Eastern Caribbean Sperm Whale Population. PLoS ONE 11(10): e0162019.

FISHERIES BYCATCH			
Key objectives	**Priority actions**	**Expected outputs**	**Main partners**
Assess: Estimate marine mammal bycatch in fishing operations.	Develop programmes aimed at estimating marine mammal bycatch in fishing operations. Such programs could include self-reporting (cell phone apps, logbooks and electronic logbooks), dockside monitoring and inspection, scientific rapid assessments (including fishermen interviews), electronic video monitoring, observer programs, and alternative platform observer programs. Include training on species identification and provide marine mammal identification guides to fishermen.	Identified fisheries and gear types with high levels of interactions (depredation and animals caught and released alive), injury, or mortality of marine mammals in fishing operations. Improved understanding of fishing operations in WCR, including gear used, area of operation, where marine mammals become entangled, and how they interact with the gear. Improved understanding of the frequency of marine mammal bycatch in fishing operations in the WCR.	Governments, fishing industry, regional fisheries bodies, academic/research institutions, NGOs and SPAW RAC
Assess: Gather information by other means to identify bycatch hotspots.	Use data from stranded marine mammals to identify fishery interactions. Use readily available bycatch models to assess bycatch risk. Use information on marine mammal co-occurrence with fishing operations and biological and ecological data to identify potential bycatch hotspots.	Stranding data may provide temporal and spatial information about marine mammal strandings that may aid in targeting direct observations. Risk assessment maps identifying bycatch hotspots and fisheries with the potential for high marine mammal bycatch.	Governments, fishing industry, regional fisheries bodies academic/research institutions, NGOs, IWC stranding Initiative, and SPAW RAC

Assess: Estimate marine mammal populations in the WCR.	Conduct line transect surveys, mark-recapture studies, or acoustic surveys to estimate marine mammal population abundance in the WCR; utilise existing marine mammal distribution data (e.g., Lifeweb database)	Quantification of marine mammal populations to better estimate the impact of bycatch.	Governments, research organisations, NGOs, national environmental institutions, SPAW RAC
Mitigate: Modify fishing practices to avoid marine mammal bycatch	Develop, test, and use bycatch mitigation strategies. Such strategies can be a combination of regulatory and voluntary measures that use gear switching, gear modifications, codes of conduct, and time/area closures[11]	Reduction in marine mammal interactions and bycatch. Development of bycatch mitigation strategies that can be used by fishing operations in the WCR.	Governments, academic/research organisations, fishing industry, FAO, IWC Bycatch Mitigation Initiative (BMI), NGOs
Mitigate: Implement measures to reduce the likelihood of marine mammal mortality or injury in commercial fishing operations.	Support efforts to remove derelict or illegal fishing gear from marine mammal habitats in the WCR. Support efforts to disentangle marine mammals from fishing gear.	A reduction in derelict and illegal fishing gear that has the potential to entangle marine mammals. Removal of gear from marine mammals that could seriously injure or kill marine mammals and impact their health and reproductive capacity over the long-term.	Governments, IWC, NGOs, fishing industry, academic/research organisations.

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[11] FAO. 2021. Fishing operations. Guidelines to prevent and reduce bycatch of marine mammals in capture fisheries. FAO Technical Guidelines for Responsible Fisheries No.1, Suppl. 4. Rome. https://doi.org/10.4060/cb2887en

Build Capacity: Increase collaboration with FAO (WECAFC), CRFM and other regional fisheries bodies to assess bycatch in fisheries	Build capacity within regional fisheries bodies (WECAFC, CRFM, GCFI, etc.) to incorporate non-finfish bycatch estimation and mitigation (marine mammals) in stock assessments, bycatch reduction efforts, and scientific reviews, within fishery management efforts.	Collection of marine mammal bycatch data as part of any logbook reporting requirements. Development and implementation of national marine mammal observer programmes onboard large fishing boats and/or rapid bycatch assessment survey for artisanal fisheries.	Governments, FAO, fishing industry, Secretariat of the Cartagena Convention SPAW Sub-Programme and SPAW RAC, NGOs, IWC's Bycatch Mitigation Initiative (BMI);
Build Capacity: Creation of formal outreach programme to fisher communities	Creation of formal outreach programme to fisher communities, including the use of surveys, which is critical to assess sightings, characterise fishing practices, and enlist traditional/local ecological knowledge. Encourage the collection of more detailed information to identify species caught through the distribution of simplified marine mammal species identification guides;	Development of a marine mammal bycatch training module (e.g., safe handling and release, gear marking, identification guides, monitoring and reporting, data collection) for inclusion in regional fisheries training workshops and outreach to local and regional fisher communities, serving to guide efforts in establishing/enhancing observer programmes and opportunistic data collection	Governments, fishing industry, regional fishery management bodies, academics, NGOs, IWC's Bycatch Mitigation Initiative;

33. This table offers a non-exclusive list of partners who have been active inside and outside the Region on specific issues and serves as a starting point for Parties to facilitate collaboration, enhance knowledge, and review and consult existing tools.

RESOURCES
REGIONAL EXPERTISE Caribbean Regional Fisheries Mechanism (CRFM): https://www.crfm.int Caribbean Stranding Network (CSN) in Puerto Rico Consortium for Wildlife Bycatch Reduction https://www.bycatch.org/ International Whaling Commission (IWC): Expert Advisory Panel on Entanglement Response (https://iwc.int/management-and-conservation/entanglement/entanglement-response-network) IWC Bycatch Mitigation Initiative (https://iwc.int/management-and-conservation/bycatch) IWC stranding initiative (https://iwc.int/management-and-conservation/strandings/strandings-initiative) UNDP/GEF PROCARIBE+ Project: https://clmeplus.org/procaribe-plus-project/ Western Central Atlantic Fishery Commission (WECAFC): https://www.fao.org/wecafc/en/
REGIONAL REVIEWS, GUIDELINES, AND TOOLS Bjorkland, R. H. (2011). An assessment of sea turtle, marine mammal and seabird bycatch in the Wider Caribbean Region. PhD Dissertation, Department of Environment, Duke University. Technical Guidelines to Reduce Marine Mammal Bycatch in Capture Fisheries https://www.fao.org/responsible-fishing/bycatch-and-discards/tg-reduce-marine-mammal-bycatch-capture-fisheries/en/ Guidelines for the Safe and Humane Handling and Release of Bycaught Small Cetaceans from Fishing Gear https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/6nyxkycfqs_SafeHandlingReleaseGuidelinesDigitalPages__002_.pdf Report of the FAO Expert Workshop on Means and Methods for Reducing Marine Mammal Mortality in Fishing and Aquaculture Operations https://www.cms.int/en/document/report-fao-expert-workshop-means-and-methods-reducing-marine-mammal-mortality-fishing-and

FAO guidelines: Sacchi, J. 2021. Overview of mitigation measures to reduce the incidental catch of vulnerable species in fisheries. General Fisheries Commission for the Mediterranean. Studies and reviews No. 100. Rome, FAO. https://doi.org/10.4060/cb5049en

Hamer, D., and Minton, G. (2020). Guidelines for the safe and human handling and release of bycaught small cetaceans from fishing gear. UNEP/CMS Secretariat. Bonn, Germany 50 pages. CMS Technical Series No. 43.

Kiszka, J. (2014). Bycatch assessment of the West Indian manatee (Trichechus manatus) and other megafauna in artisanal fisheries of the Caribbean. Final report to SPAW RAC. Florida Atlantic University.

Lenfest Ocean Program, Marine Mammal Bycatch Working Group: https://www.lenfestocean.org/en/research-projects/developing-recommendations-to-estimate-bycatch-for-the-marine-mammal-protection-act

SPAW RAC (2007) Protocols and techniques for responding to strandings: https://www.car-spaw-rac.org/IMG/pdf/2007-strandingprotocolrecommendations-spaw-english.pdf

SPAW RAC webpages on strandings (guidelines, regional contacts, trainings…): https://www.car-spaw-rac.org/?Stranding-networks-1306

The Global Marine Animal Stranding Toolkit: https://darchive.mblwhoilibrary.org/handle/1912/8695

The Global Stranding Network: https://globalstrandingnetwork.com/

Ward, N., Bogomolni, A., and Potter, C. (2013). A Stranding Guide to Marine Mammals of the Wider Caribbean Region: An introductory field guide for stranding responders. Gecko Productions Inc. 2013. 78pp.

4.2. Directed Hunts and Captivity

34. Marine mammals in the WCR continue to be hunted for human consumption and live caught for public display. With the exception of the humpback whale hunts in Saint Vincent and the Grenadines, the directed cetacean hunts in the WCR usually target small cetacean species, including killer whales (*Orcinus orca*, also known as 'orcas'), short-finned pilot whales (*Globicephala macrorhynchus*) and false killer whales (*Pseudorca crassidens*), collectively named 'blackfish'; some dolphin species; and occasionally pygmy sperm whales (*Kogia breviceps*), sperm whales (*Physeter macrocephalus*), and Bryde's whales (*Balaenoptera spp.*)[12,13]. West Indian manatees, in particular, are also subjected to illegal, poorly documented hunting over much of their range[14].

35. Marine mammals, particularly bottlenose dolphins, are held in captivity in many parts of the WCR for public display and interactive programmes that involve touching, feeding and swimming with them. The captivity industry has both welfare and conservation implications for marine mammals. There has been a recent shift in public opinion in the West regarding the public display of marine mammals, particularly cetaceans. This shift is demonstrated by recent public policy changes, including legislation that prohibits the display of orcas in the U.S. state of California (2016) and all cetaceans in Canada (2019). In France, detention of all cetacean species for commercial purposes is to be ended by 2027[15]. It seems timely to consider similar changes in the WCR.

36. Removal of live marine mammals from the wild means they are no longer available to help maintain their natural populations, and limitations imposed by captivity on their complex social behaviour and wide-ranging nature cause stress. Live-capture removals can be a serious threat to local cetacean populations, especially when conducted in the absence of robust population assessments. In addition, extraction, capture and transportation to a captive location may kill individuals (especially the young) and those that do not die may be injured or experience behavioural disruption resulting from stress. Rescue and scientific research are increasingly the only exemptions for removing marine mammals from the wild that the public finds acceptable. For marine mammals already maintained for display, region-wide standards for care and handling should be developed. These standards should be based on the best available science and be engineering or animal-based rather than performance-based. Several jurisdictions, including the United Kingdom, have standards that can serve as a starting point; the United States standards were last updated 40 years ago and therefore are outdated.

1. _____

[12] Fielding R and Kiszka JJ (2021) Artisanal and Aboriginal Subsistence Whaling in Saint Vincent and the Grenadines (Eastern Caribbean): History, Catch Characteristics, and Needs for Research and Management. Front. Mar. Sci. 8:668597.
[13] 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.
[14] Kiszka, J. (2014). Bycatch assessment of the West Indian manatee (Trichechus manatus) and other megafauna in artisanal fisheries of the Caribbean. Final report to SPAW-RAC. Florida Atlantic University.
[15] LOI n°2021-1539 du 30 novembre 2021 visant à lutter contre la maltraitance animale et conforter le lien entre les animaux et les hommes (JO 1er décembre 2021).

DIRECTED HUNTS AND CAPTIVITY			
Key objectives	**Priority actions**	**Expected outputs**	**Main partners**
Assess: Gather information on marine mammal takes in direct hunts.	Gather information on location, species, sex, age, and numbers of animals taken each year. If necessary, train investigators in the territories or invite countries to allow observers to collect the information.	Information on location, species, sex, age, and numbers of animals taken in directed hunts each year.	Governments, fishing industry, academic/research institutions, NGOs, and SPAW RAC, International Whaling Commission Scientific Committee
Assess: Estimate marine mammal populations in the WCR.	Conduct line transect surveys, mark-recapture studies, or acoustic surveys to estimate marine mammal population abundance in the WCR specifically focused on marine mammals harvested for human consumption or taken for captivity; utilize existing marine mammal distribution data (e.g., Lifeweb database)	Information on population abundance and distribution of species targeted in directed hunts. Information to help determine if directed hunts are having population level consequences on local marine mammals.	Governments, research organisations, NGOs, national environmental institutions, SPAW RAC, International Whaling Commission Scientific Committee
Assess: where consumption of cetaceans and/ or manatees occurs, monitor community level health impacts	Establish health programmes to test mercury and other contaminant levels in communities and in consumed marine mammals (from stranding), to identify potential health impacts of consuming cetacean and manatee meat	The level of contamination of hunted and consumed animals is monitored.	Governments, academics/research institutions, NGOs, Minamata Convention Node on Antigua

Assess: Seek to improve the health of captive individuals and reduce the impact on wild populations	Improve existing facilities and care through the development of robust national/regional standards for captive marine mammal health and welfare. Develop regionally acceptable standards regarding selection of candidates, capture procedures, immediate and post-capture handling and maintenance. Produce annual status reports for every marine mammal in captivity, including a public inventory of information on births, deaths, illness and genetics of individual animals and injuries incurred by the animals and public from interaction programmes.	Robust standards for captive marine mammal health and welfare. Acceptable standards regarding authorised personnel, selection of candidates, capture procedures, immediate and post-capture handling and maintenance. Reports from rehabilitation centres on stranded animals as well as reports on marine mammal reintroduction efforts. National reports of live captures, and inventory of imported/exported marine mammals in captivity and their source or origin.	SPAW RAC, and CEP in collaboration with marine mammal scientists, veterinarians, epidemiologists, governments, relevant non-governmental organisations, tourism industry and facility providers.

Mitigate: Ensure proper compliance with the SPAW Protocol and other requirements.	Prepare and submit SPAW Protocol Article 11(2) or Article 14 exemption documentation as appropriate. Obtain the necessary CITES authorisation for any international trade in marine mammal parts, derivatives or biological samples. Obtain and comply with the necessary approval from the IWC for subsistence take of humpback whales. Enact legislation to prohibit the taking of SPAW listed marine mammals.	Reports to the SPAW STAC and CoP on exemptions taken. Relevant CITES and IWC paperwork.	Governments, Cartagena Convention Secretariat-SPAW Sub-Programme, SPAW RAC, fishing industry, academics/research institutions, NGOs, CITES, International Whaling Commission Scientific Committee.
Mitigate: Revitalise awareness campaigns on marine mammals	Centralise existing educational tools, translate them when necessary, and make them available on a web platform Support education and outreach campaigns in countries where marine mammal hunting still occurs.	Awareness on marine mammals, their conservation, and the potential negative impacts of their consumption on human health are enhanced in countries where hunting still occurs.	Governments, NGOs, Caribbean Marine mammal sanctuaries, SPAW RAC.

Mitigate: Ensure that removals do not compromise the biological viability of wild marine mammal populations.	Support and conduct research on the distribution, population structure, abundance and trends of marine mammal species targeted for live capture to ensure compliance with the Protocol's provisions for environmental impact assessments and exemptions. Disseminate knowledge on marine mammal populations in the region.	Robust science on the distribution, population structure, abundance and trends of marine mammal species targeted for live capture. Knowledge, experiences and documentation available in the region are used to train and inform at the regional level to ensure that the management of marine mammals in captivity is carried out responsibly and with minimal impact on wild populations.	SPAW RAC, and CEP in collaboration with marine mammal scientists, veterinarians, epidemiologists, governments, relevant non-governmental organisations, tourism industry and facility providers.
Mitigate: Increase compliance with the provisions of the SPAW protocol prohibiting directed take of marine mammals	Develop model national legislation prohibiting marine mammal directed hunts and live capture Encourage submission of data and reports on catches of marine mammals. Organise capacity building workshops to support Parties in exemption application and catch report.	Adherence to the SPAW Protocol, CITES and other relevant international regulations and agreements.	SPAW RAC, and CEP in collaboration with marine mammal scientists, veterinarians, epidemiologists, governments, relevant non-governmental organisations, tourism industry and facility providers.
Build Capacity: Increase collaboration with FAO and WECAFC, CRFM, and other regional fisheries organisations to assess directed hunts in fisheries bodies.	Support the inclusion of marine mammal bycatch and directed hunts data in annual fisheries reports	Directed take/marine mammal hunting data collection are incorporated under fisheries management umbrella to advance the status of marine mammals in the region.	Governments, Regional fisheries bodies, academics, NGOs, SPAW RAC, Cartagena Convention Secretariat-SPAW Sub-Programme

37. This table offers a non-exclusive list of partners who have been active inside and outside the Region on specific issues and serves as a starting point for Parties to facilitate collaboration, enhance knowledge, and review and consult existing tools.

RESOURCES
REGIONAL EXPERTISE Animal Welfare Institute, whaling program: https://awionline.org/content/whaling Coastal Carolina University, Russell Fielding research on Environmental and Human Health Implications of Caribbean Whaling: https://www.russellfielding.com/research Florida International University, Marine Conservation Ecology Lab research on Artisanal and aboriginal whaling in St Vincent and the Grenadines: https://marineconservationecologylab.com/portfolio/artisanal-and-aboriginal-whaling-in-st-vincent-and-the-grenadines#highlights Fundación Omacha (Colombia): https://omacha.org/ The International Whaling Commission: https://iwc.int/management-and-conservation/whaling/aboriginal
REGIONAL REVIEWS, GUIDELINES, AND TOOLS Animal Welfare Institute. (2019). Summary of Prohibited Acts Under the SPAW Protocol Related to Small Cetaceans (UNEP(DEPI)/CAR IG.40/INF.9) SPAW RAC (2021) Current status of National Legislation on Marine Mammals in Countries and Territories of the Wider Caribbean Region (UNEP(DEPI)/CAR WG.42/INF.29 Add.2): https://www.car-spaw-rac.org/IMG/pdf/unep_depi_car_wg_42inf.29-addemdum2-english.pdf Updated list of captive facilities in the Caribbean: https://docs.google.com/spreadsheets/d/1pWFqIwZ8msdQCwOip2D-RinCLEbT0y9fW71LL5GYP5c/edit?usp=sharing

4.3. Habitat Degradation from Coastal and Watershed Development

38. While some marine mammals occupy a relatively well-defined habitat year-round or have a narrow feeding niche that restricts them to a particular kind of habitat (e.g., manatees need access to aquatic vegetation and warm water), many marine mammals in the Caribbean region are migratory or utilise both coastal and pelagic waters during different parts of their lifecycle, making habitat protection complex and challenging.[16]

39. Marine mammal habitat is degraded, compromised, and destroyed in a variety of ways. While the potential range of effects is immense, coastal species are particularly vulnerable, and most species suffer from cumulative and synergistic anthropogenic stressors and threats. Because the causes of habitat degradation are so diverse and emanate from multiple sources, the impacts of human activities on coastal habitats are difficult to monitor and address.[17]

40. Caribbean marine and coastal habitats are characterised by coral reefs, mangrove forests, and seagrass meadows which are susceptible to impacts from infrastructure expansion, urbanisation, land and marine-based tourism, fishing, mining, shipping, solid and human waste (sewage) disposal, nutrient runoff, and fossil fuel exploration and development.[18] Currently, environmental impact assessments for project planning and permitting do not account for marine mammal conservation in most WCR countries.

41. The designation of specially protected areas (ranging from multiple-use parks to no-take reserves) is a tool increasingly used to pursue conservation goals. Protected areas that regulate or even exclude certain types of human activity can be economically costly in the short term but may also provide substantial immediate and long-term economic benefits, ranging from fishery enhancement to recreational and educational opportunities for the public.

42. The designation of ecologically sensitive or important areas, including in the form of marine protected areas under national designation and listed under the SPAW Protocol, may also help to reverse the increasing trend in habitat degradation and loss of critical coastal ecosystems throughout the region, by employing an ecosystems-based management approach (EBM). Moreover, MPAs can be used as control sites for scientific research and comparative analyses.

43. Under the SPAW Programme, the Sister Sanctuary Programme has been also put forward as a system to facilitate the effective management and conservation of species, such as the humpback whale, across jurisdictional boundaries and throughout its migratory range. Under the CARI'MAM Project, an analysis of existing management

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[16] SPAW-RAC. (2020). Implementation of the Action Plan for Marine Mammals in the Wider Caribbean Region: A Scientific and Technical Analysis. Authored by Vail, C. and Borobia, M. UN Environment, Caribbean Environment Programme, Specially Protected Areas and Wildlife Regional Activity Centre. 158 pp.
[17] Avila, I. C., Kaschner, K., and Dormann, C. F. (2018). Current global risks to marine mammals: Taking stock of threats. *Biological Conservation*, 221, 44-58.
[18] UNEP. (2020). The State of the Nearshore Marine Habitats in the Wider Caribbean. Caribbean Natural Resources Institute (CANARI), UNEP-CEP Technical Report No.1, 176 pp.

plans for marine protected areas using a ‘marine mammal tracking tool’ indicated that most of the MPAs in the region are small and coastal, and do not include marine mammals in their management goals and objectives, or operational and financial planning of these areas[19].

1.

[19] CAR SPAW (2020) Inclusion of marine mammals in the MPA management plans: regional study, tools and recommendations for an improved consideration. UNEP(DEPI)/CAR WG 42/INF.30

HABITAT DEGRADATION			
Key objectives	**Priority actions**	**Expected outputs**	**Main partners**
Assess: identify interaction areas with the potential for human activities to impact marine mammal habitat in the WCR	Support and conduct research on the distribution, population structure, abundance and trends of marine mammal species. Develop and apply GIS to improve understanding of the overlap of marine mammal habitats, distribution, and threats in coastal areas; utilise existing GIS threats data to identify critical marine mammal habitats and hotspots of interaction with human activities (e.g., LifeWeb database)	Integrate existing species distribution and threats mapping data (e.g., LifeWeb Project) into environmental planning and environmental impact assessments conducted prior to project approval.	Governments, NGOs, academics/research organisations, SPAW RAC, local communities
Assess: Consolidate available information and tools for protection of marine mammal habitat	Carry out an analysis to identify management tools and collaborative actions that seem appropriate for the type of overlap found. Disseminate best practices to enhance management of existing Sanctuaries and MPAs.	Management tools and measures to minimize major impacts and protect marine mammal populations and their key habitats are identified and disseminated	Governments, SPAW RAC, RAC-REMPEITC, national and local MPA authorities/managers of marine mammal sanctuaries, NGOs, IUCN, GCFI, Conservation International's Rapid Assessment Program (RAP), Regional Fisheries Bodies.
Mitigate: Inclusion of impact assessment studies that consider marine mammals before any construction work is planned in coastal areas.	Develop a 'tool kit' including instruments to guide and prevent significant damage to critical marine mammal habitats in the WCR; e.g., Coastal Zone Management policies/action plans, guidelines/practices for environmental	Preparation of Exemptions reports for activities that bear the potential to destroy marine mammal habitat and marine ecosystems, and submission to the STAC for review and feedback.	Governments, Secretariat of the Cartagena Convention SPAW Sub-Programme, SPAW RAC, NGOs, marine mammal scientists, academics, National Coastal Zone Management authorities, Marine Laboratories, academic institutions,

	governments agencies and key industries such as tourism.	Develop guidelines and best practices for industries such as tourism and coastal development on how to monitor and mitigate impacts on marine mammals	NGOs, private business, and relevant projects and initiatives in the WCR.
Mitigate: Strengthen the Sister Sanctuary programme	Development of a Framework MOU, whereby countries with existing or new Sister Sanctuaries could join as participants, outlining areas of cooperation based on lessons learned to date from the programme, as well as considering joint programming for activities in the WCR. Preparation of a concept strategy evaluating the benefits of designating the entire WCR as a Marine Mammal Sanctuary.	Enhanced value, network and management of MPAs to marine mammal population recovery and protection of critical habitats with a common strategy for marine mammal conservation and joint programme aligned with MPAs management plans.	Governments, Secretariat of the Cartagena Convention SPAW Sub-Programme, SPAW RAC, national and local MPA authorities/managers of marine mammal sanctuaries; NGOs, CMS Convention and other relevant organisations.
Build Capacity: increase collaboration between NGOs and governments to enhance protection, ecological integrity and function of critical habitats to marine mammals, including protection for coral reefs, mangroves, and seagrass beds.	Integrate marine mammal initiatives into regional coastal management and joint programming, planning and action plans (e.g., relevant activities under the UNDP-GEF PROCARIBE+ Project, BEST Initiative, and CaribCoast). Increase outreach and cooperation with industry and commercial sectors such as fishing, mining, oil and gas, agriculture, tourism and private enterprises to promote conservation and management of coastal marine ecosystems in the region.	Inclusion of marine mammal habitat requirements in the national Integrated Coastal Zone Management (ICZM) framework and in other relevant regional initiatives or projects on coastal and marine ecosystems in the WCR as appropriate (e.g., via the UNDP-GEF Project – Protecting and Restoring the Ocean's natural Capital, building Resilience and supporting region-wide Investments for sustainable Blue socio-Economic development (PROCARIBE+); the AMEP Projects on Integrating Watershed and Coastal Area Management (IWCAM) in the Small Island Development States (SIDS) of	Governments, Secretariat of the Cartagena Convention SPAW Sub-Programme, and SPAW RAC, developer and planners for industry, academics, NGOs, partnerships with industry and commercial sectors such as fishing, mining, oil and gas, agriculture, tourism, and private enterprises

		the Caribbean and on Reducing Pesticide Run-off to the Caribbean Sea.	
Build Capacity: Enhance management effectiveness of individual sites by promoting collaboration and MPA networking, especially among SPAW-listed MPAs.	Conduct learning and sharing of best practices (e.g., research, viewing guidelines, strandings response, enforcement, conservation measures) among the SPAW-listed and other MPAs to enhance management capacities for marine mammals and engage other MPAs.	A 'Marine Mammal module' to be used in 'Training of Trainers programme' under CaMPAM (if reactivated) and other similar training and capacity-building opportunities in the WCR.	Governments, SPAW RAC, CaMPAM (if reactivated), SPAW Contracting Parties national and local MPA authorities/ managers, NGOs, IWC, Regional Fisheries Bodies, Academia and other relevant organisations.

44. This table offers a non-exclusive list of partners who have been active inside and outside the Region on specific issues and serves as a starting point for Parties to facilitate collaboration, enhance knowledge, and review and consult existing tools.

RESOURCES
REGIONAL EXPERTISE
ACP MEAs Phase III Projects: Strengthening Environmental Governance and Supporting MEAs in the Africa, Caribbean and the Pacific regions. https://www.acpmeas.com/
Agoa Marine Mammal Sanctuary (French West Indies): https://sanctuaire-agoa.fr/editorial/who-are-we
IUCN Marine Mammal Protected Areas Task Force/Important Marine Mammal Areas (IMMAs): https://www.marinemammalhabitat.org/
The Caribbean Protected Area Management Network and Forum (CaMPAM): http://campam.gcfi.org/
The Caribbean Natural Resources Institute (CANARI): https://canari.org/
The Biodiversity and Protected Areas Management Programme (BIOPAMA): https://biopama.org/
UNDP/GEF PROCARIBE+ Project: https://clmeplus.org/procaribe-plus-project/

REGIONAL REVIEWS, GUIDELINES, AND TOOLS

Mahon, R. and L. Fanning. 2021. A Monitoring and Evaluation Mechanism for the Caribbean Large Marine Ecosystem (CLME+) Strategic Action Programme (SAP). Centre for Resource Management and Environmental Studies, The University of the West Indies, Cave Hill Campus, Barbados. CERMES Technical Report No. 99: 26 pp.

SPAW Protected areas list and description: http://palisting.car-spaw-rac.org/

UNEP/CEP. (2020). State of nearshore marine habitats in the Wider Caribbean. Report prepared by Caribbean Natural Resources Institute (CANARI). Draft final report. https://www.unep.org/cep/resources/report/state-nearshore-marine-habitats-wider-caribbean

UNEP/CEP. (2020). Regional Strategy and Action Plan for the Valuation, Protection and/or Restoration of Key Marine Habitats in the Wider Caribbean 2021 – 2030. Report prepared by Caribbean Natural Resources Institute (CANARI). https://www.unep.org/cep/resources/report/regional-strategy-and-action-plan-valuation-protection-andor-restoration-key

UNEP- Spain Partnership 'Broad-Scale Marine Spatial Planning and Transboundary Marine Mammal Management' – LifeWeb Project [2010-2014]. See interactive maps at https://www.car-spaw-rac.org/?Lifeweb-project-on-marine-mammals-corridors-996&var_mode=calcul

UNEP/CEP (2020) Regional Strategy and Action Plan for the Valuation, Protection and/or Restoration of Key Marine Habitats in the Wider Caribbean 2021–2030. https://www.unep.org/cep/resources/report/regional-strategy-and-action-plan-valuation-protection-andor-restoration-key

The self-assessment tool to assess marine mammal management in MPAs of the Ocean Governance project: https://marine-mammals.info/self-assessment-tool/

4.4. Pollution and Marine Mammal Health

45. Nearshore environments, in particular, are exposed to a wide range of pollutants including persistent organochlorines, heavy metals, litter, oils (petroleum hydrocarbons), marine debris, and nutrients from a variety of marine and land-based sources, including port, industrial and agricultural activities. Some of those pollutants concentrate in the food web. Ample evidence exists linking chemical pollutants to compromised health of exposed marine mammals in parts of the Caribbean region (e.g., Florida and Gulf of Mexico) and there is a growing concern that exposure to contaminants can increase susceptibility to disease and affect reproductive performance and long-term health in marine mammals.[20]

46. In the WCR, agricultural runoff and poor wastewater management has led to local and regional concerns regarding coastal/estuarine/riverine pollutants such as pesticides, nutrients and herbicides, as well as organic contaminants from sugar refineries, fruit processing plants or domestic waste. Because of their long lifespans and mammalian (i.e. human-like) general physiology, marine mammals are vulnerable to environmental contaminants and are also considered "sentinel species" because they can provide early warnings of changes or threats to environmental and/or human health.[21,22] Creation of appropriate monitoring programs can: a) create baselines against which to assess and mitigate future changes, and b) highlight locations where the health of marine mammals, coastal ecosystems, and people may be compromised. Analyses of pollutant levels should be integrated into formal health risk assessments, and careful communication to communities that continue to consume marine mammals should be undertaken to ensure that risks are properly recognized and mitigated.

47. Exposure to toxic substances and harmful chemicals such as oil, can have acute or chronic effects when animals ingest contaminated food sources or breathe contaminated air, or if it comes into contact with their skin. Polycyclic aromatic hydrocarbons (PAHS; the chemicals associated with oil pollution), are one of the greater contaminant threats in the WCR where oil and gas development is increasing.[23,24]

48. Excessive nutrient loads contribute to harmful algal blooms which are exacerbated by warming oceans and can lead to toxic effects on people and marine life, including marine mammals.[25] In some locations, toxic algal blooms are becoming more frequent, more toxic, longer lasting and more widespread, including in southern Florida. Acute

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[20] Bossart, G. D., Schaefer, A. M., McCulloch, S., Goldstein, J., Fair, P. A., and Reif, J. S. (2015). Mucocutaneous lesions in free-ranging Atlantic bottlenose dolphins Tursiops truncatus from the southeastern USA. Diseases of Aquatic Organisms, 115, 175-184. doi:10.3354/dao02895

[21] Fielding, R., and Evans, D. W. (2014). Mercury in Caribbean dolphins (Stenella longirostris and Stenella frontalis) caught for human consumption off St. Vincent, West Indies. Marine Pollution Bulletin, http://dx.doi.org/10.1016/j.marpolbul.2014.10.040

[22] Bossart, G. D. (2011). Marine Mammals as Sentinel Species for Oceans and Human Health. Veterinary Pathology, 48(3), 676-690.

[23] Helm, R. C., Costa, D. P., DeBruyn, T. D., O'Shea, T. J., Wells, R. S., and Williams, T. M. (2014). Overview of effects of oil spills on marine mammals. Handbook of Oil Spill Science and Technology, Chapter 18. https://doi.org/10.1002/9781118989982.ch18

[24] Takeshita, R., Sullivan, L., Smith, C., Collier, T., Hall, A., Brosnan, T., Rowles, T., and Schwacke, L. (2017). The Deepwater Horizon oil spill marine mammal injury assessment. Endangered Species Research, 33, 95-106.

[25] Kudela, R. M. et al. (2015). Harmful Algal Blooms: A scientific summary for policy makers. IOC/UNESCO, Paris (IOC/INF-1320).

morbidity and mortality events occur almost annually among marine mammals that appear to correlate with the presence of toxic algal blooms.[26]

49. Basic wastewater disposal, including the disposal of raw sewage, continues to challenge some governments in the Region, many of whom continue to dump untreated wastewater directly into the ocean.[27]

50. 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 impacts on marine mammal health and their critical habitats and prey. Pollutants that are of importance include excessive nutrient loads, marine debris, wastewater, oil pollution, mercury, and heavy metals.[28]

51. Mercury and other heavy metal contamination in seafood is well-documented, as are the serious implications for human and animal health. Primary sources of mercury pollution in the region are artisanal gold mining and coal-fired power plants. As mercury bioaccumulates within the marine food chain, marine mammals (and other higher trophic-level species)—and those that consume them—are highly susceptible to the impacts of mercury toxicity, including disruption in neurologic, cardiovascular, reproductive, and endocrine systems.[29] [30] [31]

52. Stranding networks are a viable and under-utilised resource to support the collection of pollutant data. The inclusion of contaminant investigations during pathological examination of stranded or hunted cetaceans could provide critical information towards assessing pollution and impacts in the Region. Biopsies and stomach content analysis can provide critical information as well regarding plastics consumption.

53. Plastics and other debris pose a threat to marine mammals through ingestion or possible transfer of chemical pollution through micro and nano plastics and introduction of chemical residuals into the marine environment that have biological effects at low concentrations.[32]

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[26] Anderson, D. M. et al. (2021). Marine harmful algal blooms (HABs) in the United States: History, current status and future trends. Harmful Algae, 102, https://doi.org/10.1016/j.hal.2021.101975
[27] UNEP. (2020). The State of the Nearshore Marine Habitats in the Wider Caribbean. Caribbean Natural Resources Institute (CANARI), UNEP-CEP Technical Report No.1, 176 pp.
[28] SPAW-RAC. (2020). Implementation of the Action Plan for Marine Mammals in the Wider Caribbean Region: A Scientific and Technical Analysis. Authored by Vail, C. and Borobia, M. UN Environment, Caribbean Environment Programme, Specially Protected Areas and Wildlife Regional Activity Centre. 158 pp.
[29] Lopez-Berenguer, G., Penalver, J., and Martinez-Lopez, E. (2020). A critical review about neurotoxic effects in marine mammals of mercury and other trace elements. Chemosphere, 246, https://doi.org/10.1016/j.chemosphere.2019.125688
[30] Booth, S., and Zeller, D. (2005). Mercury, food webs, and marine mammals: Implications of diet and climate change for human health. Environmental Health Perspectives, 113(5), https://doi.org/10.1289/ehp.7603
[31] Fielding, R. et al. (2021). Demographic and geographic patterns of cetacean-based food product consumption and potential mercury exposure within a Caribbean whaling community. Human and ecological risk assessment: An international journal. 27(6), https://doi.org/10.1080/10807039.2020.1870865
[32] Zantis, L. J., Carroll, E. L., Nelms, S. E., and Bosker, T. (2021). Marine mammals and microplastics: A systematic review and call for standardisation. Environmental Pollution, 269, https://doi.org/10.1016/j.envpol.2020.116142

POLLUTION			
Key objectives	**Priority actions**	**Expected outputs**	**Main partners**
Assess: Review and consolidate available information on pollutant sources to identify key locations where pollutants are found in the region, including biotoxins. Identify the degree of overlap among these areas and the occurrence of critical marine habitats.	Convene a regional workshop in the three SPAW languages (English, French and Spanish) to assess existing pollutant data for the region and their effects on marine mammal health. Develop a regional program on marine mammal contamination assessment from samples collected by stranding networks.	Identification of regional hotspots and report on the main sources of pollution and effects on marine mammal health, and mitigation measures that can be taken.	Regional Minamata Node on Antigua, CARPHA, SPAW RAC, Governments, NGOs, Caribbean stranding networks, Academics, marine mammal scientists; Cartagena Convention and Oil Spill Protocol, LBS Protocol and SPAW Protocol, Contracting Parties; other relevant Governments in collaboration with universities, NGOs, relevant Conventions (e.g. Basel, Stockholm), IWC, oil/gas industry, RAC-REMPEITC, RAC IMA, RAC CIMAB, Cetacean Conservation Medicine Group (CMED-CEPEC), Minamata Convention Caribbean Node/laboratory (Antigua) and projects and initiatives (e.g. Global Programme of Action for the Protection of the Marine Environment from Land-based Activities GPA), internationally and in the WCR.
Mitigate: Collaborate with regional fisheries bodies to raise the profile of plastic and other marine debris, including abandoned, lost, discarded fishing gear (ALDFG) and impacts to marine mammals.	Develop, adopt, and implement measures that direct fishers to retain and prevent the discard of all plastics and fishing gear and require the materials be brought back to port for proper disposal.	Policies that prohibit the discard and require the proper disposal of plastic and other marine debris, including abandoned, lost, discarded fishing gear (ALDFG).	Governments, NGOs, regional initiatives, academics, marine mammal scientists, regional fishery organisations, Secretariat of the Cartagena Convention SPAW Sub-Programme, and SPAW RAC

Mitigate: Develop fisher-led removal efforts of ALDFG.	Develop programs to collect and dispose of lost, discarded fishing gear (ALDFG) and other marine debris. Consolidate and share data with existing programs to track, identify, monitor and remove marine debris and abandoned fishing gear. Identify the sources of ALDFG gear and target outreach efforts. Organise a communication campaign on ghost fishing gears and the potential new regulation dedicated to fishermen and fishery organisations.	Fishermen contribute to removal of ALDFG. The amount of ALDFG in the environment decreases.	Governments, Fishers, NGOs, gear technologists, marine mammal scientists, SPAW RAC.
Build Capacity: strengthen regional capacity for marine mammal focused oil spill response	Develop and disseminate regional guidelines for oil spill response focused on marine mammals Organise a training workshop for Cartagena Convention Contracting Parties and oil and gas industries, to explore areas of collaboration including development of guidelines, research, monitoring, noise mitigation, and other contributions, notably financial, from industry partners	Regional guidelines are produced and disseminated in the WCR At least one regional training workshop is organised. Oil and gas companies engage in the development of the guidelines, including participation in the workshop and contributing to follow up actions.	Governments, RAC-REMPEITC, SPAW RAC, NGOs; oil and gas industry; marine mammal scientists

Build Capacity: Establish a network of contaminant testing sites (laboratories)	Establish or collaborate with existing sampling programmes for the testing of mercury and other heavy metals in fish, sargassum and marine mammal resources that are harvested for human consumption; and engage with the regional node for the Minamata Convention based on Antigua to centralise data management and analysis. Establish sampling programmes for emerging contaminants (micro and nano-plastics and associated chemical residues) in marine mammal resources that are harvested for human consumption.	Develop a training module for contaminant collection. Encourage MOUs and collaboration between existing laboratories and testing sites. Develop public education and outreach materials communicating human health and ecosystem risks from contaminants.	Governments; IWC's 'expert panel' on marine mammal health and strandings; Minamata Node on Antigua; Biodiversity Research Institute; CARPHA
Build Capacity: Explore synergies with the LBS Protocol and associated AMEP Programme, to raise marine mammal conservation needs in training courses and other initiatives related to initiatives planned or underway.	Participation of marine mammal SPAW experts in LBS working groups, STACs, and COPs to raise the profile of marine mammal health and welfare in LBS programmes and initiatives.	Integration of marine mammal habitat and health initiatives into existing and emerging AMEP programmes.	Secretariat of the Cartagena Convention SPAW Sub-Programme, SPAW RAC, LBS-RACs and RANs, NGOs, marine mammal scientists, Contracting Parties to the SPAW and LBS Protocols

This table offers a non-exclusive list of partners who have been active inside and outside the Region on specific issues and serves as a starting point for Parties to facilitate collaboration, enhance knowledge, and review and consult existing tools.

RESOURCES
REGIONAL EXPERTISE Centre of Engineering and Environmental Management of Coasts and Bays (Cimab), the Regional Activity Centre for the for the Land Based Sources of Marine Pollution (LBS) Protocol, based in Cuba: http://www.cimab.transnet.cu/ Regional Marine Pollution Emergency Information and Training Centre for the Wider Caribbean (REMPEITC), the Regional Activity Centre for the Oils Spill Protocol of the Cartagena Convention, based in Curaçao: https://new.racrempeitc.org/ The Caribbean Natural Resources Institute (CANARI): https://canari.org/ Caribbean Stranding Network (CSN) in Puerto Rico /Caribbean Manatee Conservation Center http://manatipr.org/nosotros/ccmpr/ USA expertise on oil spill and toxic algal blooms https://oceanservice.noaa.gov/hazards/hab/ Coastal Carolina University, Russell Fielding research on Environmental and Human Health Implications of Caribbean Whaling: https://www.russellfielding.com/research
REGIONAL REVIEWS, GUIDELINES, AND TOOLS Diez, S.M., Patil, P.G., Morton, J., Rodriguez, D.J., Vanzella, A., Robin, D.V., Maes, T., and Corbin, C. (2019). Marine Pollution in the Caribbean: Not a Minute to Waste. Washington, D.C.: World Bank Group. https://documents1.worldbank.org/curated/en/482391554225185720/pdf/Marine-Pollution-in-the-Caribbean-Not-a-Minute-to-Waste.pdf State of the Cartagena Convention Area Report (SOCAR). (2019). An Assessment of Marine Pollution from Land-Based Sources and Activities in the Wider Caribbean Region. LBS COP4, Roatan, Honduras, 4 June 2019. UNEP(DEPI)/CAR IG.41/INF.3 UNEP/CEP. (2020). State of nearshore marine habitats in the Wider Caribbean. Report prepared by Caribbean Natural Resources Institute (CANARI). https://www.unep.org/cep/resources/report/state-nearshore-marine-habitats-wider-caribbean UNEP/CEP. (2020). Regional Strategy and Action Plan for the Valuation, Protection and/or Restoration of Key Marine Habitats in the Wider Caribbean 2021 – 2030. Report prepared by Caribbean Natural Resources Institute (CANARI). https://www.unep.org/cep/resources/report/regional-strategy-and-action-plan-valuation-protection-andor-restoration-key SPAW RAC (2007) Protocols and techniques for responding to strandings: https://www.car-spaw-rac.org/IMG/pdf/2007-strandingprotocolrecommendations-spaw-english.pdf SPAW RAC webpages on strandings (guidelines, regional contacts, trainings…): https://www.car-spaw-rac.org/?Stranding-networks-1306 Ziccardi, M.H., S.M. Wilkin, T.K. Rowles, and S. Johnson. 2015. Pinniped and Cetacean Oil Spill Response Guidelines. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-52, 138 p. CARI'MAM training courses on Managing marine mammals during oil spills. These courses are available in English, Spanish and French on the elearning platform of the French Biodiversity Agency. The courses are open to anyone, please contact the Agoa Sanctuary for more information: sanctuaire.agoa@ofb.gouv.fr

4.5. Marine Mammal Watching in the Wild and Associated Activities

55. Over the past few decades, marine mammal watching (whale, dolphin and manatee) in the wild has been promoted as a non-consumptive use that promises monetary rewards to people and benefits to local communities and governments without requiring that the animals be killed or removed from their natural environment[33]. The effects of tourism are important to consider, within the overall context of human-induced threats to marine mammals, to ensure that marine mammal watching is conducted in a manner that is respectful of the animals, local human communities, fellow tourists and the environment. In addition, marine mammal watching can provide an important platform to conduct research and provide a mechanism to share data across the WCR. Intensive, persistent and unregulated vessel traffic that focuses on animals while they are resting, feeding, nursing their young, or socialising can disrupt those activities, and possibly cause long-term problems for populations[34] [35]. It is important for the tourism industry and government agencies to develop and adopt guidelines, codes of conduct, or regulations to preclude or minimise such impacts.

56. Potential negative effects include:

- Noise pollution from increased vessel traffic;
- Increased risk of vessel strikes;
- Disruption of behaviour, and other effects of harassment;
- Changes in distribution; and,
- Destruction/pollution of habitat from coastal development;

57. Whale watching regulation initiatives have been implemented in some regions of the WCR, 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[36]. 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. 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.

1. _____

[33] Hoyt, E., & Hvenegaard, G. T. (2002). A review of whale-watching and whaling with applications for the Caribbean. Coastal Management, 30(4), 381-399.
[34] New, L. F., Hall, A. J., Harcourt, R., Kaufman, G., Parsons, E. C. M., Pearson, H. C., Cosentino, A. Mel & Schick, R. S. (2015). The modelling and assessment of whale-watching impacts. Ocean & Coastal Management, 115, 10-16.
[35] Parsons, E. C. M. (2012). The negative impacts of whale-watching. Journal of Marine Biology, 2012.
[36] SPAW RAC (2021) Current status of national legislation on marine mammals in countries and territories of the WCR. Report N°UNEP(DEPI)/CAR WG.42/INF.29 Add.2.

MARINE MAMMAL WATCHING			
Key objectives	**Priority actions**	**Expected outputs**	**Main partners**
Mitigate: Share SPAW framework for a sustainable whale watching activity in the region ("Recommendations to Support Sustainable Marine Mammals Watching in the Wider Caribbean Region" (UNEP(DEPI)/CAR WG 42/INF.31).	Enhance outreach of the SPAW regional marine mammal viewing guidelines and its implementation toolkit Support the dissemination and use of available tools for sustainable marine mammal observation activity in the region. Encourage SPAW Parties to develop their own national guidelines and legislation Strengthen collaboration with global organisations involved in the development of sustainable whale-watching Strengthen collaboration between stakeholders involved in the development of sustainable marine mammal watching	All Parties are aware of the SPAW guidelines Tools are developed at the regional level in collaboration with local stakeholders and global organisations to guarantee a sustainable activity Parties have adopted national guidelines and/or regulations for a sustainable whale watching activity	Governments, Secretariat of the Cartagena Convention SPAW Sub-Programme, STAC, SPAW RAC, IWC Whale watching Sub-committee, marine mammal experts of the WCR, whale watching stakeholders, tourism industry, local coastal zone and relevant authorities, MPA managers and relevant NGOs.

Mitigate: Increase knowledge on the whale watching activity, its long-term impact on marine mammals and the effect of guidelines/regulations	Encourage Parties to carry out an environmental and socio-economic evaluation of whale watching activities in their waters Support the establishment of scientific monitoring in collaboration with whale watching stakeholders	The whale watching industry in the region is well-characterised and monitored Parties contribute to the IWC Whale Watching Handbook with information on the activity in their waters to gain visibility and promote management actions	Governments, Secretariat of the Cartagena Convention SPAW Sub-Programme, STAC, SPAW RAC, IWC Whale watching Sub-committee, marine mammal experts of the WCR, whale watching stakeholders, tourism industry, local coastal zone and relevant authorities, MPA managers and relevant NGOs.
Build Capacity: Improve awareness of the negative impacts of poor whale watching practices among operators and clients	Encourage Parties to develop training courses for whale watching stakeholders Share the whale watching communication toolkit developed during the CARI'MAM project Integrate the SPAW guidelines in already existing materials. Improve enforcement and compliance with guidelines or regulations	Increase in awareness and capacity regarding whale watching practices Guideline/regulation compliance increases and the effect on marine mammals is monitored Increased demand for high quality whale watching tours.	Governments, Secretariat of the Cartagena Convention SPAW Sub-Programme, STAC, SPAW RAC, IWC Whale watching Sub-committee, marine mammal experts of the WCR, whale watching stakeholders, tourism industry, local coastal zone and relevant authorities, MPA managers and relevant NGOs.

59. This table offers a non-exclusive list of partners who have been active inside and outside the Region on specific issues and serves as a starting point for Parties to facilitate collaboration, enhance knowledge, and review and consult existing tools.

RESOURCES
REGIONAL EXPERTISE International Whaling Commission (IWC): https://wwhandbook.iwc.int/en/ International Fund for Animal Welfare (IFAW): https://www.ifaw.org/international/projects/whale-watching-promotion-global Agoa Marine Mammal Sanctuary (French West Indies): https://sanctuaire-agoa.fr/editorial/who-are-we The marine mammal sanctuaries of the Dominican Republic of Bancos de la Plata y la Navidad: https://ambiente.gob.do/wp-content/uploads/2016/12/Plan-Manejo-SMM-Bancos-de-la-Plata-y-la-Navidad-web.pdf
REGIONAL REVIEWS, GUIDELINES, AND TOOLS Whale watching handbook of the International Whaling Commission: https://wwhandbook.iwc.int/en/ SPAW Guidelines for whale watching: https://www.car-spaw-rac.org/IMG/pdf/brochure_04_guidelines_for_marine_mammal_watching_in_the_wider_caribbean_region-english_version.pdf SPAW RAC Toolkit for whale watchers: https://www.car-spaw-rac.org/?Whale-watcher-Toolkit International Whaling Commission Whalewatching Handbook: https://wwhandbook.iwc.int/en/preparing-for-a-trip

4.6. Acoustic Disturbance/Underwater Noise

60. Noise degrades habitat and can affect the health, behaviour, and distribution of marine mammals. Because visibility is severely limited in the marine environment, the auditory system of marine mammals is particularly developed, and allows them to ensure both intra and inter specific communication but also to analyse the environment (e.g., for navigation and prey detection). A variety of human activities introduce sound into the marine environment, including marine traffic (for example, commercial shipping, fishing, recreation, whale-watching), seismic surveys (oil and gas development and scientific research), military operations (active sonars, explosives), dredging, and coastal construction. The mechanisms by which anthropogenic sounds affect marine mammals and their prey are not fully understood. However, studies have shown that noise impacts are related to the amplitude, duration, and frequency of the sounds as well as to the species, and the behavioural and social context of the animals at the time of exposure[37]. Response of marine mammals to sound emissions can range from tolerance to temporary or permanent loss of hearing, through behavioural changes, depending on noise characteristics[38]. Disturbance by noise can interrupt biologically significant activities (e.g., nursing, breeding, resting, feeding), impair communication (i.e., by masking), drive animals away from critical habitat (e.g., feeding grounds, migration routes), and decrease population growth or survival. Under certain circumstances, anthropogenic noise can cause injury and even death of marine mammals.

61. The semi-enclosed Caribbean Sea is ranked as having one of the most intense maritime traffic in the world. In addition, the Wider Caribbean region is a major oil production area, with 18% of the global crude oil production and the activity is generally increasing[39]. Stranding events associated with military sonar have been documented in the region; behavioural responses of cetaceans associated with exposure to other anthropogenic sources of underwater noise, such as seismic surveys and vessel traffic, may also occur. However, anthropogenic underwater noise sources, including noise associated with sonar 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 initiative has been set up[40].

1. _____

[37] Richardson W.J., Greene C.R., Malme C.I., Thomsen D.H. (1995). Marine Mammals and Noise. Academic Press, San Diego.
[38] Frisk G., Bradley D., Caldwell J., D'Spain G., Gordon J., Hastings M., Wartzok D. (2003). Ocean Noise and Marine Mammals. National Academies Press. 218 p.
[39] UNDP (United Nations Development Programme). 2012. "Oil Spills: How Caribbean Disaster Managers Can Prepare and Respond." Barbados and the OECS.
[40] GHFS, WWF (2015) A review of seismic mitigation measures used along the coast of Northern South America, from North Brazil up to Columbia. Reference document for the MamaCocoSea Steering Committee.

ACOUSTIC DISTURBANCE/UNDERWATER NOISE			
Key objectives	**Priority actions**	**Expected outputs**	**Main partners**
Assess: Identify hotspots of acoustic disturbance for marine mammals.	Develop programmes aimed at enhancing knowledge on species distribution and densities, as well as sound-producing activities, in order to map areas of overlap with human activities and to identify acoustic disturbance "hot spots".	Maps of hotspots overlapping major noise producing activities and marine mammals in the WCR.	Governments, SPAW RAC and CEP, research organisations, NGOs, major sound producing industries
Assess: Initiate and continue to support research programmes that examine the effects of ocean noise on marine mammals.	Enhance stranding network capacity in acoustic impact diagnosis.	Quantification of mass strandings due to major acoustic impact.	Governments, SPAW RAC and CEP, research organisations, NGOs, national environmental institutions, stranding networks,
Mitigate: Establish acoustic guidelines and thresholds for assessing the potential physiological and behavioural effects of exposure to underwater noise on marine mammals, and identify ways to mitigate such effects.	Develop guidelines to mitigate acoustic disturbance to marine mammals in the WCR.	Guidelines to implement mitigation measures in the identified acoustic impact hotspots (e.g., propose new or revised routing schemes, speed restriction areas, no whale-watching areas, new MPAs, noise-abatement technologies) Practical approaches to reduce anthropogenic underwater noise from sound-producing activities (e.g., vessel transit, seismic surveys, other industrial activity, and military activity). Incentives for testing and using noise-reduction technology.	Governments, SPAW RAC and CEP, governments, NGOs, major sound producing industries, regional and international relevant organisations (e.g., IMO)

Build Capacity: Enhance awareness in the public and private sector on the nature and seriousness of the threats posed by various types of underwater noise.	Develop an awareness raising program targeting regulators and the private sector responsible for activities with major acoustic impact: shipping companies, energy companies, whale-watchers	Awareness raising tools in the 3 SPAW languages, targeting regulators and the private sector (e.g., booklets, videos) Awareness raising campaigns dedicated to regulators and the private sector	Governments, SPAW RAC and CEP, governments, national environmental institutions, NGOs, major sound producing industries, regional and international relevant organisations (e.g., IMO)

62. This table offers a non-exclusive list of partners who have been active inside and outside the Region on specific issues and serves as a starting point for Parties to facilitate collaboration, enhance knowledge, and review and consult existing tools.

RESOURCES
REGIONAL EXPERTISE Marine Mammal Observer Association (MMOA): https://www.mmo-association.org/ International whaling commission (IWC): https://iwc.int/management-and-conservation/environment/anthropogenic-sound International Maritime Organisation (IMO): https://www.imo.org/ See also expertise from stranding networks (§ 4.1)
REGIONAL REVIEWS, GUIDELINES, AND TOOLS GHFS, WWF (2015) A review of seismic mitigation measures used along the coast of Northern South America, from North Brazil up to Columbia. Reference document for the MamaCocoSea Steering Committee. JNCC. (2017). JNCC guidelines for minimising the risk of injury and disturbance to marine mammals from seismic surveys. ACCOBAMS. (2019). Guidelines to address the impact of anthropogenic noise on cetaceans in the ACCOBAMS area. 9p. Persohn, C., Helloco, L., Baudinière, E., Martinez, L. (2020) Recommendations to limit the impacts of manmade underwater acoustic emissions on marine wildlife. French Services for Water and Biodiversity. Naranjit, A. and Higgins, E. F. (2014) Requirements for the mitigation of acoustic disturbance from offshore seismic surveys to marine life in Trinidad and Tobago. Version: Draft 2, April 2014. IBAMA (2018) Guidelines for Marine Biota monitoring during seismic surveys. IMO (2017) Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life. https://wwwcdn.imo.org/localresources/en/MediaCentre/HotTopics/Documents/833%20Guidance%20on%20reducing%20underwater%20noise%20from%20commercial%20shipping,.pdf

4.7. Vessel Strikes

63. Another anthropogenic threat comes from vessel strikes, which can cause death and injury to marine mammals. The extent of this problem in the WCR is poorly understood. However, vessel strikes on Bryde's whales and small cetaceans have been observed and reported in Venezuela. Also, manatees are well known to be exceptionally vulnerable to vessel strikes[41]. Factors affecting the incidence and severity of vessel strikes include: the density of marine mammals and vessels in the area; the ability of marine mammals to detect vessels and of vessel operators to detect marine mammals; and the ability of marine mammals or vessel operators to manoeuvre to avoid collisions. Outreach and education efforts will raise awareness of this threat and contribute to efforts aimed at assessing the magnitude of the problem.

64. While data on shipping in the WCR is available, data on marine mammal abundance and distribution remain limited, despite work of the UNEP/Spain LifeWeb project that resulted in range maps for 25 marine mammal species within the region. They contain no information about species density within a more localised range or critical habitat. For an individual species, use of the range map can show where human threats occur within the range but cannot identify areas of highest risk.

65. The shipping intensity map mainly consists of lanes utilised by industrial cargo liners and ferries with fixed cycles of repetition in a fixed lane, mainly between inter island shipping lanes. Commercial cruise vessel data is less studied, but the activity is considered significant. Vessel traffic not only contributes to direct injury to marine mammals[42], but also serves as a significant source of underwater noise in the Region[43]. There is a need for countries to investigate the best means to inform commercial ships, recreational boaters, and other maritime interests when a voyage enters a Sanctuary or Marine Protected Area.

1. _____

[41] Galves, J., Galves, C.G., Gomez, N.A., Bonde, R.K., Powell, J., Alvarez-Aleman, A., Castelblanco-Martinez, N. (2022) Analysis of a long-term dataset of Antillean manatee stradings in Belize: implication for conservation. Oryx, First-View, 1-9.

[42] Silber, G. K., Vanderlaan, A. S. M., Arceredillo, A. T., Johnson, L., Taggart, C. T., Brown, M. W., Bettridge, S., and Sagarminaga, R. (2012). Marine Policy, 36, 1221-1233.

[43] Heenehan, H., Stanistreet, J. E., Corkeron, P. J., Bouvert, L., Chalifour, J., Davis, G. E., Henriquez, A., Kiszka, J. J., Kline, L., Reed, C., Shamir-Reynoso, O., Vedie, F., De Wolf, W., Hoetjes, P., and Van Parijs, S. M. (2019). Caribbean Sea soundscapes: Monitoring humpback whales, biological sounds, geological events, and anthropogenic impacts of vessel noise. Frontiers in Marine Science, https://doi.org/10.3389/fmars.2019.00347

VESSEL STRIKES			
Key objectives	**Priority actions**	**Expected outputs**	**Main partners**
Assess: Assess the magnitude of vessel strikes in the WCR, particularly for endangered large whales, and manatees	Building upon LifeWeb project outcomes, identify local high-risk areas of concern based on the overlap of shipping and whale distribution data, or a high number of reported incidents. Identify resident populations of marine mammals and migratory corridors within designated shipping channels. Urge Parties and responders to report all incidents of vessel strikes to the IWC ship strike database to begin to consolidate data from the WCR[44] which is currently devoid of such data.	A Caribbean Ship Strike Database or inventory using the IWC or Pelagos Sanctuary ship strike inventory for the Mediterranean as models, and identification of a monitoring and evaluation partner[45]. A regional database could streamline reporting from the Region to the larger IWC ship strike database. A map of hotspots of potential interaction between marine mammals and vessels in the Caribbean.	Governments, SPAW RAC, national and local authorities; NGOs, IWC, RAC-REMPEITC, IMO, other relevant organisations.

1. _____

[44] https://iwc.int/ship-strikes
[45] http://www.souffleursdecume.com/etudes_collisions.html

Mitigate: Reduce the frequency and severity of vessel strike	Establish mandatory vessel strike reporting systems for critically endangered marine mammal species[46] Establish, where appropriate, mitigation measures for high-risk areas (e.g., Panama for bottlenose dolphins [Bocas del Toro] and Humpback whales), such as speed restrictions, time-area closures, rerouting, or other mitigation measures-.	Mitigation measures that address the risk of vessel strikes where cetacean distribution and occurrences are high including measures such as new or revised routing schemes or speed restrictions.	Governments, SPAW RAC, national and local authorities; NGOs, IWC, RAC-REMPEITC, IMO, other relevant organisations.
Build Capacity: Raise awareness and engage the shipping industry and other maritime stakeholders regarding the development of protocols to monitor and mitigate the risk of vessel operations in migratory corridors and other important or biologically sensitive areas in the Region.	Develop outreach materials[47] that can be shared with the shipping industry, national coast guards, marine police, marine protected area managers, military sector (Navy), cruise and leisure boaters, and recreational and commercial fishing charters to raise awareness of the issue of collisions with large cetaceans and manatees.	A communication strategy including a portfolio of outreach materials (digital or in press) in English, French and Spanish	Governments, SPAW RAC, national and local authorities; NGOs, IWC, RAC-REMPEITC, IMO, other relevant organisations

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[46] See, for example NMFS Right Whale Mandatory Ship Reporting System:
[47] For example, see https://iwc.int/private/downloads/wTxPpBwQq0nCREo19HUuGQ/Spanish%20whale%20strike%20folder.pdf

68. This table offers a non-exclusive list of partners who have been active inside and outside the Region on specific issues and serves as a starting point for Parties to facilitate collaboration, enhance knowledge, and review and consult existing tools.

RESOURCES
REGIONAL EXPERTISE Regional Marine Pollution Emergency Information and Training Centre for the Wider Caribbean (REMPEITC), the Regional Activity Centre for the Oils Spill Protocol of the Cartagena Convention, based in Curaçao: https://new.racrempeitc.org/ International Maritime Organisation (IMO): https://www.imo.org/ Agoa Marine Mammal Sanctuary (French West Indies): https://sanctuaire-agoa.fr/editorial/who-are-we International Whaling Commission (IWC): https://iwc.int/management-and-conservation/ship-strikes
REGIONAL REVIEWS, GUIDELINES, AND TOOLS IWC Ship Strikes Database: https://iwc.int/management-and-conservation/ship-strikes REPCET on-board computer system for real time plotting of cetaceans: https://www.repcet.com/en/home/ SPAW/IWC (2014) Report of the Joint IWC-SPAW Workshop to Address Collisions Between Marine Mammals and Ships with a Focus on the Wider Caribbean. http://www.car-spaw-rac.org/IMG/pdf/Ship_Strikes_Report_FINAL-July25.pdf UNEP- Spain Partnership 'Broad-Scale Marine Spatial Planning and Transboundary Marine Mammal Management' – LifeWeb Project [2010-2014]. See interactive maps at https://www.car-spaw-rac.org/?Lifeweb-project-on-marine-mammals-corridors-996&var_mode=calcul

4.8. Climate Change

69. Climate change is a complex, analytically challenging issue. Although the direct cause-and-effect links to marine mammal impacts are not always clear at this stage, 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.

70. Possible marine mammal responses to climate changes include shrinkage of distribution and preferred habitat utilisation leading to increased density elsewhere. 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 countries.

71. While many countries in the Region are working to reduce their carbon footprints and have committed with lower greenhouse gas emissions, 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 modelling and predictions for scenario development, mitigation, and adaptation measures in the WCR.

CLIMATE CHANGE			
Key objectives	**Priority actions**	**Expected outputs**	**Main partners**
Assess: Obtain data to develop baselines to obtain baseline data from selected index areas representative of pelagic and coastal ecosystems. Such data will be needed to analyse and interpret the causes of changes in numbers, distribution, health and demography of marine mammals.	Identify and initiate studies in index areas to obtain baseline and longitudinal environmental (biotic and abiotic) data. Changes through time can then be tested for potential correlation with marine mammal health, survival rates, habitat conditions, etc.	Studies in index areas which obtain baseline data.	Governments, scientific organisations, relevant regional and international organisations
Assess: Evaluate existing climate change programs and initiatives for relevance to marine mammal protection	Compile an overview on main lessons learned from the implementation of key climate change projects, programmes, and strategies in the Region that address the direct or indirect effects on marine mammals, as means of providing specific future directions to mitigation measures that Parties may adopt.	Overview report	SPAW RAC, Governments, relevant regional and international organisations

Mitigate: Improved implementation of climate mitigation activities.	Seek funding and support for the development and adoption of climate mitigation activities, including the enhancement of coral reef, mangrove, and seagrass bed restoration that ultimately benefit marine mammal populations.	Funding (mechanisms) in place for the development and adoption of climate mitigation activities.	SPAW RAC, Governments, relevant regional and international organisations.
Build Capacity: enhance climate change programming for marine mammal protection within relevant resource management authorities.	Incorporate marine mammal considerations, especially for coastal species such as the manatee and estuarine dolphin species, into national climate change mitigation action plans and strategies.	National climate change mitigation action plans which include marine mammal considerations.	Governments, relevant regional and international organisations

73. This table offers a non-exclusive list of partners who have been active inside and outside the Region on specific issues and serves as a starting point for Parties to facilitate collaboration, enhance knowledge, and review and consult existing tools.

RESOURCES
REGIONAL EXPERTISE International Whaling Commission (IWC) climate change steering group: https://iwc.int/management-and-conservation/environment/climate-change NOAA Climate Program Office: https://cpo.noaa.gov/ NOAA Fisheries: https://www.fisheries.noaa.gov/topic/climate-change Climate Resilience Fund: https://www.climateresiliencefund.org/
REGIONAL REVIEWS, GUIDELINES, AND TOOLS Reyer, C., Adams, S., Albrecht, T. *et al.* (2017). Climate change impacts in Latin America and the Caribbean and their implications for development. *Reg Environ Change* **17**, 1601–1621. https://doi.org/10.1007/s10113-015-0854-6 US marine mammal climate action plan: https://www.mmc.gov/wp-content/uploads/Gulland-et-al-2022.pdf and https://www.mmc.gov/priority-topics/effects-of-climate-change-on-marine-mammals/

APPENDIX 1 - MARINE MAMMAL SPECIES ON SPAW PROTOCOL ANNEXES

Annex II

Family – Famille – Familia	Scientific name – Nom scientifique – Nombre científico	Common name (ENG)	Nom commun (FRE)	Nombre común (ESP)	IUCN/ UICN Status
Balaenopteridae	*Balaenoptera musculus*	Blue whale	Rorqual bleu	Ballena azul	EN
Balaenopteridae	*Balaenoptera physalus*	Fin whale	Rorqual commun	Rorcual común, ballena de aleta	EN
Balaenopteridae	*Balaenoptera borealis*	Sei whale	Rorqual boréal	Ballena sei	EN
Balaenopteridae	*Balaenoptera edeni*	Bryde's whale	Rorqual tropical (de Bryde)	Ballena de Bryde	DD
Balaenopteridae	*Megaptera novaeangliae*	Humpback whale	Baleine à bosse	Ballena jorobada	LC
Balaenopteridae	*Balaenoptera acutorostrata*	Common minke whale	Petit Rorqual	Ballena minke	LC
Balaenidae	*Eubalaena glacialis*	North Atlantic right whale	Baleine franche des Basques	Ballena franca del norte	EN
Physeteridae	*Physeter macrocephalus*	Sperm whale	Cachalot	Cachalote	VU
Physeteridae	*Kogia breviceps*	Pygmy sperm whale	Cachalot pygmée	Cachalote pigmeo	DD
Physeteridae	*Kogia sima (formerly Kogia simus)*	Dwarf sperm whale	Cachalot nain	Cachalote enano	DD
Ziphiidae	*Ziphius cavirostris*	Cuvier's beaked whale	Baleine à bec de Cuvier	Ballena de Cuvier	LC
Ziphiidae	*Mesoplodon europaeus*	Gervais' beaked whale	Baleine à bec de Gervais	Ballena de pico de Gervais	DD
Ziphiidae	*Mesoplodon densirostris*	Blainville's beaked whale	Baleine à bec de Blainville	Ballena de pico de Blainville	DD

Ziphiidae	*Mesoplodon mirus*	True's beaked whale	Mésoplodon de True	Ballena de pico de True	DD
Ziphiidae	*Mesoplodon bidens*	Sowerby's beaked whale	Mésoplodon de Sowerby	Ballena de pico de Sowerby	DD
Delphinidae	*Orcinus orca*	Killer whale	Orque	Orca	DD
Delphinidae	*Feresa attenuata*	Pygmy killer whale	Orque pygmée	Orca pigmea	DD
Delphinidae	*Pseudorca crassidens*	False killer whale	Fausse orque	Orca falsa	DD
Delphinidae	*Globicephala macrorhynchus*	Short-finned pilot whale	Globicéphale tropical	Calderón de aleta corta	LC
Delphinidae	*Peponocephala electra*	Melon-headed whale	Péponocéphale	Delfín cabeza de melón	LC
Delphinidae	*Lagenodelphis hosei*	Fraser's dolphin	Dauphin de Fraser	Delfín De Fraser, Borneo	LC
Delphinidae	*Stenella attenuata*	Pantropical spotted dolphin D	Dauphin tacheté pantropical	Delfín manchado pantropical	LC
Delphinidae	*Stenella frontalis*	Atlantic spotted dolphin	Dauphin tacheté atlantique	Delfín manchado del Atlántico	DD
Delphinidae	*Stenella longirostris*	Spinner dolphin	Dauphin à long bec	Delfín rotador	DD
Delphinidae	*Stenella clymene*	Clymene dolphin	Dauphin de clymène	Delfín de clymen	DD
Delphinidae	*Delphinus delphis*	Short-beaked Common Dolphin	Dauphin commun	Delfín común de pico corto	LC
Delphinidae	*Tursiops truncatus*	Common bottlenose dolphin	Grand dauphin	Delfín nariz de botella	lc
Delphinidae	*Stenella coeruleoalba*	Striped dolphin	Dauphin bleu et blanc	Delfín listado	LC
Delphinidae	*Grampus griseus*	Risso's dolphin	Dauphin de Risso	Delfín de Risso	LC

Delphinidae	*Steno bredanensis*	Rough-toothed dolphin	Sténo rostré, sténo à rostre étroit	Delfín de dientes rugosos	LC
Delphinidae	*Sotalia guianensis*	Guiana dolphin	Dauphin de Guyane, Sotalie	Tonina costera, bufeo	NT
Delphinidae	*Sotalia fluviatilis*	Tucuxi, estuarine dolphin	Tucuxi	Tucuxi	EN
Trichechidae	*Trichechus manatus*	West Indian manatee	Lamantin des Antilles	Manatí antillano	VU
Trichechidae	*Trichechus inunguis*	Amazonian manatee	lamantin d'amazonie	Manatí amazónico	VU
Mustelidae	*Pteronura brasiliensis*	Giant otter	Loutre géante du Brésil	Lobo del rio	NE

Annex III

Family – Famille – Familia	**Scientific name – Nom scientifique – Nombre científico**	**Common name (ENG)**	**Nom commun (FRE)**	**Nombre común (ESP)**	**IUCN/ UICN Status**
Mustelidae	*Lontra longicaudis*	Neotropical otter	Petite mangouste indienne	Nutria neotropical	NT

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