Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia

LIST OF IOSEA AC-ENDORSED RESEARCH & OTHER PRIORITIES

Activity #42 of the IOSEA Work Programme 2020-2024 requests the Advisory Committee to develop a list of IOSEA-endorsed research projects, which can then be promoted by the AC, the Secretariat and research institutions to help to leverage funding for scientific research to investigate the conservation biology of marine turtles.

All AC members and sub-regional focal points were contacted to help identify priority projects for Activity #42 from the IOSEA Work Programme 2020-2024. The table presented below is a compilation of comments received from the ten AC members and the NWIO Sub-Regional Focal Point (Dr. Thuraya Said Al Sariri). Lindsey West from the WIO-MTTF was also contacted to clarify certain priority items identified by an AC member. The priorities listed below are linked to the Work Programme 2020-2024, species assessments, and other IOSEA documents, when relevant.

This document was prepared for Focal Points, NGOs, and all relevant organizations working within the IOSEA region.

PLEASE NOTE: The AC has not ranked the priorities identified in this document. In the spirit of promoting national networks, the AC recommends that each Signatory State convene some kind of national consultation at which participants would establish their own national priorities from this priority list. The AC also encourages Signatory States to expand on this priority list, if needed, within their national and/or regional context.

Abbreviations used:

AC = Advisory Committee
BIOT = British Indian Ocean Territory
CITES = Convention on International Trade in Endangered Species of Wild Fauna and Flora,
EEZ = Exclusive Economic Zone
ID = Identify
ITWG = Illegal Trade Working Group
IOSEA = Indian Ocean South East Asia
IUU = Illegal, Unreported and Unregulated fishing
MTTF = Marine Turtle Task Force
NIO = Northern Indian Ocean
NWIO = North West Indian Ocean
SWIO = South West Indian Ocean
WIO = Western Indian Ocean
WP = Work Programme 2020-2024

Relevant links:

- Work Programme 2020-2024
- Assessment of the conservation status of the leatherback turtle in the Indian Ocean and South-East Asia (2012)
- Assessment of the conservation status of the loggerhead turtle in the Indian Ocean and South-East Asia (2013)
- Assessment of the Conservation Status of the Hawksbill Turtle in the Indian Ocean and South-East Asia Region (to be published in March 2022)

Priorities[1]	Relevant countries/sub-regions[2]	Justification
1. Nesting Beaches – General		
1.1.1. Establish standardized nesting beach sand temperature monitoring across a set of beaches where natural beach incubation is the standard practice. *(WP #15, #46)* **1.1.2.** Understand the impact and implications of climate change on nesting rookeries. *(WP #5, #10; IOSEA Species Assessments)*	Entire IOSEA region	This will address climate change issues (e.g., sand temperature, erosion) and/particularly observed variability in sex ratios at certain beaches, which indicate problematic hatchling sex ratios with some stocks but not with others. Additionally, sand/incubation temperatures are directly related to incubation periods, hatchling body size, and hatchling survival rates. The goal is to evaluate the potential impacts and identify areas where management plans may need to be implemented.

[1] Linked to specific WP activities, species assessments and other IOSEA documents when relevant

[2] The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the Advisory Committee, CMS Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. Designations are used in accordance with UN guidance.

Priorities[1]	Relevant countries/sub-regions[2]	Justification
1.2.1. Fill the remaining gaps in nesting distribution and relative abundance. **1.2.2.** Conduct aerial surveys of remote nesting beaches in the Northwest Indian Ocean management unit. *(WP #9, #31; IOSEA Species Assessments)*	E.g., NWIO (especially Persian Gulf, Red Sea), and also Somalia, parts of Indonesia, Timor Leste, and Maldives (especially southern atolls)	There are gaps in our understanding of the distribution and relative abundance of nesting across the region. This project would focus on filling these gaps over the next 10 years in key areas. At present the monitoring or annual reporting of turtle populations, or stocks, is limited by lack of basic knowledge in some areas. Before commencement of this activity, a clear plan will be produced, funding or in-kind support identified, and support/endorsement gained from relevant Signatories. A mixed funding model could be produced with industry, Government, and/or GEF, or other sources of funding.
2. Foraging Areas – General		
2.1. Establish index foraging area sites for comprehensive capture-mark-recapture studies for adults and/or juveniles that run for 6 years minimum with genetic stock ID of individual turtles, sex ratios and studies of diet, somatic growth, health, etc. *(WP #31)*	E.g., Centralized areas with logistically accessible foraging turtles like at Derawan in East Kalimantan, Seychelles, sites in the South China Sea, Persian Gulf, and the East African continental coast (please note: ongoing studies at the Eparses Islands (Europa, Juan de Nova and Glorieuses) and La Réunion can serve as examples/ models)	There is a lack of comprehensive in-water information for turtle populations, which is required to understand fundamental ecological aspects such as recruitment, survivorship, and population trends – all central to conservation planning.

Priorities[1]	Relevant countries/sub-regions[2]	Justification
3. Species-specific		
3.1. Identify leatherback nesting areas (other than the big/major known nesting concentrations) and establish/improve habitat /nest protection in these areas. *(WP #9, #31; IOSEA Leatherback Assessment)*	E.g., Sri Lanka, Indonesia.	This will fill in data gaps and promote the recovery of leatherback populations as well as facilitate the conservation of genetic diversity for uncommon genotypes/small populations – all central to conservation planning.
3.2. Complete leatherback population genetics (nesting beaches). *(IOSEA Leatherback Assessment)*	Sri Lanka, Indonesia, Papua New Guinea, Mozambique, etc.	This will fill in data gaps and facilitate the conservation of genetic diversity for uncommon genotypes/small populations – all central to conservation planning.
3.3. Undertake genetics of leatherbacks from strandings/bycatch/direct take. *(WP #1a; IOSEA Leatherback Assessment)*	E.g., Countries with leatherback bycatch programmes and/or direct take (e.g., Australia, Eritrea, South Africa, etc.)	This will help determine source populations with the possibility of conserving small populations with distinct genetic diversity, and is central to conservation planning.

Priorities[1]	Relevant countries/sub-regions[2]	Justification
3.4.1. Complete hawksbill population genetics. **3.4.2.** Determine hawksbill population status. **3.4.3.** Address gaps in hawksbill life history attributes. **3.4.4**. Identify hawksbill post-hatchling, foraging, and inter-nesting areas and oceanic and coastal habitats and migration corridors. **3.4.5.** Address gaps in our knowledge of hawksbill diet, growth, age, and survivorship. *(WP #44; IOSEA Hawksbill Assessment*)	IOSEA region, especially key gap areas identified in the IOSEA Hawksbill Assessment (with less emphasis on Seychelles and BIOT, and areas where Kelonia has ongoing projects)	This will address knowledge/data gaps, and enhance efficacy of recovery and management plans.
3.5.1. Complete loggerhead population genetics. **3.5.2.** Address gaps in loggerhead life history attributes. **3.5.3**. Identify loggerhead post-hatchling, foraging, and inter-nesting areas and oceanic and coastal habitats and migration corridors. **3.5.4.** Address gaps in our knowledge of loggerhead diet, growth, age, and survivorship. *(WP #31; IOSEA Loggerhead Assessment*)	All sub-regions with loggerheads, especially NWIO, NIO, and WIO	This will address knowledge/data gaps, and enhance efficacy of recovery and management plans.

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3.6. Quantify loggerhead hatchling production and survival. *(WP #43e; IOSEA Loggerhead Assessment*)	Oman, Yemen, Western Australia, South Africa/Mozambique	Understanding and maximizing hatchling output from nesting beaches is important for designing appropriate management plans for population recovery.
3.7.1. Conduct mixed stock analysis of loggerhead foraging grounds in the Indian Ocean. **3.7.2.** Conduct mixed stock analysis of hawksbill foraging grounds in the Indian Ocean. **3.7.3.** Conduct mixed stock analysis of green turtle foraging grounds in the Indian Ocean. *(WP #44; IOSEA Hawksbill & Loggerhead Assessments)*	IOSEA sub-regions where basic work still remains to be done	This is important to understand the connectivity between rookeries and foraging grounds. This work may also help initiate more ongoing studies relevant to basic population parameters (e.g., sex ratios, size class structure, and growth rates). Many locations host resident turtles and data may be collected through bycatch, markets, and dedicated mark-recapture studies.

Priorities[1]	Relevant countries/sub-regions[2]	Justification
4. Habitat		
4.1.1. Address knowledge gaps in the distribution, status, and abundance of seagrass pastures. **4.1.2.** Address knowledge gaps in the distribution, status, and abundance of coral reefs. **4.1.3.** Address knowledge gaps in the distribution, status, and abundance of mangroves. *(WP #31, #32, #41; RAMSAR is also relevant here)*	Entire IOSEA region	There are huge data gaps in the distribution, status, abundance, resilience, and productivity of seagrass, coral reef, and mangrove habitats in many countries in the IOSEA region. It is important to have a complete up-to-date coastal inventory of these habitats so that we can better understand the distribution of in-water/foraging habitats and the scale of localised threats and thereby implement conservation and restoration measures, where necessary.
5. Fisheries		
5.1. Evaluate and understand the impacts of IUU fishing and explore possible mitigation measures.	EEZs of all IOSEA nations	This is a significant, but poorly documented and understood, threat
5.2.1. Evaluate and quantify bycatch of different sea turtle species in artisanal fisheries and explore possible mitigation measures. **5.2.2.** Evaluate and quantify bycatch of different sea turtle species in industrial fisheries and explore possible mitigation measures. *(WP #6, #7, #22-25, #64, #72-74, #86f)*	The Territorial Waters and EEZs of all countries where bycatch in fisheries is a problem	This activity will help develop appropriate bycatch mitigation and fisheries management strategies, and thereby reduce a significant, but poorly documented, source of mortality – this is central to developing effective conservation and management programmes. Given the magnitude of this activity, priority areas in the IOSEA region must be identified so that work can focus on them.

Priorities[1]	Relevant countries/sub-regions[2]	Justification
5.3.1. Evaluate and quantify the impacts of ghost nets and other ghost gear, and explore possible improvements for reducing this threat. **5.3.2.** Identify and evaluate dockside gear disposal facilities in Signatory States. *(WP #2, #8, #102)*	Entire IOSEA region	This is an important, but poorly documented, threat for marine turtles and other marine life.
6. Threats (non-fisheries)		
6.1. Evaluate illegal take and trade in turtles and explore possible mitigation measures. *(WP #50, #57-60, ITWG & CITES documents)*	Particularly Mozambique, Madagascar, and Southeast Asia (hawksbills & green turtles)	This is a significant threat to sea turtle population survival and recovery.
6.2.1. Characterize and quantify the impacts of marine plastic pollution, across all marine turtle populations and life stages for (a) ingestion and (b) entanglement. **6.2.2.** Evaluate oceanographic features that disperse and concentrate plastic pollution at both large and small spatial scales. **6.2.3.** Understand the socio-economic drivers behind marine plastic pollution, as well as the barriers and opportunities for management. *(WP # 2, #102; IOSEA Species Assessments).*	Entire IOSEA region	This is a critical, widespread, and growing threat to sea turtles and their habitats. Given the enormity of the problem, the plan is to support the development of small, manageable projects that collectively lead towards understanding the threat.

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6.3. Address emerging issue of fibropapillomas (FP).	Kenya	FP may cause reduced survivorship, and sites with a high frequency of FP tumors may indicate some degree of environmental degradation that needs to be addressed.
7. Capacity building		
7.1.1. Promote standardized turtle methodology training, capacity building, and mentoring. **7.1.2.** Develop or provide advice on appropriate data management systems, tools, or software for the collection and archiving of all types of relevant turtle data (nesting, foraging, strandings, mortality, etc. through workshops and training). *(WP #15, #16, #44e, #46, #48, #54, #84, #86)*	Entire IOSEA region	This is particularly important for countries new to marine turtle research and monitoring or those with limited resources and/or training. The goal is to develop a structured plan and build capacity in the areas of on-ground monitoring, databases, and basic analyses through the provision of methodology, tools, and training. This will ensure compatibility across the region for core data parameters and ensure the archiving of standard data over decades. A plan would help the project to scale actions through time based on resources (e.g., no money may only allow for products and methodology to be sent to groups, while more money might assist with databases, face-to-face training, etc.). Priority areas could be identified in the planning stages to help focus efforts.

Priorities[1]	Relevant countries/sub-regions[2]	Justification
8. Community-based activities and Human dimensions		
8.1.1. Conduct local workshops at "index sites" – in full coordination with and cooperation of local key actors – to strengthen the appreciation of community-based conservation, including objective self-evaluations of such activities. **8.1.2.** Use the planning and execution of local workshops on community-based conservation to promote "multiplier effects," which result in more experienced and motivated local actors planning and implementing these critical activities. *(WP #28-29, #55, #61)*	Entire IOSEA region	There is a pressing need to involve the diverse sectors of different societies where they willingly appreciate the unique values of marine turtles and their habitats, and thereby participate as active stewards of those resources. Such community-based conservation approaches greatly enhance the effectiveness and success of "official" (international, national, governmental) activities.

8.2.1. Enhance marine turtle conservation, through a broader understanding of the social, economic, and cultural significance of human-turtle interactions and the associated impacts of conservation programmes on local traditions. **8.2.2.** Host a series of sub-regional workshops to understand, identify, implement, and evaluate best practice approaches for incorporating social and cultural considerations into conservation projects. (*WP #51-53, Draft WIO MTTF action plan for addressing socio-economic /cultural work plan actions – 15.06.2016)* **8.2.3.** Elucidate the status and complexity of the "sea turtle economy," which is the system that supports the production and economic consumption of sea turtle related goods and services – e.g., elements of human-sea turtle interactions that range from sea turtle consumers to sea turtle researchers and conservationists. *(WP #20)*	All IOSEA sub-regions	Socio-economic and cultural considerations are absolutely essential for understanding and resolving the many and varied complexities of environmental conservation and management. There is increasing evidence to show that taking socio-economic and cultural considerations into account not only enhances participant engagement and their experience of conservation practice, but also improves the likelihood of achieving desired conservation outcomes. However, socio-economic and cultural considerations do not receive sufficient recognition and are often overlooked during conservation project planning. Hence there is a pressing need to ensure that conservation practitioners have sufficient knowledge and understanding to be able to incorporate these approaches systematically across all stages of the project including design, implementation, and evaluation. Elucidating the “sea turtle economy” will help us understand the big picture of sea turtle management. Current approaches in sea turtle management often do not integrate all these various actors in one interconnected system, resulting in "blind-spots". For example, what has happened since IOSEA's "Illegal Take and Trade of Marine Turtles in the IOSEA Region Report" at the Seventh

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		Meeting of the IOSEA Signatory States in Bonn, Germany in September 2014? What is the current status of consumption and what are the new/sustained factors of consumption? Why is non-consumptive use (i.e. where turtles are not used as food or for manufactured products) not reported as consumption?
8.3. Design and implement a communication strategy based on a sound foundation of conservation communication and, when/where appropriate, behaviour change theory. *(WP #49, #84e)*	Entire IOSEA region	There is a pressing need to develop and make use of effective communication tools to inform and motivate diverse sectors of different societies throughout the IOSEA region so that they are aware of and appreciate the unique values of marine turtles and their habitats. Research should be undertaken with selected stakeholders to inform both the strategy and to provide a baseline to enable evaluation of the strategy. The research will ensure that the message and the channels of communication are most appropriate for each target audience. Site-based communication strategies – which would be multitudinous throughout the IOSEA - need to be directly relevant and tailored to local cultural, linguistic, political, religious, social, etc., context.

Priorities[1]	Relevant countries/sub-regions[2]	Justification
9. Legislation and Enforcement		
9.1. Identify gaps between legislation and implementation/enforcement in sea turtle governance with the goal of streamlining protection from a local to global scale. *(WP #27)*	Entire IOSEA region	Sea turtle management is commonly perceived as the need for more and stricter laws. However, in reality once established many laws are rarely implemented or even understood by the responsible authorities. We need to consider the following questions: For laws not implemented, what are the hurdles? For laws that worked, what were the enablers? If we compare legislation and practices between countries, what can we learn about what works everywhere, nowhere, or occasionally and why?