Update on the Status of the IOSEA Network Site
(Version: 8 April 2024)

RUFIJI-MAFIA SEASCAPE

A. Date of submission(31/05/2024):
The date on which the questionnaire was completed. 31/05/2024

B. Name and address of compiler(s), if not the IOSEA Focal Point
Name and contact information (including affiliation) for the individual(s) who prepared this information.

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C. Country: *The name of the country in which the site is located.*

UNITED REPUBLIC OF TANZANIA

D. Name of site: *The name of the site (alternative names should be given in brackets).*

RUFIJI-MAFIA SEASCAPE

1. Have there been changes in the management authority?
Name, address and contact details of the body responsible for the direct local conservation and management of the site, if different than in original proposal.

No changes

2. **What are the current population numbers and trends for the marine turtle species present at the site?**
Please insert population numbers for each species present and the year when the population was estimated, as well as the population trend (e.g. stable, increasing, decreasing, unknown)

An annual nesting green turtle population assessment was conducted between 2012 and 2022 during the peak nesting months of April and May in Juani Island, which supports the largest green turtle rookery in Mafia Island. Titanium flipper tags were applied to enable identification of individual females. The number of females nesting during the peak season ranged from 13 – 37, with an annual mean of 24 (±8).

Analyses of flipper tagging data for the period 2012 – 2018 produced an estimated annual nesting population of 41 - 72 nesting females.

There are no data available on population numbers or trends for other marine turtle species in the Rufiji-Mafia Seascape.

3. **Have there been any changes in land/sea ownership, protected status, legislation and/or governance framework, which affect the site?**
Describe any changes to legislation/regulations relevant to the protection/ conservation of marine turtles and their habitats at this site, and comment on their effectiveness.

Mention any changes in nationally relevant protected area status, international conservation designations and, in the case of transboundary sites, bilateral or multilateral conservation measures which pertain to all or part of the site since 2019. If a protected area or reserve has been established (at a national/regional level), give the date of its establishment and size. If only a part of the site is included within a protected area, the area of marine turtle habitat that is protected should be noted.

New International designations since 2019may include sites listed under the UNESCO/World Heritage Convention, Man and Biosphere Reserve Network, Ramsar Convention, other site conservation networks, etc. Where appropriate, list the IUCN (1994) protected areas management category(ies) that apply to the site.

Rufiji-Mafia-Kibiti-Kilwa Biosphere Reserve (RUMAKI)
The RUMAKI Biosphere Reserve is administratively located in the regions of Lindi (Kwila District) and Pwani (Rufiji, Mafia and Kibiti Districts) of Tanzania. The area is predominately a complex coastal–marine ecosystem that includes the first marine protected area in Tanzania, Mafia Island Marine Park (1994). It comprises an outstanding mosaic of tropical marine habitats, including coral reefs, seagrass beds, mangroves and intertidal areas that support populations of turtles, migrating birds, dolphins and whale sharks. The RUMAKI seascape is recognized as being the most biologically productive and diverse marine area in Tanzania and East Africa as a whole. The biosphere reserve contains two cultural World Heritage sites which, along with Mafia Island, are the best-known tourist destinations in the biosphere reserve. Alongside tourism, small-scale and semi-industrial fisheries are among the main livelihoods for the biosphere reserve's population of more than 229,000.

4. **What are currently the most important threats to marine turtles and their habitat at the site?**
Describe the human and natural factors negatively affecting the ecological character of the site, both within and in the vicinity of the site. These may include new or changing activities/uses, major development projects etc., which have had, are having, or may have a detrimental effect on the natural ecological character of the site. For example, describe in terms of the percentage of coastline (or other area) modified/affected by a particular threat; for egg collection, describe in terms of number of nests, per species, per year. Mention also data-deficient threats, where a threat is known to be present but is not quantified. Collectively, this information should provide a basis for monitoring of ecological character of the site.

Direct take of marine turtles
Directtake of marine turtles for trade and consumption persists in some villages within the Rufiji-Mafia Seascape. Green and hawksbill turtles are the most commonly taken species. Discarded carapaces are frequently observed in mangroves and coastal forests. Over the past five years there have been multiple fatalities and hospitalizations following the consumption of hawksbill turtles, including in Mafia Island in 2023.

Beach-based threats
Predation, subsistence harvesting, and tidal inundation are the three biggest threats to incubating turtle eggs in Mafia Island. Between 2002 and 2022, 12% of nests were affected by one of these

threats, representing an annual loss of over 1,000 hatchlings (based on average clutch size). Overall, predation by monitor lizards was the most common beach-based threat.

Bycatch

Marine turtles are commonly caught as bycatch in artisanal gill nets and shark nets. According to the most recent Marine Fisheries Frame Survey[1], Kibiti District had the highest number of gillnets in use, while Mafia District had one of the highest number of shark nets in use, both of which are known to pose a major threat to marine turtles.

Habitat destruction

Illegal fishing practices including the use of beach seines, poisons, and explosives (blast fishing) are a threat to critical foraging and breeding habitats. Blast fishing is reported to be on the increase again following the scaling down of high profile enforcement operations conducted by the fifth phase government.

Habitat modification

Much of the Rufiji basin is targeted for socio-economic development as part of the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), which subjects the Rufiji basin to agriculture-driven deforestation. A new dam is also under construction on the river's main stem (Nyerere Hydroelectric Power Plant at Stiegler's Gorge) that will potentially control 95% of the river's discharge for hydropower production, irrigation of agricultural land, and flood management[2]. These habitat modifications are likely to disrupt environmental flows of the Rufiji River, which will have significant environmental impacts on biodiversity in the Delta, including seagrass meadows that support foraging green turtles, as well as social and economic consequences for fisheries dependent communities in the lower Rufiji River Basin.

Plastic pollution on nesting beaches

There are large amounts of marine debris on nesting beaches in Juani Island, which is brought ashore on the East African Coastal Current. The build-up of marine debris prevents nesting turtles from reaching the top of the beach to lay their eggs. Instead, females select nest sites that are below the high tide mark, which increases the risk of tidal inundation. During the period 2002 – 2022, a total of 90 nests were lost to tidal inundation in Mafia Island, representing 2% of nests laid during this period. As well as posing a threat to incubating eggs, marine debris is a significant impediment to emerging hatchlings.

Climate change

Coastal communities in Tanzania are experiencing the effects of climate change through temperature rise, rainfall variability, flooding, drought, sea-level rise, and storm surges. However, the impacts on marine turtles (e.g. altered sex ratios) and their habitats (e.g. erosion and/or flooding of nesting beaches, decline in seagrass cover) have not been quantified.

[1] Marine Fisheries Frame Survey, Mainland Tanzania. 2018. Ministry of Livestock and Fisheries.

[2] Anthony, E.J., Besset, M., Zainescu, F. and Goichot, M., 2021. Geomorphology of a tropical river delta under pressure: the Rufiji delta, Tanzania—context, channel connectivity and alongshore morpho-sedimentary and hydrodynamic variability. *Geo-Marine Letters*, *41*(2), p.24.

5. New conservation and management interventions taken since 2019and measures planned for near future

Describe conservation and management interventionstaken at the site to address threats since 2019. Any application of coastal and marine spatial planning, or integrated coastal/marine zone management planning, involving or affecting the site should be noted.

Describe any other new conservation measures taken at the site, such as restrictions on development, management practices beneficial to wildlife, closures of fishing, etc. (Note that information on any monitoring schemes and survey methods should be given under point 19, below.)

Where applicable, describe public outreach and communication activities. In addition, if applicable, describe any new developments inthe involvement of local communities and indigenous people in the participatory management of the site, including co-management activities, surveillance and enforcement, and performance evaluation since 2019.

National Action Plan for the Conservation of Marine Turtles (NAPCMT) 2024-2029

A NAPCMT was launched in March 2024, following more than two years of stakeholder consultations and workshops across mainland Tanzania and Zanzibar. The NAPCMT aims to address threats to marine turtles and their habitats and ensure the long-term viability of marine turtle populations. It serves as a flexible framework for collaboration among stakeholders, including government agencies, NGOs, coastal communities, private sectors, and research institutions. The NAPCMT comprises five chapters: an introduction, an overview of marine turtle biology and ecology, a review of governance and legal frameworks, a set of strategic objectives, and a framework for implementation, monitoring, and evaluation. The NAPCMT outlines seven key objectives which are aligned with the IOSEA Conservation and Management Plan: reducing marine turtle mortalities, protecting critical habitats, educating the public, strengthening law enforcement, advancing research, fostering collaboration, and enhancing policy and legal frameworks. Successful implementation of the NAPCMT is measured through a range of metrics including a decrease in turtle mortalities caused by human activities, the safeguarding of critical habitats, an increase in public engagement, effective law enforcement, advances in scientific understanding of marine turtles, improved stakeholder collaboration, and the development of robust policies that support marine turtle conservation and protection. The National Marine Turtle Conservation Committee has responsibility for oversight of the implementation of the NAPCMT.

Empowerment of Women's Fish Worker Groups

Over the past two years (2022 – 2024) women fish workers in four villages in Mafia District have been participating in an empowerment programme insupport of participatory coastal management. 98 women participated in training sessions with modules on marine ecosystems, fisheries management, good governance principles, and communications skills. The women were supported to register their groups at District level and develop action plans for their activities, including actions to conserve biodiversity and raise awareness in their communities. Implementation of the action plans involved giving presentations at village assemblies and village savings group meetings on the importance of marine biodiversity and associated ecosystem services, threats to marine biodiversity, and potential conservation solutions. Village leaders participated in training inclusive governance training in support of the women's activities and passed resolutions in support of women's participation in coastal management.

Beach clean-ups

Community members and Sea Sense NGO collaborateregularly to clean green turtle nesting beaches in Juani Island, Mafia District, where the build up of marine debris poses a threat to nesting females and emerging hatchlings.

Communications activities

A seagrass awareness campaign was implemented between 2021 and 2023 in three villages in Kibiti District, reaching 331 primary school pupils, nine teachers and two Ward Education Officers. A community event was also held to celebrate World Seagrass Dayandraise awareness of the importance of conserving seagrass for the benefit of endangered wildlife including marine turtles

and dugongs, and for coastal people who benefit from a range of ecosystem services. The theme of the event was *"Nyasibahari, uhaiwa Bahari"* (Seagrass is the life of the sea). More than 700 people attended the event and awareness materials were distributed (posters and kangas). Community fisheries managers (Beach Management Units) in two villages in Kibiti District participated in awareness sessions to strengthen knowledge of seagrass biology, their ecological and social importance, and the threats they face, and to discusspotentialstrategies for conserving and protecting seagrass habitat.

6. Current / proposed scientific research and monitoring since 2019

Name current and/or proposed scientific research projects and their start and end dates, relating to marine turtles and their habitats. Please describe monitoring activities (e.g., tagging, satellite tracking, genetic sampling, nesting and foraging ground surveys, ongoing beach monitoring, etc.). Cite relevant published papers in support of the submission.

Nesting beach monitoring by community Conservation Officers is ongoing at six nesting sites in Mafia Island. Daily foot patrols are conducted, and nests at risk of predation, subsistence harvesting, or tidal inundation are translocated to a safer area on the same beach. Nests are monitored throughout the incubation period and post-hatching excavations are conducted to determine hatching success. Management actions implemented by Conservation Officers have reduced egg mortality and contributed to hatchling production (paper in prep).

Marine turtle mortalities are monitored by community Conservation Officers in Kibiti District. Between 2019 and 2022, 126 mortalities were recorded (green n=98; hawksbill n=21; loggerhead n=2; olive ridley n=3; unidentified species n=2).

Between 2020 and 2023, research was conducted on the social and cultural dimensions of community-based marine turtle conservation, including motivations for participation, the social differentiation of knowledge and experiences of marine turtles, and the role of environmental values in public support for marine turtle conservation (papers in prep).

7. Briefly describe current financial as well as capacity-building needs

Identify fundraising and capacity building needs for the site (e.g. in relation to monitoring, management interventions, surveillance and enforcement, and performance evaluation).

-Need to finance Implementation of the National Action Plan for conservation of Marine Turtles

-Finance nests monitoring

-Need digital surveillance equipments e.g surveillance drones

-Establishing rehabilitation centres

8. References since 2019

List any new references relevant to marine turtle records and to the site, including management plans, major scientific reports, scientific articles and bibliographies. When a large body of published material on the site is available, only the most important references need be cited, with priority being given to recent literature containing extensive bibliographies. Reprints or copies of the most important literature should be appended whenever possible. Provide website addresses of references where available.

Botterell, Z. 2024. A global assessment of microplastic abundance and characteristics on marine turtle nesting beaches.*Marine Pollution Bulletin* (under review).

Lugendo, B., Wegoro, J., Shaghude, Y., Pamba, S., Makemie, M. and Hollander, J., 2024. Seagrass mapping across the coast of Tanzania. *Ocean & Coastal Management*, *253*, p.107169.

O'Leary, J.K., Goodman, M., Tuda, A., Machumu, M. andWest, L.2020.Opportunities and challenges in achieving co-management in marine protected areas in East Africa: A comparative case study. *Journal*

of the Indian Ocean Region, pp.1-31.

Rohner, C.A., Cochran, J.E., Cagua, E.F., Prebble, C.E., Venables, S.K., Berumen, M.L., Kuguru, B.L., Rubens, J., Brunnschweiler, J.M. and Pierce, S.J., 2020. No place like home? High residency and predictable seasonal movement of whale sharks off Tanzania. *Frontiers in Marine Science*, *7*, p.423.

Van De Geer, C.H., Bourjea, J., Broderick, A.C., Dalleau, M., Fernandes, R.S., Harris, L.R., Inteca, G.E., Kiponda, F.K., Louro, C.M., Mortimer, J.A., Msangameno, D.,West, L.et al. 2022**.** Marine turtles of the African east coast: current knowledge and priorities for conservation and research. *Endangered Species Research*, *47*, pp.297-331.

9. Please describe how the official designation as an IOSEA Network Site supports conservation efforts. Please also suggest how benefits of inclusion in the Network could be maximized..

-An inclusion in IOSEA provides an opportunity to learn new techniques in protecting and providing a sense of common effort in lifting the voice for conservation of the sea turtle.

-This Provide a platform to manage together migratory species (sea turtles) enhancing communication.