Conservation news

Improving marine turtle conservation in Myanmar

Myanmar is host to five species of marine turtle: the hawksbill *Eretmochelys imbricata*, green *Chelonia mydas*, leatherback *Dermochelys coriacea*, loggerhead *Caretta caretta* and olive ridley *Lepidochelys olivacea*. Extensive surveys in Myanmar's delta region in 1911 indicated nesting populations of 3,750 olive ridleys and 5,000 green turtles but despite early attempts to regulate egg harvest (F.D. Maxwell, 1911, unpubl. data), these populations are in extreme decline (Ko Myint et al., 2017, *37th International Sea Turtle Symposium*), with nesting females now counted in the tens at former strongholds. The causes of this decline are many, including unregulated harvesting of eggs and bycatch by trawlers near nesting sites. The Department of Fisheries has attempted to alleviate this crisis by establishing hatcheries and supporting volunteers to protect nests. In October 2016 a workshop on marine turtles was held in Yangon with participants from the government, universities and NGOs. This meeting resulted in the development of a nationwide marine turtle conservation project led by Fauna & Flora International (FFI), supported by the US Fish and Wildlife Service.

This project started with training, attended by a total of 30 participants, on turtle biology, survey methodology, and the development of standardized survey forms to ensure consistency. Project partners were then supported to conduct beach monitoring at key nesting sites, and from December 2017 to November 2018 there were 277 patrol days. This resulted in the protection of 135 nests across four sites: Oyster, Thameehla, Moscos and Kandongalay Islands. Of these, 83 were green turtle nests, 14 hawksbill, 19 olive ridley, and 19 unknown. Hatching success rates averaged 70 ± SD 19% (n = 81) for the green, 62 ± SD 8% (n = 3) for the hawksbill and 77 ± SD 19% (n = 2) for the olive ridley turtle.

In 2018 temperature data loggers were deployed in nests on Thameehla and Oyster Islands. None of the nests reached lethal temperatures of > 33 °C, (R. Howard et al., 2014, *Endangered Species Research*, 26, 75–86). On Thameehla Island data loggers placed in the centre of two green turtle nests during Myanmar's hot season (March–May) recorded maximum nest temperatures of 29.6 and 32.2 °C, respectively. A third data logger placed inside a green turtle nest in October, the end of Myanmar's monsoon, reached a maximum temperature of 29.2 °C. Four data loggers were also placed in the sand near nests, at the same depth. These recorded maximum temperatures of 28.6–32.1 °C. On Oyster Island two data loggers were used, during Myanmar's winter in December, one in a nest and one in the sand, with maximum recorded temperatures of 28.6 and 28.4 °C, respectively.

Within hatcheries for nests relocated from flooding zones on Thameehla Island, however, temperatures were high, with a maximum of 36.2 °C recorded in one green turtle nest. Sand temperatures within the hatchery reached 35.7 °C in May, indicating that hatchery design and protocols need reviewing. Over the forthcoming 2019–2020 season a larger deployment of data loggers will provide better spatial and temporal understanding of nest temperatures, sex ratios and survival, and facilitate development of appropriate management measures, especially under the looming threat of climate change.

Overall, through the establishment of a national network comprising the Departments of Fisheries and Forestry, Myanmar universities, INGOs, the Myanmar fishing federation, and local businesses, measures have been initiated for the protection and recovery of marine turtles in Myanmar. These include capacity building, with Myanmar researchers begining to take the lead; identification of more nesting beaches and establishment of additional monitoring sites; the recent introduction of a regulation making turtle exclusion devices mandatory on all trawlers and stow nets; and greater access to information for the public, especially fishers, on the importance of marine turtles and the laws surrounding their protection. This work is being used in the development of action plans to ensure the long-term conservation of marine turtles in Myanmar.

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Guidance published on facilitation of conservation-friendly market systems

Fauna & Flora International (FFI) has been working in partnership with Practical Action to adapt the latter's Participatory Market System Development approach to a biodiversity conservation context. A key output from this collaboration is a set of guidance documents, published in February 2019, to help conservation practitioners facilitate the development of more productive, fair, inclusive and biodiversity-friendly market systems. The tools and