

- <https://www.traffic.org/site/assets/files/12524/se-asia-marine-turtle-trade.pdf>. Accessed on May 25, 2020.
- Ibrahim, K. & D.S.K. Sharma. 2006. Forty years of sea turtle conservation efforts: Where did we go wrong? Lessons learned and the way forward. In: *Charting Multidisciplinary Research and Action Priorities Towards the Conservation and Sustainable Management of Sea Turtles in the Pacific Ocean: A Focus on Malaysia* (eds. Ahmed, M., S. Wagiman, K. Ibrahim, S.C. Ho, H.C. Liew, B.H. Yeo *et al.*) Pp. 29-34. The WorldFish Center: Penang, Malaysia.
- Jabatan Perangkaan Malaysia. 2020. Sekretariat dan Jawatankuasa Khas DOSM Menangani COVID-19: Statistik & Info-Media (BDA). BIL 19/2020: 23-25. https://www.dosm.gov.my/v1/uploads/files/7_Publication/Articles/20200410-Isudan-Berita-Bil_19_2020.pdf. Accessed on May 25, 2020.
- Jamalludin, M.A. & J. Mohd Jani. 2017. Enakmen Penyua Terengganu 1951: Kajian Kes Transformasi Undang-Undang Hidupan Liar Di Malaysia. In: *Seminar Kebangsaan Transformasi Governan (STG) 2017*. <https://www.researchgate.net/publication/321487372>. Accessed on June 15, 2020.
- Joseph, J., S.A. Ali & L.S. Hing. 2014. Heavy metal compositions in green turtle (*Chelonia mydas*) eggs from nesting beaches in Peninsular Malaysia. *Asian Journal of Conservation Biology* 3: 83-87.
- Kaska, Y. & R. Furness. 2001. Heavy metals in marine turtle eggs and hatchlings in the Mediterranean. *Zoology in the Middle East* 24: 127-132.
- Lam, J.C.W., S. Tanabe, S.K.F. Chan, M.H.W. Lam, M. Martin & P.K.S. Lam. 2006. Levels of trace elements in green turtle eggs collected from Hong Kong: Evidence of risks due to selenium and nickel. *Environmental Pollution* 144: 790-801.
- Liew, H.C. 2011. Tragedy of the Malaysian leatherback population: What went wrong? In: *Conservation of Pacific Sea Turtles* (eds. Dutton, P.H., D. Squires & M. Ahmed). Pp. 97-107. University of Hawai'i Press: Honolulu, Hawai'i.
- Merwe, J.P., M. Hodge, H.A. Olszowy, J.M. Whittier, K. Ibrahim & S.Y. Lee. 2009. Chemical contamination of green turtle (*Chelonia mydas*) eggs in Peninsular Malaysia: Implications for conservation and public health. *Environmental Health Perspectives* 117: 1397-1401.
- Mohd Jani, J., M.A. Jamalludin & S.L. Long. 2020. To ban or not to ban? Reviewing an ongoing dilemma on sea turtle egg trade in Terengganu, Malaysia. *Frontiers in Marine Science* 6: 762. DOI: 10.3389/fmars.2019.00762.
- Nabangchang, O., J. Jianjun, A. Indab, T. Thuy, D. Harder & R. Subade. 2008. Mobilizing resources for marine turtle conservation in Asia: A cross-country perspective. *ASEAN Economic Bulletin* 25: 60-69.
- Nathan, T.M., C.Y. Lee, A. Senadjki, S. Mohd, S.R. Mat Rahim & M. Wahab. 2019. Modern technologies and behaviour of youth: A case study in Malaysia. In: *International of Business, Accounting, Finance and Economic (BAFE, 2019)*. https://www.researchgate.net/publication/336556584_Modern_Technologies_and_Behaviour_of_Youth_A_Case_Study_in_Malaysia. Accessed on June 16, 2020.
- Pattanayak, S., J. Whitehead, G. Van Houtven & B. Gelso. 2008. Combining revealed and stated preference data to estimate the nonmarket value of ecological services: An assessment of the state of the science. *Journal of Economic Surveys* 22: 872-908.
- Venkatachalam, L. 2004. The contingent valuation method: A review. *Environmental Impact Assessment Review* 24: 89-124.
- WWF-Malaysia. 2009. Survey of marine turtle egg consumption and trade in Malaysia. http://awsassets.wwf.org.my/downloads/survey_of_marine_turtle_egg_consumption_and_trade_in_malays.pdf. Accessed on June 16, 2020.

IMPACT OF COVID-19 ON SEA TURTLE NESTING, CONSERVATION AND MANAGEMENT IN BANGLADESH

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In Bangladesh, the major sea turtle nesting season is in winter (October to March/April). The national lockdown in response to the COVID-19 pandemic began on 26th March 2020 and has, to date, continued throughout June. Within the lockdown period, human activity continued as many people are daily wage earners or operate small businesses, especially in major cities. In coastal areas, the lockdown was more strictly followed and there

was no tourism. Some fishing activities continued, although it was not supposed to during the lockdown.

The NGO Marinelife Alliance (MLA) runs a community-based research and conservation program involving local conservation assistants (CAs). All 56 CAs live in beach front villages along 350km of the southeast and south-central coast. They continued conducting night

observation and mitigating threats such as disturbance of nesting turtles and illegal take of eggs; this task was easier than usual during the lockdown because there was no crowding and disturbance. A setback was that biologists and central researchers could not move to the field. This challenge was overcome by the well-trained CAs sharing their data via cellphone and social media. Another major

impact of the lockdown was that ecotour operators who previously provided financial support for MLA conservation activities could not do so. The lack of tourists has allowed beach vegetation and invertebrates to flourish during the lockdown, with sand dunes forming along the beach and beach morning glory (*Ipomeas pp.*) growing to protect the shoreline and support beach biodiversity.

COVID-19, CYCLONES AND SEA TURTLES IN INDIA

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The COVID-19 pandemic resulted in a sudden nationwide lockdown in India on 24th March 2020. The nesting season of leatherback and olive ridley turtles start from November and lasts until April both on the Indian mainland coast and Island territories, while green and hawksbills nest throughout the year. The nationwide lockdown did not have any significant influence on sea turtle nesting, monitoring and conservation activities.

On the east coast, olive ridley turtles usually nest from December to March, and hence most of the nesting had concluded when the national lockdown was announced. In the state of Odisha, mass nesting (*arribada*) took place at Rushikulya rookery from the 21st to 26th March 2020, including a day-time nesting event, which partially overlapped with commencement of the lockdown. While it is not uncommon to have turtles nesting during the day in these *arribadas*, some of the Indian media channels reported this phenomenon to be a result of reduced human activity on the beach (e.g., Das, 2020; Express News Service, 2020; Gill, 2020).

Researchers from Dakshin Foundation continued to monitor the beach till the 24th March 2020. It was estimated that over 200,000 turtles had nested during the first three days of the *arribada*. Despite the lockdown, the Odisha Forest Department personnel were present for the mass hatching to ensure that disoriented hatchlings were released at the water's edge. During the lockdown, there was a cyclonic event (Cyclone Amphan) on the 16th May 2020 that was expected to affect the Odisha coast; however, the cyclone moved north towards West Bengal and resulted in no damage to the critical nesting beaches of Odisha.

In Tamil Nadu, the Students' Sea Turtle Conservation

Network (SSTCN) reported that the nesting season had ended prior to the lockdown, however, the clutches relocated to the hatcheries continued to hatch till May. In collaboration with the Tamil Nadu Forest Department, SSTCN members were granted permission from the local authorities to visit the hatchery and ensure that the hatchlings were released in a timely manner.

The west coast of Maharashtra has low-density nesting. Nevertheless, the village of Velas hosts an annual "Turtle Festival", a sea turtle-based ecotourism initiative jointly run by the village *panchayat* (local government) and the Mangrove Foundation of the Maharashtra Forest Department. Since the lockdown led to cancellation of all tourism related activities, the Mangrove Foundation hosted the Turtle Festival on Facebook Live and broadcast hatchling releases every morning and evening for viewers to witness from their homes. However, on 1st June, 2020, the Maharashtra coast was hit by Cyclone Nisarga which caused heavy damage to sheds and other structures used to protect the nesting sites in Velas and other sea turtle nesting beaches in Anjarle, Dabhol, Kelshi etc. Fortunately, there was no damage to the beach, and since the cyclone had occurred after the end of the nesting season, monitoring and ecotourism activities were not been hampered.

With most organisations working from home and online, there was an increase in outreach sessions conducted in the form of webinars, especially on the occasion of World Turtle Day (23rd May 2020). The themes of these webinars varied from understanding sea turtle biology and conservation to the work being conducted in the region and the experiences of sea turtle biologists. These sessions were conducted in vernacular and English and were hosted by a range of news media outlets like the