

There are reports of olive ridley (Baby, 2012) and leatherback (*Dermochelys coriacea*) (Anil *et al.*, 2009) sea turtles from the Kerala coast. Recently, Sreekumar *et al.* (2016) reported a dead stranded olive ridley turtle from Cherai Beach. There may be other instances of stranding turtles occurring along the Kerala coast that have not been properly documented. Reporting of sea turtles that are stranded, or incidentally captured etc. is mainly carried out by Central Marine Fisheries Research Institute throughout India. Kannan and Rajagopalan (2007) made a study on the incidentally captured sea turtles along Kerala state, including all five species that occur in coastal waters of India. According to Rajagopalan *et al.* (2002), incidental catch of sea turtles along Kerala coast was greatest in the month of January.

As sea turtles regularly occur in the waters around Kerala, increased public awareness may help reduce threats and lead to beneficial actions, such as careful retrieval and release of sea turtles that are incidentally captured by fishing gear. Additionally, improved public awareness about sea turtles may lead to improved reporting rates of stranded sea turtles along the coast, which would help us better understand both occurrence and threats faced by these species.

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## STRANDED OLIVE RIDLEY TURTLE ON EDACKAZHIYUR BEACH, CHAVAKKAD, KERALA, INDIA

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Edakkazhiyur beach (10°36'32''N, 75°59'24''E) in Chavakkad, Kerala, India, is a known nesting ground for olive ridley turtles (*Lepidochelys olivacea*). The nesting season in this area runs from November to March, and over the years the number of nests along Chavakkad beach have increased from one nest in 1998-99 to 10 nests in 2017-18 (Sundaram *et al.*, 2019), thanks to the efforts of Green Habitat, a local NGO dedicated to the conservation of turtles. Periodically, night patrols are conducted during the nesting season.

During a night patrol on 8<sup>th</sup> February 2019, we observed a dead female olive ridley turtle on Edakkazhiyur Beach. We returned the following morning after dawn, for

closer inspection, and observed that the turtle had been badly injured with broken carapace and was starting to decompose (Figure 1). The turtle was about 60cm long in carapace length. The carcass was later buried in the beach.

It is not clear when the injury to the carapace occurred. If when the turtle was alive, it might have come near to the shore for nesting and in the process may have been hit by the propeller of a boat or trawler. The boat strike could also have occurred after the turtle had died of other unknown causes. Stranded turtles along the Kerala coast have been rarely reported, although it could be that more occur but have not been properly documented. There seems to be only four reports of stranding turtles along the Kerala



**Figure 1. Dead olive ridley turtle on Edakkazhiyur Beach. (Photo credit: Saleemifocus.)**

coast, including Anil *et al.* (2009), who reported a dead stranded leatherback (*Dermochelys coriacea*) in Vizhinjam and Baby (2012) who reported a dead stranded olive ridley turtle from Thrissur. Recently, Sreekumar *et al.* (2016) reported a dead stranded olive ridley turtle from Cherai beach and Saleem *et al.* (2019) reported a live injured olive ridley turtle from Thrissur. All the four instances of stranding were observed during the breeding season.

According to Rajagopalan *et al.* (2002), the rate of incidental catch of sea turtles along Kerala coast is greatest in the month of January, which is roughly the middle of the olive ridley breeding season, hence maximum care by vessels should be taken during this period to avoid turtles. As a preventive measure, fishing and trawling effort in the vicinity of the Kerala nesting beaches should be limited during the breeding season, to reduce the likelihood of incidental capture of reproductive females. To further protect these turtles, increased awareness of sea turtles among fishers is needed, with the aim to ensure that turtles incidentally captured in fishing gear are successfully removed from the gear and released back to the ocean alive. The use of turtle excluder devices (TEDs) by fishing trawlers may also help reduce bycatch.

Green Habitat intends to regularly monitor for stranded turtles along Kerala coast for future reference and studies.

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# WHEN IS A STRANDED TURTLE A BYCATCH TURTLE? ASSESSING POTENTIAL CAUSE OF STRANDING IN SEA TURTLES

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## INTRODUCTION

*“While some of them were found tangled in nets, most lay bloated with their eyes popped out, indicating drowning”* (Hemalatha, 2015).

Stranding of live and dead sea turtles may occur for many reasons, such as after incidental capture in fisheries gear (including ghost gear) and shark control gear, vessel strike, ingestion of foreign materials, disease, and development activities, or after specific environmental factors such as freshwater discharge after intense rainfall or low water temperatures resulting in cold stunning (for examples see Casale *et al.*, 2010; Pilcher *et al.*, 2014; Poli *et al.*, 2014; Flint *et al.*, 2015; Flint *et al.*, 2017). However, in areas where mortality of sea turtles accidentally caught in fishing gear is high, there is a tendency to hold fishers responsible for all turtles found washed ashore. In India, the observations used to justify such blame often includes that described in the above quote from Hemalatha (2015)- that bloated turtles with protruding eyes must have drowned after becoming entangled in fishing gear such as trawler or gill nets.

Certainly, entanglement in active fishing gear and ghost gear can result in injury or death. Rates of mortality are often highest in areas where fishing occurs in waters where turtles aggregate for breeding and nesting (e.g. along the Orissa coast; Pandav *et al.*, 1997; Gopi *et al.*,

2007) and ghost gear becomes concentrated by ocean currents (e.g. around the Maldives in the central Indian Ocean; Stelfox & Hudgins, 2015). But holding the fishing industry primarily responsible for turtle mortalities and declines can result in fishers being defensive about their livelihoods (e.g. Tucker *et al.*, 1997; Santora, 2003) and resistant to using modified gear or complying with area or seasonal closures that reduce the rates of sea turtle bycatch (e.g., Tucker *et al.*, 1997; Campbell & Cornwell, 2008).

Bloating in turtle carcasses is not a conclusive sign of drowning; instead, it is caused by gases accumulating during decomposition (Epperly *et al.*, 1996). Evidence is needed to demonstrate that turtles stranded as a result of entanglement in fishing gear, and sea turtle biologists and conservationists wanting to collect information about possible causes of mortality can use the stages of decomposition and injuries or interactions with pathogens described below.

## STAGES OF SEA TURTLE DECOMPOSITION

Sea turtles killed at sea often sink, rising to the surface again only when gases produced during decomposition cause the body to float (Epperly *et al.*, 1996). The carcass may then drift with local currents and wind (Epperly *et al.*, 1996; Hart *et al.*, 2006) until it washes ashore as a dead, stranded turtle. The condition of turtle carcasses