

## Shark predation record on a Green Turtle, *Chelonia mydas* (LINNAEUS, 1758), in South African waters

On January 3, 2017, whilst conducting a night time beach survey for nesting Leatherback Turtles, *Dermochelys coriacea* (VANDELLI, 1761), and Loggerhead Turtles, *Caretta caretta* (LINNAEUS, 1758), along the northern KwaZulu-Natal coastline (South Africa), a dead Green Turtle *Chelonia mydas* (LINNAEUS, 1758), was found just above the high tide mark (27°57'28.1" S, 32°35'20.8" E; Fig. 1). Immediately upon inspection it was obvious from an extensive wound on the left flank that the specimen had been bitten and severely injured by a shark (Fig. 2A). The most prominent bite wound measured 270 mm across in a straight line and involved the excision of considerable tissue from the specimen. The carcass was still very fresh, as the internal organs were all visible and in a good condition (i.e., there was little to no evidence of secondary scavenging), suggesting the predatory interaction occurred in the immediate

vicinity. The turtle was female, with a carapace length (measured along the curve) of 700 mm and width of 670 mm across at its widest point. The plastron was 540 mm long and 580 mm across. These measurements indicate that the specimen was a young sexually mature turtle. Green Turtles are known to reach sexual maturity at a carapace length of 650 mm to 830 mm (BRANCH 2008). There was no evidence of eggs in the ovaries.

Other than the obvious bite wound on the left rear quarter of the animal, the left rear flipper also had some puncture marks and a laceration. The entire carapace was covered in scratches, as was the plastron. Some of these scratches may have been caused by the carcass being washed up over rocks; however, based on systematic spacing patterns of puncture wounds occurring in curved arcs, some were definitely the result of smaller sharks trying to scavenge on the remains (Fig. 2B). Pink Ghost Crabs *Ocypode ryderi* KINGSLEY, 1880, were encountered scavenging on the carcass during the next few days of supplemental observation as nesting surveys in the area continued.

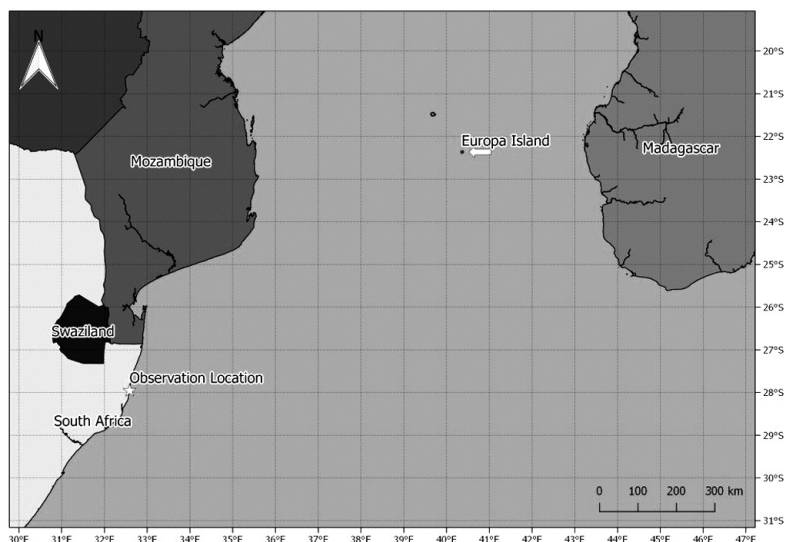


Fig. 1: Map indicating the location along the northern KwaZulu-Natal coastline (South Africa), where the dead *Chelonia mydas* (LINNAEUS, 1758), depicted in Figs. 2A and 2B, was found. The closest known nesting site is on Europa Island, situated in the Mozambique Channel.

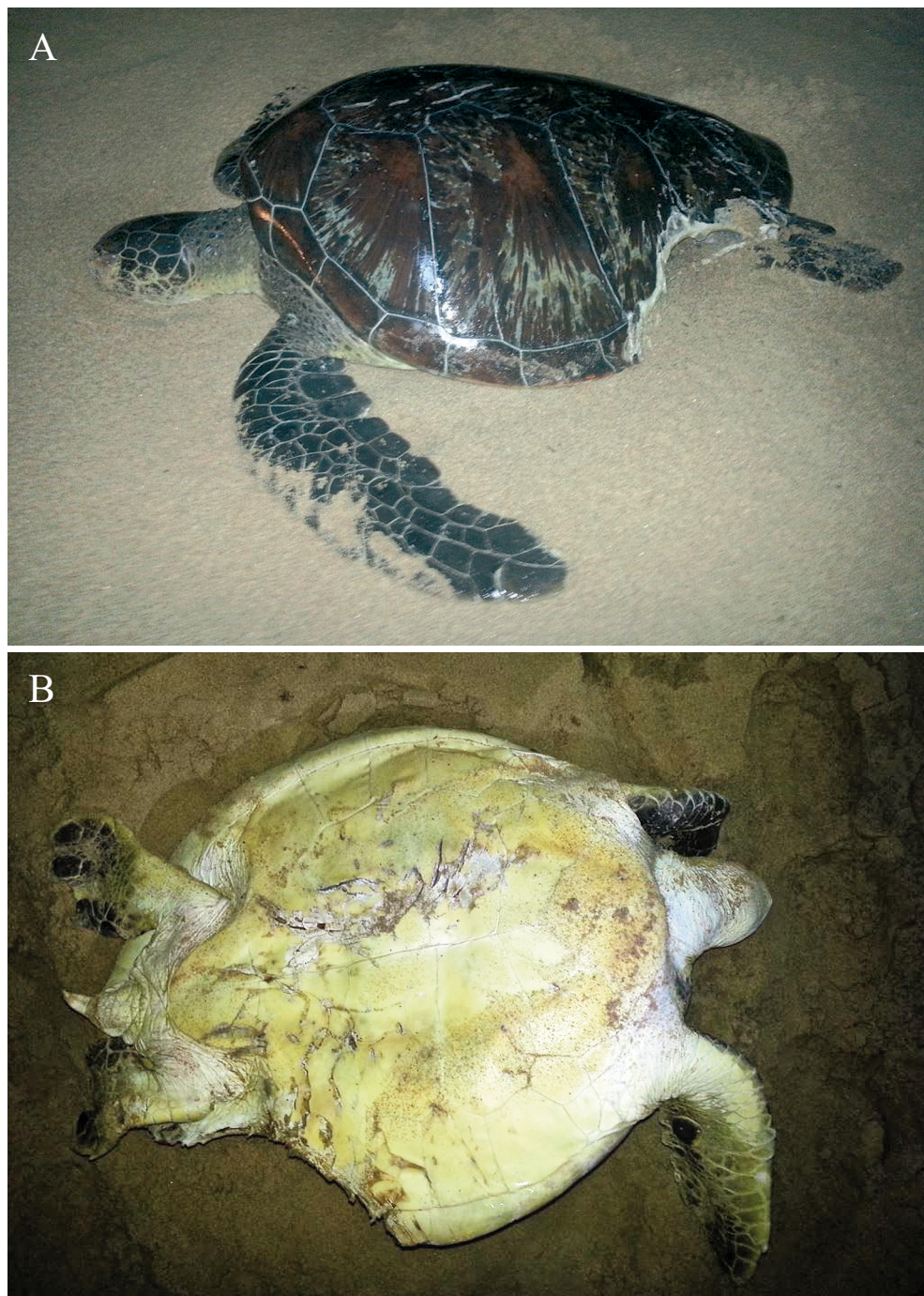


Fig. 2: The female *Chelonia mydas* (LINNAEUS, 1758), obviously died from an extensive wound on the left flank most probably caused by a Tiger Shark. A – dorsolateral view. B – ventral view.



*Chelonia mydas* is one of five marine turtle species occurring in the oceans surrounding South Africa (HUGHES 1989; BRANCH 2008; BATES et al. 2014). It is currently listed as Near Threatened in South Africa (BATES et al. 2014) and is not documented to breed along its coastline. The closest, main nesting site being Europa Island, situated in the Mozambique Channel (HUGHES 1989; BRANCH 2008) (Fig. 1). Along the KwaZulu-Natal coast, however, this species is often observed by divers, grazing in nearshore waters. After its first year of life, the Green Turtle becomes a herbivore, feeding predominantly on grasses and algae in the littoral zone (HUGHES 1989), which seldom exceeds 10 meters in depth.

In South African waters, four species of shark occur that have been recorded to predate on marine turtles. These being the Great White Shark *Carcharodon carcharias* (LINNAEUS, 1758) (D'AUBREY 1964; WALLET 1983), the Oceanic Whitetip Shark *Carcharhinus longimanus* (POEY, 1861) (COMPAGNO et al. 1989), the Bull Shark *Carcharhinus leucas* (MÜLLER & HENLE, 1839) (COMPAGNO et al. 1989) and the Tiger Shark *Galeocerdo cuvier* (PÉRON & LESUEUR, 1822) (WALLET 1983; COMPAGNO et al. 1989; CLIFF & WILSON 1994; RADA et al. 2015).

Judging from gross forensic attributes of the bite wound on the carapace of the *Chelonia mydas* carcass, it is most probable that the species responsible for the attack was *Galeocerdo cuvier*, which has cockscomb-shaped teeth that are strongly serrated and anatomically arranged to facilitate effective cutting through tough materials (WITZELL 1987; MOTTA 2004). This tooth and jaw morphology is well documented to allow Tiger Sharks to bite out large chunks of a turtle's carapace during predation events (HEITHAUS et al. 2002). The capacity of *Carcharhinus leucas* to inflict such a wound is limited, taking their tooth morphology and body size into consideration. Using the method described and proposed by LOWRY et al. (2009), it is estimated that the *G. cuvier* responsible for the predation attempt was between 2.30 m and 2.36 m in total length, and potentially larger if less than the full extent of the jaw was brought to bear on the carapace while biting. This

estimate is in line with the prediction of predator size, for turtle-feeding Tiger Sharks (LOWRY et al. 2009). This shark species selectively preys on large cheloniids facilitated by a unique masticating mechanism and feeding behavior and even can specialize in such a diet since predator and prey share the same inshore habitat (WITZELL 1987).

It is highly unlikely that either *Carcharodon carcharias* or *Carcharhinus longimanus* was responsible for this attack, given the freshness of the carcass, as the former is a species favoring the cooler waters of the country and the latter is a species generally not found close inshore (COMPAGNO et al. 1989).

The KwaZulu Natal coastline is partially protected by shark nets to prevent shark encounters with humans. Thirty-seven areas along the province's coast are protected in this manner, and nets are maintained by the Natal Sharks Board (CLIFF & WILSON 1994). The closest nets to the site where the *C. mydas* carcass was discovered, however, are more than 100 kilometers away, making this an unprotected beach. During past marine turtle nesting surveys along the same stretch of beach, the author encountered many other turtles exhibiting evidence of previous encounters with sharks, such as having flippers missing or pieces removed from the carapace, but never encountered a dead specimen of any cheloniid species. This occurrence of a washed up specimen of *C. mydas* on a beach known to be utilized by other marine turtle species for oviposition could indicate that some specimens of this species do in fact nest in Southern Africa on rare occasions.

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