

Whereas animals and humans may unwittingly spread *P. antipodarum* between watersheds, once established other vectors include fish that may consume *P. antipodarum*, but which then pass thru their digestive system alive (Vinson et al. 2008. N. Amer. J. Fish. Mgmt. 28:701–709). *Actinemys marmorata* may also act as a vector within a riparian system that could theoretically spread *P. antipodarum* upstream and downstream, or to an off-channel pond, lake, or reservoir, if infected individuals travel overland and the snail survives. For many years in California, fisherman, boaters, and aquatic biologists have been urged to clean and dry their gear for a minimum of 48 h, freeze for 6 h, or disinfect equipment with chemicals to slow the spread of this highly invasive mollusk (<http://ucanr.edu>; 16 November 2019).

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APALONE FEROX (Florida Softshell). PREDATION. *Apalone ferox* is a highly aquatic species of softshell turtle distributed from South Carolina southward throughout Florida and west to Mobile County, Alabama, USA (Ernst and Lovich 2009. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, D.C. 827 pp.). *Apalone ferox* is the largest of the native North American softshell turtles, rendering adults immune to predation from all sources except for large American Alligators (*Alligator mississippiensis*). However, nests and hatchlings are subject to a wide variety of predators including multiple species of predatory mammals and birds (Ernst and Lovich 2009, *op. cit.*). Throughout the Everglades ecosystem, seasonal pulses in

hydrology concentrate prey resources into areas of low elevation that retain water throughout the dry season. Huge influxes of wading birds occupy the Everglades during these seasonal dry downs to take advantage of the increased prey densities that occur during this period (Cook et al. 2014. Freshwater Biol. 59:1608–1621). While other studies have described the increase in prey densities of fish and invertebrates, highly aquatic chelonian species like *A. ferox* are also likely concentrated during these periods and may provide another source of energy for some of the large wading birds capable of consuming them. At 1805 h on 23 February 2020, I observed an adult Great Egret (*Ardea alba*) consuming a juvenile *A. ferox* (Fig. 1) within a deep slough section of the Loxahatchee National Wildlife Refuge, Palm Beach County, Florida, USA (26.49157°N, 80.21838°W; WGS 84). The *A. alba* struggled to consume the *A. ferox* for over 30 min before finally swallowing the prey whole. The *A. alba* appeared to have killed the *A. ferox* by breaking its neck, instead of through its usual method of hunting that relies on using its prodigious beak to spear prey items. It is possible that the influx of high trophic level wading birds during the dry season may substantially increase predation on juvenile and hatchling turtle species across the Everglades ecosystem.

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CHELONIA MYDAS (Green Sea Turtle). PREDATION. Aside from *Homo sapiens*, sharks of the orders Carcharhiniformes and Lamniformes are the primary predators of Cheloniidae (Marquez 1990. FAO Fisheries Synopsis 125:1–81). *Carcharodon carcharias*, *C. leucas*, and *Galeocerdo cuvier* are known to prey upon *Dermochelys coriacea*, *Caretta caretta*, and *Chelonia mydas* at sea (Fergusson et al. 2000. Env. Biol. Fishes 58:447–453; Heithaus et al. 2002. Mar. Biol. 140:229–236; Cliff and Dudley 2008 J. Exp. Mar. Biol. Ecol. 356:43–51). Injuries characteristic of shark predation have been documented in Cheloniidae stranded along the western Gulf of Mexico (GoM) in Texas, USA (Shaver 1995. Mar. Turt. Newsl. 70:2–4). Herein, we describe four reports of *C. mydas* removed from shark stomachs, two of which were identified to species, and report injuries consistent with shark interactions in 45 additional *C. mydas* found stranded in south Texas during 2019.

On 22 April 2019, personnel conducting surveys for nesting and stranded sea turtles on Boca Chica Beach, Cameron County, Texas, USA found the decomposed head and nearby complete stomach of a shark. The stomach contained an intact juvenile *C. mydas* (Fig. 1A) that measured 25.8 cm straight carapace length (SCL) and 21.3 cm straight carapace width (SCW). The *C. mydas* had injuries indicative of shark predation, including crescent-shaped bite wounds characterized by sharply incised tooth marks with scoring of bone on the carapace and plastron, and a similar wound on the right front flipper. The shark was identified as *Carcharodon leucas* based on the morphology of the head and teeth and partial sequencing of the mitochondrial cytochrome oxidase I gene.

On 28 April 2019, a recreational fisherman removed two juvenile *C. mydas* (Fig. 1B) from the stomach of an unidentified shark on Boca Chica Beach, 1.6 km north of the Rio Grande River. Both had bite wounds on the plastron and flippers. The *C. mydas* were identified to species based on photographs, as they were not retrieved for examination. The shark was not photographed and no samples were available for identification of species.



FIG. 1. Predation of a juvenile *Apalone ferox* by *Ardea alba* within a deep slough of the Everglades, Florida, USA.

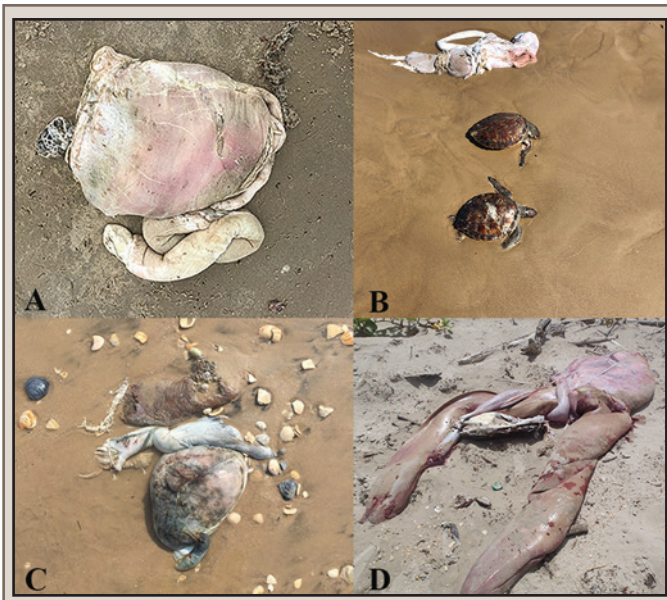


FIG. 1. A) *Chelonia mydas* carcass encased (with rear flipper protruding) in a *Carcharhinus leucas* stomach found on Boca Chica Beach, Texas on 22 April 2019; B) *C. mydas* carcasses removed from a *Chondrichthyes* stomach washed ashore on Boca Chica Beach on 28 April 2019; C) possible *C. mydas* carcass encased in a *Chondrichthyes* stomach observed on Boca Chica Beach on 29 April 2019; D) *C. mydas* carcass removed from a *Galeocerdo cuvier* stomach at Padre Island National Seashore, Texas on 29 June 2019.

On 29 April 2019, personnel conducting surveys for nesting and stranded sea turtles photographed an unidentified shark stomach washed ashore on Boca Chica Beach that appeared to contain a juvenile *C. mydas* (Fig. 1C). However, neither the species of shark nor the consumed *Cheloniidae* could be identified because both were moved or washed away before they could be examined.

On 29 June 2019, a juvenile *C. mydas* was found in the stomach of a 246.4 cm (total length) *G. cuvier* captured on hook-and-line near the Padre Island National Seashore (PAIS) 27.4 km marker (Fig. 1D). The anglers took the shark home but provided the *C. mydas* to PAIS biologists. The *C. mydas* was partially digested and three flippers and the head were missing. The detached distal half of the right front flipper also was found within the stomach. The *C. mydas* measured 32.1 cm curved carapace length (estimated) and 26.9 cm curved carapace width (estimated). The shark was identified as *G. cuvier* based on photographs.

Forty-five additional juvenile *C. mydas* (29.1 cm mean SCL; range: 22.2–58.8 cm) exhibiting injuries consistent with shark interaction stranded in south Texas in 2019. Forty-three were found on the GoM-facing coast, one was caught within a bay, and another was found within a coastal inlet. Twenty-seven of the stranded juvenile *C. mydas* were alive upon discovery. Of those found dead, the injuries consistent with shark interactions were either attributed to predation or post-mortem scavenging of turtles that had died from other causes.

These observations indicate that juvenile *C. mydas* are being targeted as prey by *C. leucas* and *G. cuvier* in the western GoM. The number of juvenile *C. mydas* in south Texas waters has notably increased in recent years (Shaver et al. 2017, PLoS ONE 12:e0173920); an effect credited to international conservation efforts. Greater numbers of *C. mydas* recruiting into foraging habitat undoubtedly has increased their availability as prey. Continued documentation of shark interactions is of interest to

both study of the recovering *C. mydas* population as well as its potential ecological implications.

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CHELONIA MYDAS (Green Sea Turtle). TWINNING. Embryological twinning in turtles is rare, but occasionally reported. Twins have been recorded in several species of sea turtles, such as the Olive Ridley Sea Turtle (Sreeram et al. 2016, Indian Ocean Turtle News. 24:8–9), Leatherback Sea Turtle (Eckert 1990, J. Herpetol. 24:317–320), and Green Sea Turtle (Kaska and Downie 1999, Zool. Middle East 19:55–69). Here, we report a case of twinning in *Chelonia mydas* based on observations made in March 2017 in Atol das Rocas (3.86388°S, 33.81111°W; WGS 84), an important nesting area for this species in Brazil.

Atol das Rocas is located 260 km east of the state capital of Rio Grande do Norte, northeastern Brazil. On 24 January 2017 a female Green Sea Turtle laid her eggs and the location of the nest was marked with a numbered PVC stake. The hatchlings emerged on 26 March 2017; the nest was opened and stillborn turtles were removed. Nineteen of 109 eggs failed to hatch and one pair of twins was found among the stillborn (Fig. 1). Twin sea turtles have been found alive (Sreeram et al. 2016, *op. cit.*). Additionally, it was reported that the same female Leatherback Sea Turtle had twins in different years, and even for the same species, the occurrence of twins may be rare in some nesting areas and common in others (Eckert 1990, *op. cit.*). Twins may or may not differ in size, and they can have malformations of the shell or exhibit albinism (Kaska and Downie 1999, *op. cit.*). In the occurrence presented here, we were not able to perform further morphological or DNA analysis to determine the cause of twinning. This is apparently the first reported case of marine turtle twinning for Atol das Rocas, Brazil.



FIG. 1. Twins found inside a Green Sea Turtle nest from Brazil. In this image, it is possible to see the same yolk shared by the hatchlings.

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