

Marine Turtle Newsletter

Hypothermic Stunning of Sea Turtles in Texas

Donna J. Shaver

*National Park Service, Padre Island National Seashore, 9405 South Padre Island Drive,
Corpus Christi, Texas 78418-5597 USA*

Hypothermic stunning ("cold stunning") of sea turtles during cold weather episodes has been reported in Western Europe (Brongersma, 1982), New England (Shoop, 1980), Long Island Sound, New York (Meylan and Sadove, 1986), the Indian River system, Florida (Mendonça and Ehrhart, 1982; Witherington and Ehrhart, 1989) and Corpus Christi, Texas (Hildebrand, 1982). Species affected have included Kemp's ridley (*Lepidochelys kempi*), green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) sea turtles. These species initially react to exposure to 10.0°C water by bobbing at the surface and die between 5.0°C and 6.5°C (Schwartz, 1978).

Historically, *C. mydas* was probably the most abundant species occurring in Texas inshore waters and the species most affected by hypothermic stunning. Fisheries for green sea turtles were centered along the Texas and Florida coasts (Hildebrand, 1982; Ehrhart, 1983). At its peak, the Texas green sea turtle fishery was in excess of 230,000 kg/yr, but fell to virtually nil when the catch of turtles was outlawed in 1963 (Hildebrand, 1982). There is evidence that, in addition to overfishing, the severe freezes of 1894-95 and 1899 played a role in the decline of the Texas sea turtle industry (Hildebrand, 1982).

Hypothermic stunning of sea turtles in Texas inshore waters occurred during severe cold weather in 1971, 1979 and 1983 (Hildebrand, 1982; Texas Sea Turtle Stranding and Salvage Network [STSSN] records). Unfortunately, little systematic effort was made to locate affected animals or document the size classes involved. Seventeen stunned green turtles were found along the mainland shore near Port Isabel in 1971 and two were found floating in shallow water in the southern Laguna Madre in January 1979 (Hildebrand, pers. comm.). Six more stranded turtles were found in Texas inshore waters 18-22 December 1983; one dead head-started Kemp's ridley in the Laguna Madre near Corpus Christi, four live green turtles in the Laguna Madre in the Port Isabel and South Padre Island areas and one live hawksbill in the Aransas Pass Ship Channel (Texas STSSN records).

A more severe and widespread hypothermic stunning event occurred in February 1989. Water temperatures during the winter of 1988-1989 remained mild until 3 February when a severe cold front moved through Texas. Water temperatures in the lower Laguna Madre dropped to as low as 3°C, remained below 10°C until 11 February, and then gradually increased. Stranded live and dead sea turtles were found immediately after the drop in temperature. Citizens discovered the turtles and either reported or brought them to the Texas Parks and Wildlife Department, U.S. National Park Service (Padre Island National Seashore), Sea Turtles Inc. (South Padre Island),

Pan American University Coastal Studies Lab (South Padre Island), Gladys Porter Zoo (Brownsville), the University of Texas at Austin, Marine Sciences Institute (Port Aransas) and the NMFS Southeast Fisheries Center Lab (Galveston). Attempts were made by these organizations to locate stranded turtles by searching areas where stunned turtles were reported.

Each turtle was identified and the exact stranding location, stranding date, condition and final disposition were noted. Straight line carapace length and width and/or curved carapace length and width were measured for most. Dead turtles were either buried, or frozen for later necropsy. Live turtles were brought to rehabilitation facilities (University of Texas, Gladys Porter Zoo, Sea Turtles Inc.), retained in tanks until water temperatures increased, and then tagged and released at the stranding sites.

Forty-six turtles found stranded in Texas inshore waters 6-14 February 1989 were judged to have been cold stunned. Forty-five were green turtles (14 were alive) and one was a loggerhead (dead) found in Laguna Madre near Port Mansfield. One dead green turtle was found in East Lagoon (Galveston area), the remainder in the Laguna Madre (1 near Corpus Christi, 8 in the Land Cut area south of Corpus Christi, 6 in the Port Mansfield area, 30 in the Port Isabel, South Padre Island and Brazos Santiago Pass areas). Since the freeze, a number of undocumented turtles that decomposed at the stranding locations have been reported to National Park Service officials. Likely, these were undetected cold stunned turtles in remote bay areas.

The loggerhead measured 71.0 cm straight line carapace length (SCL). Green turtles ranged from 29.8-65.0 cm SCL (mean=45.1 cm, SD=10.1, n=15) and 24.0-57.0 cm curved carapace length (mean=42.2 cm, SD=9.6, n=19). There was no relation between the length of the turtles and whether they were found dead or alive. However, there was a relation between the date of detection and mortality. That is, 13 (of 32) turtles found 6-9 February were alive whereas only one (of 14) found 10-14 February was alive. Likely, cold stunned turtles that were not located for extended periods of time succumbed due to longer periods of exposure to cold temperatures.

There are several possibilities why more turtles were detected after the 1989 freeze than after cold bouts in 1971, 1979 and 1983:

1. the 1989 decrease in water temperature was much more dramatic,
2. more effort was undertaken to detect and report cold stunned turtles in 1989,
3. more green turtles may have entered the Laguna Madre prior to the 1989 freeze than prior to the other freezes, suggesting natural fluctuations in the abundance of turtles and/or the timing of these movements; finally,
4. the difference may reflect increased population levels in this area.

Attempts should be made to locate cold stunned turtles as soon as water temperatures reach 10°C and below. These turtles may represent substantial proportions of the populations occupying inshore water and can be rehabilitated and ultimately released if detected prior to prolonged exposure to cold water temperatures.

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