

**Serious Injury to Florida Manatees**  
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Florida manatees (*Trichechus manatus latirostris*) are a subtropical subspecies of the West Indian manatee (*Trichechus manatus*). The Florida manatee ranges from the coastal and inshore waters of Florida in the winter months, to the southeastern United States in summer months. The coastal range of the manatee population has led to an inevitable interaction with human activities such as fishing and boating. In Florida, approximately 24% of annual Florida manatee mortality is due to collisions with watercraft (Lightsey *et al.* 2006). While propeller lacerations (sharp-force trauma) are quite often cited as the cause of death of manatees struck by boats, impact injuries (blunt-force trauma) account for more deaths than do propeller injuries. There is a wide range of watercraft injuries sustained by manatees, some of which can be explained by some relatively unique behavioral, anatomical, and morphological features. Watercraft injuries can be separated into three categories based on the physical characteristics of the injury and the inciting structure. Impact injuries are most common, accounting for 58% of all watercraft-related mortality and can be caused by blunt objects such as keels, hulls, and gear casings, or sharper objects such as propellers, rudders, and skegs (Lightsey *et al.*, 2006, Rommel *et al.* 2007). Sequelae of impact injuries typically involve subdermal contusions, muscle/tissue shredding, bone fractures, vertebral separations, and inertial organ tears. The second most common type of injury accounts for 32% of all watercraft-related mortality and involves open propeller lacerations that expose muscle and bone, or open the pleural and/or abdominal cavities to the environment (Lightsey *et al.*, 2006). Common findings from such injuries include lacerated organs and bones, exsanguinations, severed vertebral columns, and partial or complete body transection. Finally, approximately 10% of watercraft related mortality is caused by a combination of blunt- and sharp-force trauma which can present with any number of the afore mentioned sequelae of each respective category (Lightsey *et al.*, 2006). Empirical and anecdotal evidence suggests that certain anatomical and physiological traits possessed by manatees allow them to survive injuries that would be considered fatal to most other mammals. As such, throughout their lives most manatees obtain numerous sublethal injuries that lead to substantial exostoses and bone remodeling as well as other chronic conditions such as pyothorax and abscessation. It is estimated that over 90% of adult Florida manatees have evidence of at least one sublethal interaction with a watercraft (pers. comm. Sentiel Rommel). To date, little is known about the types and sizes of watercraft that injure manatees, or the activity (recreational vs. commercial) the vessels were conducting at the time of collision (Rommel *et al.* 2007). Finally, two other causes of death seen in Florida manatees involve other human activities and include such things as entanglement and floodgate or water control structure deaths. Entanglements seen in manatees usually involve either monofilament or crab pot rope around one or both pectoral flippers, however occasional entanglements with anchor or mooring lines do occur. The most common sequelae of entanglement are either complete or partial amputation of one or both pectoral flippers, with the manatee usually surviving the injury long after

amputation. Some exceptions have occurred where an infectious or septic event was established, however in most cases the flippers appear to necrotize gradually due to ischemic necrosis, thereby allowing the manatee to slowly isolate the flipper and any infections occurring within it. A small number of manatees have been found with rope entanglements around the pectoral flippers and cranial thoracic region. These cases are relatively rare. A small percentage of manatees in Florida are also killed by crushing and/or drowning in floodgates and canal locks found in intercoastal bodies of water such as channels and canals. These types of injuries have only been documented when resulting in fatal interactions and therefore nothing is known about whether sublethal interactions of this type occur. Water control structure-related deaths frequently involve rectangular or symmetrically shaped, often bilateral impressions on the dermis and epidermis, with substantial subdermal contusions, internal hemorrhage, muscle and organ shredding, and occasionally evidence of wet drowning.

#### Citations

Lightsey, J. L., Rommel, S. A., Costidis, A. M., Pitchford, T. D. 2006. *Journal of Zoo and Wildlife Medicine* 37(3): 262–275

Rommel, S. A., Costidis, A. M., Pitchford, T. D., Lightsey, J. L., Snyder, R. D., Haubold, E. M. 2007. *Marine Mammal Science* 23(1): 110–132