

Current Methods for Determining Serious Injury

SOUTHEAST (Lance Garrison)

Nature of interactions

There are several categories of injuries that occur in the Southeast:

- Injuries to small cetaceans caused by hookings or entanglements with longline gear
- Injuries to small cetaceans from interactions with commercial gear, where animal is released alive
- Injuries to small cetaceans from interactions with recreational gear, where animal is either hooked externally or ingests gear, including cases of repeated hookings.
- Entanglements and vessel collisions with right whales, with particular attention to very young calves
- Injuries to small cetaceans from vessel collisions

Cause of Injuries

Longline gear: The Atlantic pelagic longline fishery operates from the Grand Banks off Canada to the Caribbean and the Gulf of Mexico. The majority of interactions with marine mammals occur in the Mid-Atlantic Bight, which extends from New York south to North Carolina. Fishermen report that pilot whales depredate their catch, and observer data indicates that there is a significant positive correlation between interactions with pilot whales and damage to swordfish catch (Draft PLTRP 2006). Similarly, observer data show a positive correlation between interactions with Risso's dolphins and damage to swordfish catch (*Ibid*). There are not enough encounters between longline gear and other marine mammals to determine whether depredation or just chance encounters with the gear are responsible for the interactions, but in general, most marine mammals that interact with longline gear are released alive with varying degrees of injury. Interactions take the form of hookings in the mouth and in other areas of the body, as well as entanglements in fishing line. Entanglements most frequently occur in the mainline, and animals are generally cut free of the gear and not classified as seriously injured on release. Hookings are most often in the mouth and the hook not removed prior to release. Frequently, the gangion or leader line parts off before the animal can be brought near the boat and the animal is released both hooked in the mouth and trailing significant amounts of entangling gear. When an animal becomes hooked or entangled, the crews typically work rapidly to release the animal, as undue struggle has the potential to further harm the animal as well as the crew. Factors that influence whether the gear can be removed include the size of the animal, the location and severity of the hooking/entanglement, the condition of the seas, and the experience of the crew.

Traps/pots: Dolphins generally become entangled in line around the flukes, pectoral fins, or head. Animals may drown or be seriously injured by dragging crab trap/pot gear for extended periods of time. Dolphins are frequently released alive from these entanglements (8 Tursiops in South Carolina alone in the crab trap/pot fishery, with 5 since 2003; McFee et al. 2006). However, the extent of serious injury caused by entanglements have not been assessed. The Atlantic crab trap/pot fishery is one that is included under the Bottlenose Dolphin Take Reduction Plan (BDTRP; 71 FR 24776; April 26, 2006).

Shrimp trawl: Lazy lines on shrimp trawls have caused mortality to bottlenose dolphins throughout the southeast. There are anecdotal accounts of entanglement in which the animal is released alive.

Recreational gear: The range of the coastal stocks of bottlenose dolphins frequently overlaps with recreational activities of people. Illegal feeding of dolphins is prevalent in the southeast. In some areas this is causing behavioral changes of the animals--such as conditioning to people and loss of wariness of people and vessels--which may be contributing to depredation on recreational and commercial gear. Dolphin depredation on bait/catch of recreational gear is increasing, and, in some cases, dolphins are being repeatedly hooked or entangled in gear. Observed and anecdotal reports of depredation show dolphins cleaning the hook of bait or catch or snapping the line. There are also observations of females teaching begging and depredation behaviors to their calves and other animals. Injuries generally include lures/hooks lodged in the mouth or head region, partial or total ingestion of lures/hooks, and monofilament nets entangled around various parts of the body either in combination with hooks/lures or separately. This year, there have been increased dolphin strandings with recreational gear attached, ingested, or entangled, especially in Sarasota Bay and Indian River Lagoon, Florida. In reviewing Florida statewide stranding data from 2001-2006, there were 28 cases of tackle ingestion, 15 entanglements, and 5 cases of hooks or lures in the mouth. In some cases, mortality was a direct result of the interaction. The fates of animals that do not strand dead

with recreational gear attached but sustain multiple hookings or entanglements are not known, nor is the potential impact of chronic injuries from these interactions. (Case study: female *Tursiops truncatus* with calf in Panama City, FL, that was hooked on two separate occasions within 6 months).

Ship strikes: The Southeast U.S. is the only known calving area for northern right whales. There are several major ports in the Southeast (Canaveral, Jacksonville, Brunswick, Fernandina Beach, Savannah, and Charleston) along the right whale migratory pathway to the Northeast U.S. Calves may be particularly vulnerable to ship strikes and entanglements in fishing gear. In 1991, a calf was documented in the Southeast with propeller gashes. In 2005, this same animal was found floating dead off Cumberland Island, the cause of death likely her healed propeller wounds splitting open as her girth expanded with advancing pregnancy. Vessel collisions with small cetaceans does not happen as frequently as with whales. However, when it occurs, it often results in mortality from blunt trauma or severe propeller wounds. There are cases in which small cetaceans--notably bottlenose dolphins--survive boat strikes but sustain injuries and disfigurement to dorsal fins and other body parts. In Sarasota Bay, Wells and Scott (1997) documented four cases of vessel strikes on bottlenose dolphins in which all four animals survived the actual vessel strike. One of the animals struck was a female less than 2 months old. Her wounds consisted of a large gash on the left side of the dorsal fin with trailing yellowish necrotic tissue, which ultimately caused the dorsal fin to curl to the right. She was seen swimming normally alongside her mother with the fresh wounds, but later died at age 4 from a lung infection. It is unknown to what extent her early injuries from the vessel collision may have had on her overall health. Likewise, the effect on long-term survival in similar cases is unknown. (Case studies: mortality of *Stenella coeruleoalba* in Destin, FL; propeller wounds to dorsal fin from *Tursiops truncatus* in the Indian River Lagoon, FL).

Methods of determining serious injury

Serious injury determinations are made based on the guidelines provided in Angliss and DeMaster (1998). For small cetaceans, it was concluded that animals that ingested hooks, were released with significant amounts of trailing fishing gear, were swimming abnormally, or suffered some obvious severe external trauma should be considered seriously injured. Animals that are hooked externally or are released and swim away normally are not considered seriously injured. For large whales, the guidelines indicate that entanglement of young whales in a way that could cause trauma and mortality as the whale grows should be considered a serious injury. However, no further distinction was made in assessing injuries of calves as compared to larger animals.

Serious injury determinations for cetaceans interacting with the longline fishery are made on a case-by-case basis after reviewing the observations, comments, and photographs of fishery observers. These determinations are made and reported annually in technical memoranda that provide estimates of bycatch in the pelagic longline fishery of both marine mammals and sea turtles (Fairfield-Walsh and Garrison 2006). In general, the Northeast Fisheries Science Center makes serious injury determinations for large whales. However, recently the Southeast Region made a cause-of-death determination for an entangled right whale calf in order to facilitate timely management action. This determination was based on necropsy findings, photographs, and other observations. There is no process in place for making serious injury determinations for small cetaceans that have been reported as injured due to vessel collisions or interactions with commercial or recreational gear; these injuries are generally not included in estimates of total human-caused serious injury and mortality in Stock Assessment Reports.

Key issues/questions

Longline gear: The observer may or may not be able to see the nature of the injuries if the animal is released far from the boat or in poor visibility. In addition, the report form that had been used did not prompt consistency in observer comments regarding the nature of the injury or the condition of the animal upon release. Issues include:

- Specific criteria indicating the amount of gear a cetacean would have to trail before it was considered a serious injury was discussed at the previous serious injury workshop, but consensus was not reached.
- The fishery is now required to use circle hooks. More information is needed to determine whether injuries caused by circle hooks are different than those caused by J hooks (specifically the degree to which hooks are ingested).
- There has been a lack of consistency and detail in reporting by observers regarding the nature of the injury as well as the condition of the animal upon release (due to factors discussed above).
- Fishermen may be more able (and motivated) to release animals with a minimum of harm if they receive proper training, but almost no effort in establishing a program has been made.

- Fishermen have also indicated that they would be more motivated to take on the risk of disentangling or dehooking an animal if the animal released without gear was then determined to be only injured (as opposed to seriously injured).

Trap/pot: The ultimate fate of animals released alive from an entanglement is unknown. Questions include:

- How can we assess internal injuries that may have resulted from an entanglement?
- Is the extent of entanglement injuries more serious depending on location of entanglement (e.g., head, pectoral fins, fluke)?
- Do injuries incurred during such entanglements cause the animals to be more susceptible to other stressors?
- Depending on the extent of the injuries, should entanglements in which dolphins are released alive be included in serious injury and mortality estimates under take reduction plans?

Recreational gear: Questions include:

- Must an injury be acute to be serious? What about injuries that have latent impacts on an animal's ability to forage, defend itself against predators, or reproduce?
- What is the fate of small cetaceans released with a hook/lure in their mouth or other body part? With an ingested hook? Could a hook in the mouth lead to death?
- If the hook/lure is shed naturally--i.e., corrodes, gets displaced, or tears out--are there potential longer-term implications of injuries where the hook/lure was lodged? From repeated hookings? From shedding of gear?
- Are calves more susceptible to serious injury than adults from these interactions?

Ship strikes: At the 1997 Serious Injury Workshop, the large whale subgroup noted that serious injury should be assigned to cases of young whales that were entangled in a way that could cause trauma and mortality as the whale grew. However, no further distinction was made in assessing injuries of calves as compared to larger animals. Objective criteria are also needed for making serious injury determinations for vessel-struck small cetaceans, and a process for including serious injuries of vessel-struck small cetaceans in the estimates of human-caused takes needs to be developed. Questions include:

- Should guidelines be different for what constitutes serious injury for smaller animals (including right whale calves) considering the size, behavior, and strength of the animal?
- How do we account for potential longer-term implications and effects on survivability if an animal appears to be behaving normally following vessel strike?

Can we develop serious injury criteria for propeller lacerations?

REFERENCES

Angliss, R.P. and D.P. DeMaster. 1998. Differentiating serious and non-serious injury of marine mammals taken incidental to commercial fishing operations. NOAA Tech. Memo. NMFS-OPR-13, 48 pp.

Draft Pelagic Longline Take Reduction Plan. 2006. Available at <http://www.nmfs.noaa.gov/pr/interactions/trt/pl-trt.htm>

Fairfield-Walsh, C. and L. Garrison. 2006. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2005. NOAA Technical Memorandum NMFS-SEFSC-539. 52 pp.

McFee, W.E., L.G. Burdett, and L.A. Beddia. 2006. A pilot study to determine the movements of buoy line used in the crab pot fishery to assess bottlenose dolphin entanglement. NOAA Technical Memorandum NOS NCCOS 34. 35 pages.

Wells, R.S. and M.D. Scott. 1997. Seasonal incidence of boat strikes on bottlenose dolphins near Sarasota, Florida. Marine Mammal Science 13(3): 475-480.