A Characterization of Bottlenose Dolphin (Tursiops truncatus) Interactions with the Commercial Shrimp Trawl Fishery of South Carolina

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ABSTRACT:
In November 2010, NOAA elevated the Southeast Atlantic shrimp trawl fishery from a “Category III” to a “Category II” fishery making it subject to a more extensive observer program. The purpose of this study was to determine if interactions between bottlenose dolphins (Tursiops truncatus) and commercial shrimp trawlers pose a significant physical threat to the dolphins and if fishery related mortality is underreported. This was accomplished with a combination of stranding record research, on-board observations, and a shrimp fishermen survey. This study utilized historical dolphin stranding data from the South Carolina Marine Mammal Stranding Network (SC MIMSN) to look for signs of shrimp fishery interactions. These include dolphins found with rope marks or gear attached. As well as, suspicious cases in which an apparently healthy dolphin was found dead with undigested shrimp and common bycatch fish in its stomach. Each stranding case was characterized according to the likelihood that mortality resulted from fishery interaction. To supplement the stranding data, the principal investigator conducted a 70 day field study consisting of fishery dependent and fishery independent on-board observations. Consequently, the May 2010 through December 2010 study has encompassed 5 different fishing vessels and gear configurations as well as different locations and fishing strategies. On-board observations focused on direct physical gear interactions and predation behaviors. Additionally, a sub-sample of shrimp fishermen in South Carolina was asked to participate in a survey. The survey included questions related to gear, dolphin observations, and the status of the fishery. Preliminary field results point to a high percentage of dolphin presence around shrimp vessels and a high instance of physical gear interaction. In addition, survey results have provided significant evidence that fishery related mortality is higher than reported.

INTRODUCTION:

Dolphin bycatch in the South Carolina commercial shrimp trawl fishery has only been reported two times to NOAA or the SCDNR since 1992. However, the fishery has had very low observer coverage and NOAA feels that the fishery should be elevated to a “Category II” fishery. This designation implies that the fishery is responsible for mortalities and serious injuries of greater than 1% and less than 50% of the stock’s Potential Biological Removal (PBR) level. In South Carolina that works out to be between 0.2 to 10 dolphins per year. Although trawl fishery interactions have not previously been studied in South Carolina, photo-identification projects, stock condition analyses, and crab pot fishery studies have suggested that interactions with shrimp trawlers in South Carolina are more prevalent than previously estimated (Speakman 2010; Pate 2008; Burdett and McFee 2004).

In addition, the SCDNR research trawler R/V Lady Lisa had 2 incidental dolphins taken during Southeast Area Monitoring and Assessment Program (SEAMAP) scientific sampling in 2006. Including 1 in South Carolina. As a result, NMFS now requires the project to record dolphin abundance and behavior at the beginning and end of each tow.

METHODS:

On-board observations • May 2010 – Dec. 2010 • Surveys made at the start and end of each tow • Noted dolphin abundance and interaction behaviors.
Fishery Independent • 45 Days • SCDNR, R/V Lady Lisa • SEAMAP, Turtle Survey
Fishery Dependent • 25 Days • 4 commercial boats – 2 in Charleston, SC - 1 in Beaufort, SC - 1 in McClellanville, SC
Shrimper Survey • 157 surveys sent to all shrimp fishermen who have maintained a license for at least 5 years. • Questions related to fishing logistics, status of the fishery, and dolphin interactions.
Stranding Record Research • Reviewed South Carolina Marine Mammal Stranding Network (SC MMSN) database. • Compared finfish bycatch data to previous stomach content analyses (Pate 2008).

RESULTS:

On-board observations • 385 tows observed; Dolphins present on 45% • Averaging 1.3 at the start of each tow (Set-Out) and 4.6 at the end (Haul-Back) • 12% of Set-Outs and 44% of Haul-Backs

Physical Interactions
Rubbing on Line • 6% of Haul-Backs • Head, body, and fins • Often multiple dolphins

Biting on Line • 2% of Haul-Backs • Bitten at surface and pulled underwater

Biting on Nets • 25% of Haul-Backs • Picking at fish in the net and biting mesh

Feeding Interactions
Feeding on Discards • 6% of Haul-Backs • Croaker, Mackerel, Flounder, Shrimp

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CONCLUSION:

Responses to survey questions revealed that at least 12 dolphins have been taken in the commercial shrimp trawl fishery. However, only 2 commercial dolphins takes and 1 incidental SCDNR research take have been reported to NOAA or SCDNR in the past 20 years. In addition to these 3 known dolphin mortalities, the stranding data contained 15 cases where trawler related mortality could not be confirmed, but that had characteristics of possible or probable trawl fishery interactions. On-board observations also noted large numbers of dolphins around trawl vessels and a significant occurrence of physical interactions with the fishing gear. These data confirm that dolphins takes in the South Carolina commercial shrimp trawl fishery are underreported and suggests that interactions between bottlenose dolphin and the shrimp trawl fishery are quite frequent. It is possible that under reporting dolphin bycatch is an act of self preservation on the part of the shrimp fishers or as a result of them not knowing the correct reporting procedures. Nevertheless, it is clear that NOAA, SCDNR, and SC MMSN need to increase communication with the fishery on the topics of reporting dolphin takes, the scientific value of each dolphin carcass and the importance of dolphins as sentinel species.

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