

Responses to Marine Shipping Working Group Questions

GK Silber, October 2015

Referencing the paper entitled “Vessel Speed Restrictions reduce the risk of collision-related mortality” (Conn & Silber, 2013),

1. *Do your findings support the premise that reduced speeds reduce the probability of a fatal/mortal ship strike?*

Response: Yes. Although I would say it is more than a premise. The results, consistent with related studies (e.g., Vanderlaan and Taggart, 2007; Laist et al., 2015; others), establish a rather clear relationship between ship speed and the probability of a fatal strikes.

2. *Do your findings support the premise that reduced speeds reduce the probability of any ship strike (fatal or non-fatal)?*

Response: No, the data analyzed are (a) known strikes, when (b) the fate of the animal was known. Other studies have examined the probability of all strikes relative to speed (see response to question 4).

3. *Please advise if the sample size impacts the confidence level associated with the responses to these questions.*

Response: Generally speaking, a greater sample size increases the precision (i.e., reduces the size of the confidence intervals). For this reason, the referenced Conn & Silber paper should, theoretically, have more precision than related analyses (Pace & Silber, 2005; Vanderlaan and Taggart, 2007) that preceded it, because it had roughly twice sample size of the earlier works. These regression lines may have relatively large confidence intervals because there are a number of points (i.e., fatally-struck whales at low vessel speeds) that help shape the curve -- which is what, I suspect, this question is really about. Vessel speeds restrictions will not eliminate fatal strikes, but the evidence strongly suggests they diminish the chances.

4. *Relative to the probability of ship strikes, please explain the impacts of reduced speed (which means the vessel is in a SMA or DMA for longer periods of time), on (1) the probability of any strike and (2) the probability of a fatal/mortal ship strike.*

Response: This reminds me of the question about running versus walking slowly through a downpour. Probably get pretty wet either way. :)

Our model does not address this question. However, a handful of others do – there may be additional studies I am not aware of. One such study is Kite-Powell et al. (2007) which modeled the “chance of an encounter” between right whales and ships, regardless of fate (i.e., death or survival) of the whale, and found that “more than half of right whales located in or swimming into the path of an oncoming ship traveling at 15 knots or more are likely to be struck even when they do take evasive action. The model also suggests that the strike risk posed by a conventional ship moving at 20 to 25 knots can be reduced by 30 percent by slowing to 12 or 13 knots, and by 40 percent at 10 knots.”

Another, Vanderlaan and Taggart (2007) (page 151), concluded that “[a]lthough slow-moving vessels spend more time within the domain than fast-moving vessels, this simple model (Fig. 4) ...serves to illustrate that the encounter probability does not increase with decreasing speed as simply as one might expect.”

A third, although somewhat more tangentially related, study by Gende et al. (2011) who, in a study of humpback whales and cruise ships in Glacier Bay, AK, looked at the relative “exposure to a strike” (these are my words, not theirs) expressed as distance of whales from ships relative to ship speed. They found that “the relationship between whale distance and ship speed changed at 11.8 knots (6.1 m/s) with whales encountering ships, on average, 114 m closer when ship speeds were above 11.8 knots. Binning encounter distances by 1-knot speed increments revealed a clear decrease in encounter distance with increasing ship speed over the range of 7–17 knots.”

Some MSWG members also expressed interest in knowing what conclusions NOAA has drawn from this and other research with respect to these premises. They appreciate and value your opinion, and would also value knowing if NOAA has made any pronouncements on these issues through rulemaking or otherwise.

Response: Pronouncements? Not that I am aware of. I believe this study, and others (e.g., Laist et al, 2015; Lagueux et al., 2011), make a rather strong case that rulemaking that established vessel speed restriction along the U.S. eastern seaboard have sharply diminished the likelihood of fatal strikes of North Atlantic right whales.

References

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