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Re: National Marine Fisheries Service *Proposed Rule to Implement Speed Restrictions to Reduce the Threat of Ship Collisions with North Atlantic Right Whales*: Federal Register 71 (122): 36299-36313

Dear Administrator Dudley,

We offer you and the Office of Information and Regulatory Affairs (OIRA) and the Office of Management and Budget (OMB) some criticism of information provided in a 03 May 2007 letter to OIRA and OMB from the World Shipping Council (WSC) regarding the *Proposed Rule to Implement Speed Restrictions to Reduce the Threat of Ship Collisions with North Atlantic Right Whales* published on 26 June 2006. The WSC letter of 03 May 2007 addresses questions, and in some cases misrepresents, scientific findings used by the United States National Marine Fisheries Service (NMFS) to develop the above cited proposed rule. As authors of an exceedingly relevant and peer-reviewed scientific study (Vanderlaan and Taggart 2007)<sup>1</sup>, referenced by the WSC in their above cited letter, we find it incumbent upon ourselves to challenge the misrepresentations provided to OIRA and OMB so that you and your advisors might become more fully informed of the issues. In particular, we address two major sections (#1 and #3) of the WSC letter (italicised) as follows:

*"1) "To the extent that vessel speed is related to the probability of a whale strike, what evidence there is suggests that lower speeds could actually increase, not decrease, the probability of a strike. (Council Comments at 4-7)"*

The above statement is, in fact, a reference to Figure 4 in Vanderlaan and Taggart (2007) and has validity only at vessel speeds of near 4 to 6 knots or less. These are speeds that are not being considered in the above cited Proposed Rule and thus have no relevance. Further, the change in probability of encounter at speeds decreasing from 24 knots down to 6 knots (as modeled and illustrated in Fig. 4) amounts to approximately 4% for one vessel and increases slightly as the number of vessels increase. Thus, to all intents and purposes the probability that a vessel transiting a given area will encounter a whale is nearly constant when transiting at speeds of between 6 to 24 knots or more. Thus, the WCS comment #1 above is misleading and misguided when interpreted in light of the above cited Proposed Rule.

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<sup>1</sup> Vanderlaan, A.S.M. and C.T. Taggart. 2007. Vessel collisions with whales: the probability of lethal injury based on vessel speed. *Marine Mammal Science*. 23:144-156.  
[http://www.phys.ocean.dal.ca/~taggart/Publications/Vanderlaan\\_Taggart\\_MarMamSci-23\\_2007.pdf](http://www.phys.ocean.dal.ca/~taggart/Publications/Vanderlaan_Taggart_MarMamSci-23_2007.pdf)

"3) There is virtually no evidence to indicate a correlation between vessel speed and the severity of injury in the event of a collision. (Council Comments at 7-9)"

To the contrary; there is ample credible and scientifically based evidence that that the severity of injury to a large whale and the lethality of a vessel strike is very much a function of vessel speed, and particularly so if the vessel is much more massive than a large whale. From a World Shipping Council perspective, most vessels are much more massive (say 10,000 to 100,000 DWT) than a large whale (say 40 tons). Such evidence is clearly shown in Figures 2 and 3 of Vanderlaan and Taggart (2007). Further, the probability of lethal injury is clearly a function of vessel speed when independently and quantitatively assessed using two different methods as in Vanderlaan and Taggart (2007), when quantitatively assessed using yet another method as in Pace and Silber (2005)<sup>2</sup> and yet again when qualitatively assessed as in Laist et al. (2001)<sup>3</sup>. These above cited studies are not only consistent when based on empirical observations, the uncertainties in the estimates are consistently smaller at higher speeds than at lower speeds and they are entirely consistent with expectations drawn from first principles in one dimensional collision physics as illustrated in the Appendix and Supplementary Material provided in Vanderlaan and Taggart (2007). When the vessel is much more massive than the whale (as above), it is only the mass of the large whale (more or less constant in the 30 to 60 ton range) and the speed of the vessel that determines the impact forces involved in the collision and thus the severity of injury to the whale. In lay terms, the situation is not dissimilar to that of vehicle colliding with a song bird. It does not matter that the vehicle is a 600 lb motorcycle, ¼ ton pickup truck, a 10 ton dump truck, a 100 ton train engine or a 1000 ton train. If either of these vehicles collides with the bird at say 5 or 10 miles per hour, the bird may survive (higher uncertainty in all cases). However, if either of these vehicles collides with the bird at say 20 or 30 miles per hour, the bird is very unlikely to survive (lower uncertainty in all cases). The mass of the vehicle does not matter as long as it is much more massive than the bird. It is only the speed of the vehicle that matters and the damage done generally increases as the square of the speed. In summary, there is much compelling evidence that the severity of injury to a large whale (low mass relative to a vessel), in the event of a collision with a large vessel (high mass relative to a whale), is a function of the vessel speed and vessel size (mass) plays a very minor role. It is sound in theory; i.e. well established Newtonian mechanics and collision physics and it is sound in empirical observation. Contrary to the WSC, there is a considerable and meaningful scientific basis to conclude that the chosen action in the above cited Proposed Rule will serve to protect right whales, no matter how large the vessel, particularly if vessel speeds in critical habitat areas for right whales are held to 10 knots or below; i.e. speeds where the probability of lethal injury can be expected to be less than 50%.

We trust that the above information clarifies some issues and is of value to OIRA and OMB and that your good offices will interpret the comments provided by the WSC accordingly. We also suggest that your good offices also consider the fact that although much scientific information and analyses have been brought to bear on this issue by the scientific community, the World Shipping Council, to our knowledge, has provided no credible quantitative data and scientific information or analyses to substantiate their many claims. We urge you to seek advice from accredited statisticians and physicists when addressing these important issues.

Sincerely,



C.T. Taggart

and



A.S.M. Vanderlaan

<sup>2</sup> Pace, R.M. and G. Silber. 2005. Simple analyses of ship and large whale collisions: Does speed kill? Sixteenth Biennial Conference on the Biology of Marine Mammals, San Diego, December 2005. [http://www.nmfs.noaa.gov/pr/pdfs/shinstrike/poster\\_pace-silber.pdf](http://www.nmfs.noaa.gov/pr/pdfs/shinstrike/poster_pace-silber.pdf)

<sup>3</sup> Laist, D. W., A. R. Knowlton, J. G. Mead, A. S. Collet and M. Podesta. 2001. Collisions between ships and whales. *Marine Mammal Science* 17:35-75.