Sent by electronic and regular mail

July 20, 2007

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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;* Fed. Reg. 36299-36313

Note: see http://www.nero.noaa.gov/shipstrike for all references cited in this letter

Dear Administrator Dudley and Chairman Lazear:

I would like to take this opportunity to provide the Office of Management and Budget and the Council of Economic Advisors some detailed feedback on a letter that you received 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 June 26, 2006. The WSC letter of May 3, 2007 was very detailed and questioned much of the scientific work that was used by National Marine Fisheries Service (NMFS) to develop the proposed rule. While their questions and concerns may be valid, some of the interpretations made do not accurately reflect what the scientific literature has stated. Because the WSC comments appear to echo many perceptions found in other industry comment letters, as a right whale scientist for 24 years and the lead author on a couple of the papers that the WSC questions, I am offering clarification of these misinterpretations so that your agencies have a better understanding of this issue.

First and foremost, I want to note that studies of North Atlantic right whales and the impacts they face from human-activities have been ongoing since 1980. This represents one of the longest running studies of a wild animal species in the world, especially a marine animal species. Despite nearly three decades of research on this population, there will always be aspects of their lives and encounters with human activities that may never be fully understood simply because of the limitations posed by studying animals at sea. But this longitudinal study has provided us the chance to collect pieces of information on the negative encounters they face and to evaluate trends over time. This information combined with anecdotal information of vessel strikes from around the world has allowed for as rigorous scientific study as is possible with the data at hand. While we will never know the full story of how, when, and where these impacts occur, the substantial amount of scientific work that has been done should not be dismissed as inadequate. Numerous scientists have addressed the question about the role of vessel speed in the frequency and severity of strikes and all these studies have shown that there is a correlation.

To address the WSC misinterpretations, I have taken each of their four main points in opposing the rule as stated in their letter to OMB of May 3, 2007 along with relevant segments within their attached comments on the Proposed Rule from October 5, 2006 and have provided clarification:

WSC 1st opposition point

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)

WSC specific comments related to 1) above (page 5):
"In a more recent study, *Vanderlaan and Taggert (2006*), the authors, using the same databases as the NMFS, looked at the issues of probability of lethal injury based on vessel speed and the consequence of increased whale exposure to vessels navigating at slow speed. We will look at the first issue later in these comments. As for the second, the study concluded that "…the encounter probability [between ship and whale] increases slowly as speed decreases from 24 knots or greater and then begins to increase more rapidly as vessel speed continues to decrease toward zero." (at page 5)

Knowlton comments:

The *Vanderlaan and Taggart* paper has addressed two main and independent issues as WSC has noted – the encounter probability as a function of speed, discussed below, and the probability of a lethal injury when an encounter does occur, discussed under the 3rd opposition point.

The *Vanderlaan and Taggart* paper does note the encounter probability slowly increases as speed decreases. However, if one looks at Figure 4, a graphic of "The probability of a vessel whale encounter, as a function of vessel speed…" these data are displayed at 2

knot intervals from 0 to 24 knots. It is also shown for one vessel, two vessels and five vessels. In the graphed line with one whale and one vessel, the probability only begins to change dramatically at speeds below around 6 knots. Between 6 knots and 24 knots the probability changes from approximately 20% to 17% chance of encounter, a minimal change in probability of a strike (this similar pattern is seen with two vessel and five vessels but with a relatively higher probability of encounter because of more vessels in a given area). *Thus at speeds over 6 knots, the average probability of a vessel and whale encounter changes relatively little. Therefore at any of the vessel speeds being discussed for the protection of right whales as well as speeds that vessels presently operate, encounter probabilities do not change noticeably.*

In the proposed rule, NMFS is requesting a speed limit of 10 knots, well above the 6 knot speed where the probability of an encounter changes dramatically. WSC has represented these data inappropriately.

WSC 2nd opposition point

2) The data indicates that the threat from vessel strikes associated with military vessels and vessels less than 20 meters in length, both of which are exempt from the proposed rules, is substantially greater than any threat from containerships. There is no basis for adopting an economically burdensome rule that includes only those vessels that are least likely to cause the harm sought to be avoided. (Council Comments at 3, 6-7)

WSC specific comments related to 2) above (page 4):

"In fact, we find no evidence that the speed of liner ships (container and roll-on/roll-off vessels) has ever been a causal factor in a ship strike mortality of a North Atlantic right whale. Further, we cannot find a single, confirmed incident in all of the cited studies where a liner vessel (in excess of 180m in length) has been involved in a confirmed fatal right whale ship strike along the U.S. East Coast."

Knowlton comment:
We have few instances where the vessel involved in the strike of a right whale is actually known – of the three known instances, one was a 43 foot recreational vessel operating at 22 plus knots that caused a severe injury to a right whale and was disabled and thus had to report the incident; the second was an 82 foot Coast Guard cutter that fatally struck a right whale calf when operating at 15 knots; and the third was a 900 foot Navy aircraft carrier that struck and killed a pregnant female when transiting at 21 knots. In the Navy case, the observers saw the whale dive forward of the bow and looked astern and saw blood in the water. They did not feel the strike occur.

However, *Jensen and Silber* (2003) provide detailed information of the vessel types involved in strikes worldwide and discuss the apparent higher prevalence of military strikes. This information is provided below:

"Of the 134 cases of known vessel type, there are 23 reported incidents (17.1%) of Navy vessels hitting whales, 20 reports (14.9%) of ship strike for container/cargo ships/freighters, 19 (14.2%) reports of ship strike for whale-watching vessels, and 17 reports (12.7%) for cruise ships/liners (Figure 5). Sixteen reports of ship strike (11.9%) are attributed to ferries. Nine cases of ship strike (6.7%) are reported for Coast Guard vessels and eight cases (6.0%) for tankers. Recreational vessels and steamships were each responsible for seven collisions (5.2%) in the database, while fishing vessels were responsible for four records (3.0%) of strike. One collision (0.75 %) was reported from each of the following: dredge boat, research vessel, pilot boat, and whaling catcher boat. Although these data provide valuable information regarding the wide range of vessels involved in collisions, care should be taken in interpreting these numbers. *As noted earlier, captains of large ships, such as container ships, tankers, and cruise ships may not be aware that a collision with a whale has occurred and thus do not report the incident.* [italics and underline added] It is also likely that captains of ships of all sizes who are under no obligation to report, in fact, do not, out of apathy or fear of enforcement consequences.

"It should be carefully noted that the relatively high incidence of Navy and Coast Guard collision reports may be largely a factor of standardized military and government reporting practice rather than an actual higher frequency of collisions relative to other ship types. These two federal agencies are actively involved in large whale protection programs and reporting struck or dead whales to the National Marine Fisheries Service is now a part of standard operating practices." (*Jensen and Silber*, page 6)

As the *Jensen and Silber* data show, container/cargo ships/freighters represent the second highest vessel type involved in strikes (20 reports – 14.9% of total). Navy vessels represent the highest number at 23 reports, 17.1%. But again, the Navy is required by an internal directive to report these strikes. *Thus, in reality, considering the high volume of commercial shipping worldwide and along the eastern seaboard, the container/cargo ships/freighters strikes could well exceed the number of Navy strikes if all such strikes were felt by the crew and also reported.*

It should be remembered that for the majority of vessel strikes of whales that occur along the eastern seaboard, the vessel involved is not known. All that is found are whales with propeller cuts from various size propellers and broken bones and internal hemorrhaging from vessels of unknown size. All sizes of vessels strike whales but the lethality and severity of such strikes has been shown to increase as vessel size increases (see Laist et al. 2001).

NMFS has done a thorough job of keeping track of serious injury and mortality events as noted in their recently published report Mortality and Serious Injury Determinations for Baleen Whale Stocks along the United States Eastern Seaboard and Adjacent Canadian Maritimes, 2001-2005 (February 2007). From 2001-2005, NMFS verified 292 large whale mortalities and determined that 26 were due to entanglements and 27 were the result of ship strikes. The cause of death could not be determined for 223 (76%) of the carcasses (NMFS 2007, page 3).

Two things are notable in this summary – first lethal ship strikes are not infrequent amongst large whales – 27 documented over a five-year period, yet the vessel involved in these 27 strikes is not known for the vast majority of them. Even more importantly, cause of death could not be determined for 76% of the mortalities (223 animals). This is because animals floating at sea (unless they are right whales) are typically not retrieved for a necropsy. Some number of these animals would have died from a vessel strike based on the evidence of such encounters from animals that were able to be necropsied. A review of right whale mortalities actually elucidates this possibility clearly. Because of the severely endangered status of right whales, NMFS has provided funding to retrieve and necropsy all right whale carcasses when feasible. From 2001 to the present, a total of 31 right whale carcasses have been documented. Fourteen of these carcasses were actively towed to shore, 10 were found on the beach, and seven were unable to be retrieved. Most notably, of the 14 carcasses retrieved, nine (64%) were determined to have died as the result of ship strike. If we applied this percentage to the large whale carcasses that were not retrieved (223 animals), there may have been as many as 142 large whales that died as the result of a vessel strike in that five-year timeframe.

The proposed rule must be finalized because the critically small right whale population simply cannot be sustained with this level of mortality making species recovery impossible and extinction likely. Yet, WSC has opted to come to the conclusion that because a liner ship has never been documented to strike a right whale or any large whale along the eastern seaboard, they are therefore not part of the problem. *But WSC refuses to acknowledge the fact that we do not know exactly when, where, and with what vessel type most vessel/whale strikes occur along the eastern seaboard. They simply ignore the data of numerous documented vessel strike mortalities plus the large number of carcasses of large whales (including right whales) where cause of death could not be determined.*

For WSC to assume that liner vessels are somehow immune to striking right whales is misleading and a disservice to the industry they represent.

WSC 3rd opposition point

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)

Specific WSC comments (page 8)

"That said, the NPRM does make reference to *Vanderlaan and Taggart (2006),* which we understand has been accepted for publication after the date of the NPRM. According to the NPRM, that study states a range of probable mortality at three different speeds: 9 knots, 15 knots, and 21 knots. None of those speeds, however, is a speed that has been proposed as a maximum speed for covered areas. Moreover, that study ends with the observation that: 'In summary, and acknowledging the uncertainties, our analyses provide compelling evidence that as vessel speed falls below 15 knots there is a substantial decrease in the probability that a vessel striking a large whale will prove

lethal.' *Vanderlaan and Taggart* (at page 6). Accordingly, to the extent that NMFS decides to adopt a speed restriction, this report would seem to indicate that 15 knots would be a more defensible figure.

WSC comments (page 9)

"Second, as the admitted need for additional hydrodynamic testing indicates, it is entirely possible that the optimum speed for avoiding whale injury is not necessarily the slowest navigationally feasible speed. Just as vessels passing one another in opposite directions in close quarters rely on and compensate for bow waves that push the vessels apart, so it may be that whales within a certain quadrant in front of an oncoming vessel could be pushed away from a vessel at one speed, but drawn toward it at a lower speed."

Knowlton comments

Several studies have been done to evaluate the role of speed in the severity of a collision. All three of these studies (Vanderlaan and Taggart 2006; Pace and Silber 2005; and Laist et al. 2001) using different analytical approaches have reached the same conclusion that vessel speed plays a role in the level of severity of a strike. Two of these three studies have been peer-reviewed.

The first paragraph of the *Vanderlaan and Taggart* results state the following:

"Speed and injury are not independent (6 df, $P = 0.014$) when vessel speed is categorized across three 8-knot speed intervals: low ($0 \leq$ knots ≤ 8), moderate ($8 <$ knots ≤ 16), and high (>16 knots); that is, as speed increases the severity of injury increases. The same test based on four-speed classes incrementing at six knots and three-speed classes incrementing at 10 knots, and assessed against the four severities of- injury, leads to the same conclusion (9 df, $P = 0.0007$ and 6 df, $P = 0.0001$, respectively)." And again, as noted above, "[a]cross this speed range, the chances of a lethal injury decline from approximately 80% at 15 knots to approximately 20% at 8.6 knots." See figure 3 in this paper for a visual depiction of this change. NMFS has rightfully determined that an 80% chance of a lethal encounter at 15 knots is not acceptable. By choosing 10 knots, they have reduced the chance of an encounter being lethal to well below 50%.

On the second point regarding hydrodynamic forces, WSC clearly does not understand the findings of that work. The basic finding notes that if a whale is "passive" in front of an oncoming vessel and makes no attempt to move, the forces that will influence it will have the same end result independent of speed. So for example, if the whale is passive and in the path of the ship, the bow force may push it away from the bow but as the ship passes by it will get drawn in towards the ship. Whether it gets struck by the ship or not is simply a function of the size of the ship and how close to the centerline the whale is, not how fast the ship is going if the whale is passive. If the whale "appears" near the ship after the positive sway force (bow force) that would push it away from the bow has passed, for example, a whale coming to the surface after a deep dive, the whale can get drawn into the ship and towards the propeller. *The ability of the whale to avoid getting*

drawn into the ship will be influenced by the ship's speed – the faster the ship is going, the stronger the forces are drawing the whale into the ship. Three of the summary finding in the *Knowlton et al* (1998) report titled The Hydrodynamic Effects of Large Vessels on Right Whales: Phase Two are:

- A passive whale is not in increased danger from a passing ship from hydrodynamic forces.
- A whale which "appears" after the initial positive sway force from the ship has passed can be drawn into a ship even if it is outside of the beam of certain ships and is in increased danger from a ship in these situations.
- If the whale is trying to escape the approaching ship, reduced speed will increase its ability to avoid collision.

*In **none** of the simulations was there a situation where a slower moving ship increased the risk of collision*. A slower moving ship has lower hydrodynamic forces and is thus safer for a whale trying to take avoidance action. WSC has clearly misunderstood the findings of these hydrodynamic studies and has made some inaccurate assumptions about speed and hydrodynamic forces.

NMFS, as the agency responsible for mitigating right whale mortality by law, has taken the appropriate approach in using the 10- knot speed limit. This speed limit considers aspects of economic impacts, safe navigation, and benefit to right whales in a fair and well-researched manner. To use a 15- knot speed limit as WSC suggests would simply not provide the adequate protection to the whales that a more restrictive speed would provide.

WSC 4th opposition point

With respect to the geographic scope of the rule (30 nautical mile radius of the entrance to mid-Atlantic ports), NMFS and the Navy previously determined during the Endangered Species Act consultation process that 20 nautical miles was an appropriate radius for any operational restrictions. (Council Comments at 12-13)

WSC specific comments

A generous conclusion is that there were six right whale ship strike mortalities in 33 years or one every 5.5 years in the mid-Atlantic migration path. (There was one additional reported mid-Atlantic strike in 2005 by a naval vessel). A more realistic assessment is that of these six, none was attributed to a large ship and all were likely killed near the coastline. There is absolutely no basis here for regulating large commercial vessels within 30 nm of the mid-Atlantic coast.

"For the remainder of the range," [NPRM mid-Atlantic range] "the overwhelming majority of the sightings are within 15-20 nm of shore." (Knowlton *et al*. 2002)

Knowlton comments

The data for the number of strikes that have occurred in the mid Atlantic region now totals eight animals from 1979 to the present. Four of these eight strikes have occurred since 2001 (i.e one every 1.5 years). Again the vessel involved in these eight strikes was only known on one occasion and it was a 900-foot Navy aircraft carrier. The assessment of vessel size for the remainder has not been conclusive as some animals suffered blunt trauma and broken bones and others had propeller cuts or severed tails. An effort to understand the propeller dimensions (and possibly vessel size) associated with cuts observed on whales has been initiated for some animals but the technique is in the process of being carefully peer-reviewed. In addition to the pregnant female whose flukes were severed by the 900-foot Navy vessel propeller, two others in the mid Atlantic region had severed flukes from a large diameter propeller suggesting that it most likely was large vessels that struck these whales. It is not clear how WSC has come to their assessment that all the strikes were caused by smaller vessels.

As for the distance from shore at which the strike occurred, this is only known for the Navy ship and this occurred at 10 nm from the coast and 15 nm from the port entrance at Chesapeake Bay. For the remainder, the carcasses often are found many days after the strike occurred and thus the location of the strike is not typically known and could be miles away from where a given carcass is found.

The 30 nautical mile (nm) distance at which NMFS has chosen to regulate to is based on an analysis of existing data by Knowlton et al. (2002). As noted in this report, the survey and sightings data are sparse and the authors note their concern about a potential near-shore bias of the data because most opportunistic sightings are likely from boat operators that work in near-shore waters. To address this concern, the authors did look at the available data from satellite tagged animals and showed that *80.8% of the tagged whale sightings were within 30 nm of the coast but only 53.8% were within 20 nm of the coast*.

NMFS has chosen this 30 nm buffer around port entrances (rather than along the entire coastline) in order to provide the strongest protection possible to migrating right whales, including pregnant females heading south and females with newborn calves heading north while also considering the negative economic impact of imposing a speed restriction all along the coastline. Despite the scarcity of the data, it is well known how many animals are seen in the calving grounds off the southeast U.S. each winter and these animals all migrate along the mid Atlantic coast to and from these calving grounds. In some years, this number well exceeds 100 individual right whales.

Summary

In summary, for all four points that the World Shipping Council has highlighted as their main concerns, they have consistently misinterpreted the data that exist in order to strengthen their argument to exclude liner shipping from this proposed rule or diminish the effectiveness of the rule. Although there are many more details within their comments

letter that are not accurate, I have opted to stay focused on their four main points of opposition. I would hope that OMB and CEA recognize the fact that WSC has purposely highlighted only certain elements of the data to benefit their agenda without any appropriate review of the science and statistics. The clarifications I have offered above show that the science is more than adequate to support this proposed rule and move it forward to a final rule. Time is of the essence for the recovery of North Atlantic right whales and to prolong this process indefinitely will simply lead to more needless vessel/whale strikes in a population struggling to survive. The United States can be a world leader in whale conservation by taking this strong and unprecedented step to protect the North Atlantic right whale throughout their range.

Please do not hesitate to call me if you need further clarification but I believe the data speaks for itself.

Sincerely,

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cc: William Hogarth, National Marine Fisheries Service
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