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CURRENT ISSUES FACING NORTH ATLANTIC RIGHT WHALES AND STAKEHOLDERS

DR. MICHAEL J. MOORE*

Abstract: At the beginning of the Symposium sessions at the Massachusetts Institute of Technology and at Boston College Law School, Dr. Michael Moore provided a narrative and photographic introduction to current threats to whale survival, with particular reference to North Atlantic waters off the eastern coast of the United States and the most endangered whale species, the North Atlantic right whale, *Eubalaena glacialis*. The conditions experienced by North Atlantic right whales reflect conditions faced by all the great whales of the North Atlantic. Given the 1935 absolute moratorium on hunting right whales in any waters, there are three major areas of current concern for whale conservation and survival noted in Dr. Moore’s presentation and addressed in legal terms by subsequent contributors to the Symposium: (1) entanglement in commercial fishing gear; (2) vessel strikes; and (3) ambient and episodic marine noise. Each of these is generated by human activities on the oceans.

Introduction

At the beginning of the Symposium sessions at the Massachusetts Institute of Technology and at Boston College Law School, Dr. Michael Moore provided a useful and illuminating narrative and photographic introduction to current threats to whale survival, with particular reference to North Atlantic waters off the eastern coast of the United States and the most endangered whale species, the North Atlantic right whale, *Eubalaena glacialis*. The conditions experienced by North Atlantic right whales reflect conditions faced by all the great whales of the North Atlantic. Elements of Dr. Moore’s oral presentation are condensed and

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presented here in summary form as a backdrop to the legal and policy contributions that follow. Dr. Moore noted several published research and reference works that would be useful to legal scholars seeking further grounding in this area.1

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Right whales have been a matter of commercial interest for at least a thousand years, since King Sancho the Wise, a Basque provincial king who granted privileges in 1150 to certain persons to take whales, imposed a duty on whalebone.2 Subsequently, there occurred a millennium of human-right whale interaction. For most of those years, the interaction was a matter of harvest—taking whales for their baleen and oil. Now, however, the interaction is primarily incidental to other commercial enterprises and raises serious regulatory and mitigation questions, walking a tightrope of tensions between commerce and conservation.

One of the first groups seriously concerned about whale conservation, at least on paper, were planners for what became the Discovery Investigations based at South Georgia Island in the South Atlantic at the beginning of the Antarctic whaling era in the 1920s.3 Their con-

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2 See generally Clement R. Markham, On the Whale Fishery of the Basque Provinces of Spain, 25 NATURE 365 (1882).

cern was focused on conserving the whale-hunting industry itself rather than the whales per se, but they produced a series of careful studies published in the Discovery Reports series covering the years from 1920 to 1980 that conveyed a great deal of information about Southern Ocean whales, their distribution, and ecology.

North Atlantic right whales have had a long history of whale-hunting pressure. They were desirable prey to hunt because they are large, containing a great deal of oil, and easy to kill, because they are relatively slow and more buoyant than other species, and so tend to spend a great deal of time at or near the surface. The whale hunting began with shore-based whaling with spears, then moved to offshore, and ultimately motorized and highly mechanized, whaling. The North Atlantic right whale was essentially commercially extinct by the 1700s, so low in numbers that it wasn’t a significant part of nineteenth century Yankee whaling as a major profit line, although whalers still killed them opportunistically until the total ban of 1935.4

The relict population of North Atlantic right whales is mostly found along the eastern coast of the United States and the Canadian Maritimes. Pregnant whales migrate south each winter to Georgia and Florida to calve, returning to Cape Cod Bay to feed in early spring. They then move to the Great South Channel off Nantucket and then to Canada off Nova Scotia for the summer. Some non-calving animals winter in more northern latitudes. There are only about 350 of these animals left. As a result of the whales’ distinctive individual markings, a large collection of sightings, other research reports, and photographs compiled by the New England Aquarium from their own research crews and from other institutions around New England and the eastern seaboard, we probably know this whale population in terms of the number of animals within the species better than any other species of mammal in the world.5 We know the majority of them individually and have sighting records that cover many individuals for the majority of their lives. We know an animal’s gender, we often know both parents, its grandparents, offspring, whether it has been calving, whether it has been entangled, how many times it has been entangled, whether it has been hit by a ship or a propeller, and more. Accumulating this unique

5 Philip K. Hamilton et al., Right Whales Tell Their Own Stories: The Photo-Identification Catalog, in The Urban Whale, supra note 1, at 75.
amount of individual-based monitoring has allowed modeling of trajectories for the whole population.\(^6\)

The North Atlantic right whale has low reproductive and population growth rates.\(^7\) Despite the identification catalog, it is actually very difficult to make categorical statements about trends in North Atlantic right whale demographics. About four percent of them die annually, and they average an annual five percent recruitment (birth) rate. That means the population is not growing much, if at all.\(^8\) In comparison, the Southern right whale (\textit{Eubalaena australis}) population in the Southern Ocean is estimated to number over 10,000 animals and enjoys a seven percent net increase each year.\(^9\) The fundamental difference in survival rates appears to lie with the difference in the degree of interaction between humans and whales in the two hemispheres. The Southern Hemisphere has a higher ratio of ocean to land mass compared to its northern counterpart; it also has far less industrial activity, fishing gear, noise, and shipping. A Southern right whale population that calves in Argentina can withstand losing sixty or seventy calves in a year because there are so many of them, whereas a good calving year for the North Atlantic right whale population is thirty calves in all.

We have learned a great deal by intensive study of the carcasses of dead whales for the past thirty-five years.\(^10\) In the twenty-year period from 1986 to 2005, there have been fifty recorded deaths, the majority from unnatural human-generated causes: nineteen from vessel collisions and twelve estimated from fatal entanglements. Additionally, during that period eight animals that remained entangled survived.\(^11\)

In \textit{North Atlantic Right Whales in Crisis}, we noted the serious effects of commercial fishing gear entanglements on these whales, not just in terms of conservation and sustainability of the population’s numbers, but also in terms of welfare considerations for whales (the issue of physical suffering).\(^12\) In contrast to smaller mammals that lack the mass

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\(^7\) See generally Scott D. Kraus et al., \textit{Reproductive Parameters of the North Atlantic Right Whale}, 2 \textit{J. CETACEAN RES. & MGMT. (SPECIAL ISSUE)} 231 (2001).

\(^8\) See sources cited supra note 6.


\(^10\) See generally Morphometry, \textit{supra} note 1.

\(^11\) See generally Amy R. Knowlton & Scott D. Kraus, \textit{Mortality and Serious Injury of Northern Right Whales (Eubalaena glacialis) in the Western North Atlantic Ocean}, 2 \textit{J. CETACEAN RES. & MGMT. (SPECIAL ISSUE)} 193 (2001); Scott D. Kraus et al., \textit{supra} note 1.

\(^12\) See generally Kraus et al., \textit{supra} note 1.
and power to break free from serious entanglements, right whales can often break away from being anchored in fishing gear. When this happens they are not necessarily rope-free. The entangling ropes remain on the animals and there is the risk of a constriction problem. Significant constriction entails a poor prognosis although entanglement often takes months to result in a fatality.13

Entanglement produces some disturbing cases. From necropsies one can see bones of whales’ flippers notched by entangling ropes or multiple sites of entanglement in a single animal, as in a recent case of a whale that came ashore dead in Virginia, first sighted entangled in Canadian waters. The fishing-gear rope was wrapped many times through the baleen in the mouth, over the blow hole, partially occluding one nostril, as well as around the left flipper, eliciting a massive bony reaction as the rope cut down to the flipper bones. It took five months for that whale to die. The origin of the rope was unknown. Ropes often cut deeply into entangled whales’ tissues. Attempts have recently been made to model how a rope cuts into a whale.14 If a rope is merely flexing back and forth with an appendage, without slipping over the skin, it doesn’t cut in, but as soon as a tightened rope begins to slide on an entangled body part, then the “cheese-wire effect” begins to saw into and through the body part.

In chronic, long-duration entanglements, the entangled whale loses weight due to lack of feeding. They lose their normal blubber condition, so therefore are no longer positively buoyant, and sink when dead. In contrast to vessel strikes, which can kill animals in seconds or minutes like an explosive harpoon, entanglements kill over weeks and months. Fixed fishing-gear entanglements thus represent, in addition to the sustainable conservation considerations, a very serious animal welfare concern for a form of impact that is uniquely painful in the prolonged suffering it causes.

In the context of national policy, the entanglement problem presents a classic conflict between the cultural and socioeconomic value of commercial fisheries versus the risk of species extinction and significant animal welfare concerns.15

In terms of entanglement mitigation measures, there are two major avenues for improvement—improvements to commercial fishing gear to prevent entanglements, and efforts at lessening the amount of

13 See generally Moore et al., Entangled Right Whales, supra note 1.
15 See generally Moore et al., Entangled Right Whales, supra note 1.
gear in the water through more efficient gear deployment practices. A recent equipment-based effort has been introduced by government agencies, including weak links to break fishermen’s buoys off the ropes linked to the entangling gear. A fundamental flaw of this approach is that the break-away linkage is located at the point where the buoy and rope are connected, but very often the buoy is not involved in the actual entanglement; instead, it merely drags along behind. Seasonal and dynamic area management efforts are also in effect, limiting the time and placement of gear in order to limit the exposure of whales to gear. Massachusetts took the initiative in attempting to limit line in the water column by making it negatively buoyant, but this measure only addresses line between traps. The problem of line from the trap to the surface buoy remains.

One of the major shortcomings of governmental mitigation efforts is that they have been undertaken without adequate attempts to scientifically model proposed changes in the laboratory and in the field before imposing potentially ineffective rules and substantial costs upon the fishing industry. There is a need for better prior evaluations of efficacy before industry is forced to suffer substantial costs. Because severe entanglements continue to occur routinely, the fishery industry in particular becomes more and more resistant to further regulatory changes because they have seen the cost and inadequacies of previous government rules.

Other responses to the entanglement problem may have more impact, including reductions of effort. A recent paper compared the catch by U.S. lobstermen in the Gulf of Maine, west of the Hague line, with the Canadian catch off western Nova Scotia. The Canadians severely limit effort and volume of fishing gear in the water. There are very different amounts of effort, but ultimately a very similar total catch. This supports the concept that perhaps fishermen need not have so much effort and gear in the water in order to actually make a better profit. Similar recent reports come from Maine’s Monhegan Island, where there is local management of the lobster fishery. By cutting back on the season and the number of traps, they hope to reduce their fuel and bait costs and actually improve net economic returns, while reducing the risk of fixed gear damage to whales.

16 See generally Myers et al., supra note 1.
The same dichotomy between commercial interests and species protection is presented by other threats to whales in coastal waters. The problem of vessel strikes is simpler in some ways than entanglement. There are two forms of vessel strike: sharp trauma, where animals at or near the surface are sliced by propeller blades, and blunt trauma, where a ship’s bow or other blunt structure such as the keel hits a whale’s skull or shatters its vertebra.\(^\text{18}\)

In terms of mitigation efforts for vessel strikes, the most successful approach in the past decade has been mariner education. Nautical charts, for example, now contain information on right whale avoidance areas, how to recognize a right whale, and the like. There have been shipping lane adjustments in the Bay of Fundy area and Massachusetts Bay, subtly changing the vessel passage lanes on the basis of whale sighting data. In mid-October 2008 the National Oceanic and Atmospheric Administration issued operational measures for a North Atlantic right whale ship-strike reduction strategy, including reducing seasonal speed limits to ten knots in significant potential conflict areas, which is a significant improvement.\(^\text{19}\) In attempts to keep ships and whales separate, other experimental efforts have shown promising results. In these experiments, automatic ship location identification systems (automatic transponders) have been linked to receiving stations in cell towers in that region to determine which ships are avoiding designated conflict areas and which are not.\(^\text{20}\) It is planned for ship operators to receive a polite letter indicating that the ships have not avoided the conflict areas and suggesting that they do so.\(^\text{21}\)

In addition to fixed fishing gear and ship-collision impacts, harm from episodic noise and the masking of normal whale acoustic communication by persistent ambient background noise from sources such as ships and mobile fishing gear appear to pose a significant—yet not


\(^{19}\) See generally Angelia S. M. Vanderlaan & Christopher T. Taggart, Vessel Collisions with Whales: The Probability of Lethal Injury Based on Vessel Speed, 23 Marine Mammal Sci. 144 (2007).

\(^{20}\) See generally Angelia S.M. Vanderlaan & Christopher T. Taggart, Ships Voluntarily Alter Course to Protect Endangered Whales (Mar. 13, 2009) (unpublished manuscript, on file with author).

\(^{21}\) E-mail from Moira Brown, Senior Scientist, Canadian Whale Institute, to author (Feb. 18, 2009, 05:58:00 EST) (on file with author).
well-understood—systemic concern regarding acoustic exposures.\textsuperscript{22} We also worry about sonar and seismic exposures. \textit{The Urban Whale} addresses noise exposure, and indicates that the hearing frequency range for right whales is directly impacted by the frequencies of ships’ sonar, airguns, and bottom-profiler acoustic mechanisms, presenting substantial issues that relate to the effects upon hearing for right and other whales.\textsuperscript{23}

There are other issues that need to be considered as well, notably habitat quality. Reproductive success and body condition are tightly tied in with ecosystem productivity, particularly in terms of food quantity and quality.\textsuperscript{24} The issue of toxic contaminants is significant,\textsuperscript{25} as is vulnerability to infectious diseases. Sixty-five percent of right whales are currently shedding \textit{Giardia}, although we do not know whether that is problematic.\textsuperscript{26} In addition, there is the genetic question of inbreeding: the fact that the most endangered species of whales exists in such a small remnant population poses long-term survival concerns.\textsuperscript{27}

In summary, fixed fishing-gear entanglements and vessel contacts are serious causes of injury and death for endangered whales. Some mitigation measures have been set in motion, but more and better measures could be implemented. In terms of values, the question of extinction and avoidance of prolonged suffering to animals is counterpoised against consumer satisfaction and societal nutrition. This Symposium addresses the need to balance human behavior and resource consumption with a sustainable and humane global ecology. Those are the kinds of costs and benefits we need to balance. It is perhaps worth adding that the silver lining to the current global economic depression


\textsuperscript{23} Susan E. Parks & Christopher W. Clark, \textit{Acoustic Communication: Social Sounds and the Potential Impacts of Noise, in The Urban Whale}, supra note 1, at 310.


\textsuperscript{26} See generally J.M. Hughes-Hanks et al., \textit{Prevalence of Cryptosporidium spp. and Giardia spp. in Five Marine Mammal Species}, 91 \textit{J. Parasitology} 1225 (2005).

is that consumption of raw and manufactured resources has taken a substantial downturn. One knock on effect of this is reduced ship traffic and less demand for seafood. For right whale species survival and welfare this is not a bad thing. While the human race grapples with the current economic crisis, it is critical that we radically rethink what it takes for a peaceful, equitable, and sustainable human footprint on the global ecosystem.