Case Study of a Human-Wildlife Conflict

Human Activity in Canadian and US Coastal Waters Endangering North Atlantic Right Whales

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Introduction

This paper will examine the ongoing conflict between humans and the North Atlantic right whale (NARW). Although the impact of human whaling and ocean use on whale populations is well known and international conventions have been established to limit whaling, the NARW is still at risk due to human activity. This case study will examine the background and history leading to this current conflict, the human activities currently endangering the whales, the human factors that are driving this situation and possible ways to identify and develop solutions.

Background.

North Atlantic right whales once inhabited ranges in the coastal waters of both sides of the Atlantic. Two separate populations lived along the coasts of North America and Europe, following seasonal migration paths from north to south (Laith 2017). Although once abundant, they are now the rarest of the great whales; the western population is now calculated to be only 450 individuals, and the eastern population is believed to consist of a few individuals and may be functionally extinct (NOAA, 2012). After being driven to the brink of extinction by centuries of hunting and harvesting, northern right whales were placed under international protection early in the 20th century. Estimated of their population at the turn of the century vary from 50 to 100 individuals (Laith 2017; NOAA, 2012), and although the eastern population has not been saved the western population has expanded since that time. Although no longer being hunted, the NARW is now facing new threats and the species' mortality rate currently exceeds its reproductive rate. At its current rate of decline, the entire population of NARW could be functionally extinct within 20 years (Pennisi, 2017)

History / Chronology

The story of NARW endangerment begins in the early 16th Century, when Basque whalers established themselves on the Labrador Peninsula and began harvesting bowhead and right whales. The Basque whaling industry peaked in the 1560s and 1570's, and then declined when the region's whale stocks were diminished (Loewen, 2009). Commercial whaling in the Atlantic continued through the 17th through the mid-19th centuries, when technology advances drove down the demand for whale oil and baleen, and the scarcity of most whale species made the industry unprofitable (Laith 2017).

The human world was slow to recognize and react to the decimation of cetacean populations world-wide and the North Atlantic in particular. The first steps in controlling the harvesting of whales were taken in 1931 with the signing of The Convention for the Regulation of Whaling. This treaty called on all signatories to ban the hunting of right whales, and banned the killing of whale calves, immature whales and female whales with calves, of all whale species (Convention for the Regulation of Whaling, 1931). It was replaced in 1946 by the International Convention for the Regulation of Whaling, which was intended to protect whale species from overhunting, but allowed harvesting of whales for food and scientific research (International Convention for the Regulation of Whaling, 1946).

Beyond the regulation of whaling, there have been no significant international efforts to conserve whale populations. However, both the Canadian and United States (US) governments have taken action to protect whale populations from human-caused dangers. The US government first addressed whale endangerment with the Marine Mammal Protection Act of 1972 and with the signing of the Endangered Species Act in 1973. In the 1990s, the US government identified critical habitats for right whales, established aerial surveys to warn ships of the presence of NARW and created the Atlantic Large Whale Take Reduction Plan to reduce

whale injuries and deaths due to entanglement of fishing gear. In 2005, the North Atlantic Right Whale Recovery Plan was enacted, which provided a detailed assessment of the dangers posed by human activity, a whale monitoring plan, and additional steps to reduce whale mortality. The Canadian government began responding to the endangerment of NARW in the 1990s, with the establishment of conservation areas. The NARW was added to the Species at Risk Act in 2001, and the Recovery Strategy for the North Atlantic Right Whale in Atlantic Canadian Waters was published in 2009 (Stewardship Measures, n.d.).

These laws and regulations provided some measure of protection for the western NARW population, whose numbers slowly grew to approximately 500. However, in the past several years, these whales have experienced sharply increased mortality rates due to human activity in Canadian and US waters.

Key Issues

Unlike other protected species, such as manatees or American bison, the population of right whales has not rebounded to a significant extent. Over the past century their population has risen only to a current level of 450 individuals. In recent years, human-caused deaths have exceeded the number of right whales being born. In fact, in the past year there were no recorded births, and 18 known deaths. In addition to the increased of human-caused deaths, studies have shown that the causes for these deaths is shifting. Prior to 2009, the majority of NARW deaths were caused by ship strikes, but since then the vast majority of deaths are due to entanglement in fishing gear (Kraus, Kenney, Mayo, McLellan, Moore and Nowacek, 2016). At present, female NARW are being killed at a faster rate than males. Only 100 reproducing females are presently known to exist; they become sexually mature at age 9, calve only once every 3 to 4 years and have a gestation period of 12 to 13 months (Allen, 2014). At present, the majority of female

NARWs are killed before they reach 30, and their reproduction rate has slowed to once every 9 years (Cramer, 2017); in fact, no new calves were observed in the 2017-2018 calving season (Gibbens, 2018).

NARWs migrate seasonally along the North American coast. Females and young calves spend winters in the waters off Georgia and the Carolinas during calving season, then return to the summer habitat in the Canadian Maritime region, including the Bay of Fundy and the Gulf of St. Lawrence. This migration takes them through crowded shipping lanes, making them vulnerable to ship strikes (Gowan and Ortega-Ortiz, 2014). The situation is exacerbated by climate change. The whales' food sources are shifting from their accustomed regions to new areas, as ocean temperature, acidity and salinity levels are changing. As a result, the whales are now leaving their traditional habitats and venturing into areas in which protective measures have not been enacted and monitoring is not being conducted (Cohen, 2017).

Stakeholders

The party with the greatest concern in this conflict is, of course, the NARW themselves. The survival of their species is at stake, and they are already stressed to the point that their reproductive cycles are threatened (Feces from entangled North Atlantic right whales, 2017). Their human-caused mortality rate, particularly that of breeding females, places them at extreme risk. Their cause is actively supported by conservation groups in both the US and Canada.

The fishing industries of the US and Canada are another major stakeholder. The whales' territories and migration routes are some of the most productive commercial fishing grounds in the world. Commercial fishing companies from both Canada and the United States harvest both shellfish and cold-water fish from these waters, using lobster and crab pots, gillnets and other gear that present a danger to marine life. However, these industries are a major economic

resource for both countries and a mainstay for coastal communities. Typically, lobster and crab fishermen are small businessmen with high overhead costs for equipment and gear, who typically resist any attempts at regulation that include seasonal or regional restrictions, or require investment in new gear (Laist, 2017). Fishermen are also facing the challenges of a changing climate, as the warming ocean results in lobsters, crabs and other marine animals are moving to more northern waters.

The commercial shipping industry is also a player in this issue. The sea lanes along the Atlantic seaboard are busy at all times of year, and shipping companies are heavily dependent on meeting busy schedules which makes it difficult for them to comply with speed restrictions through management areas. This results in a high incidence of ship strikes throughout the whales' range, particularly on females as they migrate to and from the southern calving region. The cruise ship industry is particularly sensitive to timetables and speed restrictions, as their schedules are often set years in advance. Speed restrictions based on whale activity have been blamed for the cancellation of port calls throughout Canadian Maritime provinces (Woodward, 2018)

Psychological and Cultural Concepts

Although sometimes portrayed as the villains of this story, the US and Canadian fishermen express frustration and sadness over the NARW deaths. Beyond the cost of lost and damaged gear from whale encounters, they show genuine sadness over the loss of the whales. They feel caught between the need to remedy the situation, and distrust of government measures to reduce the danger caused by their equipment. The perception of the fishing community is that the measures proposed by government fisheries management are untested, would not be effective and would create financial hardship to implement. (Kessler, 2012).

The Canadian and US governments have historically taken different approaches to the protection of NARW, possibly due to philosophical and cultural differences between the two nations. The US has been more directive in nature, consulting with industry and then publishing and enforcing regulations on shipping and fishing; while the Canadian authorities have traditionally focused on public awareness and voluntary compliance with guidelines (Stewardship Measure, n.d.). However, in 2017 two events energized both the Canadian government and fisheries industry. The first event was the deaths of 18 NARW within a few weeks primarily in the Gulf of St. Lawrence, an area that had previously not been a major habitat. The second event was the July 10th death of Joseph Howlett, a New Brunswick fisherman who was a mainstay of a civilian effort to rescue and free entangled whales. After freeing a trapped NARW, Mr. Howlett received a devastating blow from the whale's fluke as it moved away from his boat. The highly publicized loss of 4 percent of the total NARW population within a few weeks, coupled with the dramatic and heroic death of a whale rescuer were a shock to the system for the Canadian government. It resulted in immediate restrictions on crab fishing in the Gulf of St. Lawrence, speed restrictions on shipping and new regulations on fishing equipment. In the months since, Canada's government has indicated that it will take a more active role in whale protection and enforcement (Bissett, 2018; MacKinnon, 2018).

The "Human" Side of the Issue

During the course of this study, it became apparent that every human stakeholder group has the best intentions towards the whales and a clear desire to eliminate the danger to the NARW. However, there is strong disagreement on the means of achieving that end. The North Atlantic fishing industry does not feel that the governments' solutions will be either economically feasible or effective, or that the governments understand enough about whale

movement and migration. They view themselves as the experts in fishing management and believe that they have the best understanding of both the economic and practical impact of regulations (Willick, 2017). As small businessmen protecting their livelihoods and their communities, they desire some positive assurance that regulations will be effective and that they will have some relief from the expense of implementing new safeguards.

Available Data and Data Gaps.

The US National Oceanic and Atmospheric Administration (NOAA) and the Marine Animal Response Network of Atlantic Canada maintain information on NARW sightings, strandings, injuries and entanglements. This data is collected from multiple sources, including fishermen, ships in regions inhabited by NARW and non-profit conservation organizations. In almost all cases, this data is based in first-hand sightings. The data is used to provide enact seasonal management areas along whale migration routes and enforce fishing restrictions (Van der Hoop, et al, 2012). Additionally, NOAA is experimenting with the use of passive acoustic collection of whale sounds to provide early detection of whales.

Other data collection methods have been demonstrated to provide more current and accurate information. A 2014 study created a winter habitat model of NARW collected data on aerial sightings of NARW and environmental data including water temperature and depth. This study was able to accurately predict the location of NARW, particularly cow/calf pairs (Gowan and Ortega-Ortiz, 2014). Passive acoustic monitoring tests have also been demonstrated to detect the presence of NARW with a high degree of accuracy. Acoustic monitoring buoys and Marine Archival Recording Units were found to provide NARW locations with much higher accuracy that visual sightings from surface or aircraft. These methodologies could be expanded to provide predictions of NARW activity both inside and outside of protected areas and provide

for informed management decisions about fishing and ship speed restrictions (Soldevilla, Rice, Clark and Garrison, 2014).

One additional avenue of research would be to investigate methods of monitoring and predicting the density of zooplankton, the NARW's principal food source, in the North Atlantic. It would be reasonable to assume that the whales will modify their ranges to take advantage of food sources; having knowledge of, and forecasting, the levels of zooplankton in ocean regions would aid informed decisions on implementing controls on shipping and fishing.

Possible Solutions

Both Canada and the United States have implemented conservation efforts based on fortress models (Vaccaro et al, 2103), in which seasonal management areas are implemented with bans or restrictions on shipping and fishing throughout the NARW migration and habitat ranges. Unfortunately, as the current mortality rate shows, these measures have been proven to be ineffective. The restrictions based on fishing in management areas has not reduced whale mortality and, although speed reductions have been shown to reduce ship strike mortality (Conn & Silber, 2013), the incidence of strike mortalities has not been affected by them. Reviews of these practices have shown that the management areas to overly fragmented and that they are not managed in a manner that is responsive to the movement and activities of the NARW and other whale species (Mullen, Peterson & Todd, 2013; Van der Hoop et al, 2012). Further, the use of management areas is only an attempt to protect the whales that are present within those areas at any point in time; there is no protection provided to whales that are physically outside of them.

It is clear that whales do not stay in predictable areas, and that their migration and habitat will vary based on weather, temperature and food availability. The imposition of seasonal restrictions in management areas accomplishes nothing when the whales are not to be found in

those areas, does nothing to protect whales that are outside of the management areas, and reduces the credibility of protections in the eyes of fishermen and shipping companies.

Although technologies have been proposed to eliminate the dangers posed by the current methods used for harvesting crab and lobster, such as breakaway ropes or ropeless traps, they have not been accepted as practical by fishing associations (Williams, 2017a). Additionally, should these technologies be mandated, or adopted, for the Canadian and US fishing communities, they would not be fully implemented in time to save the whales from extinction.

It is recommended that conservation of NARW be undertaken by use of models based on economics and public taste, assisted by new technologies. Expansion of NOAA's Northeast Acoustic Network (NOAA, n.d.) would provide near real-time information on the location and travel of whales and permit the characterization of the whales by analysis of their calls (Soldevilla, Rice, Clark & Garrison, 2014). Coupled with oceanographic analysis, this data would provide highly reliable information on the presence of whale species and their direction of travel (Gowan and Ortega-Ortiz, 2014). It would also enable flexible management of shipping speed restrictions and would allow informed management of fishing areas, based on the detected location of whales. The flexible management of territorial waters could replace the current patchwork of seasonal management areas, allowing more timely protection for whales while permitting commercial use of sea lanes and fisheries when the whales are not present.

The fishing industries of the US and Canada have indicated deep concern over the dangers posed to NARW, and have stated a desire to cooperate with authorities if detection and mitigation methods were demonstrated to be effective. The expanded use of passive sonar would allow governmental agencies to provide guidance on which areas can be safely fished without endangering whales and would provide fishermen with timely information on when nets and

traps could be safely deployed and recovered. This would enable the economic use of conservation areas with sharply reduced impact on endangered whale species. In addition, detection-based speed rules would be attractive to the cruise ship industry, which has been forced to cancel long-scheduled ports of call due to seasonal speed restrictions (Williams, 2017b). This is believed to be a solution that would gain industry acceptance while achieving the responsiveness and granularity that has been found lacking in the current practices (Conn & Silber, 2013).

The use of safe fishing practices, based on whale locations, would be an effective way to influence public taste and drive demand for safely-fished products. This has been shown to be highly effective when the tuna industry was driven to implement dolphin-friendly tuna in the 1990s, and in the current "fair trade" movement for products obtained from developing countries. Consumer preferences for "ecolabels" and has been demonstrated to be a strong factor in product selection. A segment of the US population has been found to have a definite preference for "dolphin-friendly" tuna over brands that do not carry that label. In fact, the presence of "dolphin-friendly" labels serves to increase public awareness of the dangers presented by tuna fishing (D'Souza, 2000) A "taste" model in which restaurants and shops are able to advertise "whale-safe" crab and lobster may create a market advantage for the fishing industry, and offset the costs of complying with data-driven restrictions.

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