

# On the Right Way to Right Whale Protections in the Gulf of Maine—Case Study

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## 1. INTRODUCTION

For centuries, the right whale was abundant and inhabited both sides of the North Atlantic Ocean.<sup>1</sup> Almost 500 years of heavy harvesting brought the right whale to the verge of extinction.<sup>2</sup> For whalers, the right whale was an easy and lucrative target. Its predictable, dilatory movement close to the shoreline, its tendency to float when dead, and its large amounts of high-quality oil made it the “right” whale to pursue. In 1937, whaling nations agreed to stop harvesting of the species.<sup>3</sup> Although the North Atlantic right whale hunt is

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<sup>1</sup>S. Katona & S.D. Kraus, *Efforts to Conserve the North Atlantic Right Whale* (1999).

<sup>2</sup>*Id.*

<sup>3</sup>International Agreement for the Regulation of Whaling, 8 June 1937, 190 L.N.T.S. 79. *See also* R. Reeves, *Overview of Catch History, Historic Abundance and Distribution of Right Whales in the Western North Atlantic and in Cintra Bay, West Africa*, 2(Special Issue) *J. CETACEAN RES. MANAGE.* 187–192 (2001).

non-existent now, the recovery rate is still very low and faces several challenges. Ironically, despite a very successful, enforced ban on right whale hunting, the characteristics which made it so attractive to whalers are those that still threaten it today.

The North Atlantic right whale migration range is along the continental shelf waters of the eastern United States and Canada where there are high concentrations during the summer in the Gulf of Maine, the Bay of Fundy, and the Scotian Shelf; and off Florida where the winter calving grounds are located. This migration route runs adjacent to the most populated and industrialized areas of North America. Major anthropogenic activities affecting the marine environment include marine traffic, land-based industrial and agricultural pollution, degradation and loss of habitat, noise, and fishing gear entanglements.<sup>4</sup>

In this article we examine the threats to right whales, the legal status of the right whale in the United States and Canada, evolving technology used to locate the right whale, and how these circumstances may be integrated in a right whale management and conservation plan. We conclude with the challenges and risks which may arise from such plans.

### 1.1. North Atlantic Right Whale Habitat

Given the range and sensitivity of the North Atlantic right whale to activities that span the U.S.-Canadian border in the Gulf of Maine, this species serves as a focal point for a matrix of international and national efforts to improve the overall ecosystem of the region. The right whale migrates along the east coast of the United States throughout the year. Current estimates of the species range from 346 to 672 individuals.<sup>5</sup> Southern calving grounds are located off the southeastern U.S. coast in the vicinity of the Florida-Georgia border while northern feeding grounds are located in the Gulf of Maine, the Bay of Fundy, and on the Scotian Shelf. Northern migration occurs in the late winter while southern migration occurs in the late fall.<sup>6</sup> During the summer months, right whales are found farther north in the Grand Manan Basin in the lower Bay of Fundy, and in Roseway Basin on the Scotian Shelf, where they feed at depth on copepods.<sup>7</sup> The Gulf of Maine includes areas of vital importance to the survival of the right whale and, because of its unique qualities, the region has

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<sup>4</sup> National Oceanic and Atmospheric Administration (NOAA) & Commerce Atmospheric Administration, *Designated Critical Habitat; Northern Right Whale* (1994).

<sup>5</sup> P. Hamilton, *The 2011 North Atlantic Right Whale Population Estimate: 509*, 20(4) RIGHT WHALE NEWS 1–8 (2012); North Atlantic Right Whale Consortium, *North Atlantic Right Whale Consortium 2012 Annual Report Card, Report to the North Atlantic Right Whale Consortium* (November 2012).

<sup>6</sup> Jeremy Firestone et al., *Statistical Modeling of North Atlantic Right Whale Migration along the Mid-Atlantic Region of the Eastern Seaboard of the United States*, 141 BIOL. CONS. 221 (2008).

<sup>7</sup> J. Michaud & C.T. Taggart, *Spatial Variation in Right Whale Food, Calanus finmarchicus, in the Bay of Fundy*, 15 ENDANGER. SPECIES RES. 179–194 (2011).

fostered transboundary cooperation that spans states, provinces, and nations.<sup>8</sup> The Bay of Fundy and Scotian Shelf serve as the summer-autumn feeding habitat for mature whales and the Bay of Fundy also serves as a summer-autumn nursery ground, mainly for the mother and calves. The Great South Channel, east of Cape Cod, serves as the spring to early summer feeding and nursery grounds while Cape Cod Bay and Massachusetts Bay serve as the late winter to early spring feeding and nursery grounds.<sup>9</sup>

Right whales are considered “umbrella species,” animals whose conservation affords protection of other species and habitat.<sup>10</sup> The right whale is impacted by the extraction of marine resources both from the water column and seabed, toxic algal blooms, and mortality directly related to fishing and shipping activities. As a migratory species protected under a matrix of laws in the greater Gulf of Maine Region, the right whale cuts across use sectors and jurisdictional boundaries, and has the potential to continue serving as a rallying species for ecosystemic improvement.

## 1.2 Threats to the Right Whale Habitat and Population in the Gulf of Maine

Incidental deaths and injuries to the right whale throughout their range result from fishing gear entanglement, shipping impacts<sup>11</sup> (vessel strikes and acoustic

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<sup>8</sup> L.P. Hildebrand & A. Chircop, *A Gulf United: Canada-U.S. Transboundary Marine Ecosystem-Based Governance in the Gulf of Maine*, 15 OCEAN & COAST. L. J. 339 (2010). See also R.G. Boatright, *Cross-Border Interest Group Learning in Canada and the United States*, 39 AM. REV. OF CAN. STUD. 418 (2009) (noting right whales as a focal point for sharing of information between interest groups on either side of the international boundary—but only episodically—pointing to the potential for more sustained and organized political strategizing among non-governmental organizations in the region).

<sup>9</sup> S.S. Elvin & C.T. Taggart, *Right Whales and Vessels in Canadian Waters*, 32 MAR. POL'Y 379, Table 1 (2008).

<sup>10</sup> Janis Searles Jones & Steven Ganey, *Building the Legal and Institutional Framework*, in *Ecosystem-based Management for the Oceans* (Karen McLeod & Heather Leslie eds., 2009) (The authors note the Endangered Species Act, an act which focuses on the protection and recovery of listed species, has been a powerful tool. As an example, the authors point to the fact that activities that might have been lawful under the Magnuson-Stevens Act involving the extraction of resources from the ocean must be modified to protect critical habitat before they can be approved.); M.C. King & K.F. Beazley, *Selecting Focal Species for Marine Protected Area Network Planning in the Scotia-Fundy Region of Atlantic Canada*, 15 AQUAT. CONSERV.: MAR. FRESHWAT. ECOSYST. 367 (2005) (identifying species that are highly useful by developing and applying a matrices of ideal characteristics, with the right whale receiving the high score in the Scotia-Fundy Region).

<sup>11</sup> S.D. Kraus et al., *North Atlantic Right Whales in Crisis*, 309 SCIENCE 5734:561–562 (2005); M.J. Asaro, *Geospatial Analysis of Management Areas Implemented for Protection of the North Atlantic Right Whale along the Northern Atlantic Coast of the United States*, 36 MAR. POL'Y 915 (2012), citing *U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2010*, NOAA Tech Memo NMFS NE 219 (G.T. Waring et al. eds., 2010), at 598 (“From 2004 through 2008, the minimum average rate of annual human-caused serious injury and mortality to the right whale in U.S. and Canadian waters was 2.8 individuals per year; 0.8 per year seriously injured or killed by entanglements with fishing gear, and 2.0 per year seriously injured or killed by vessel collisions.”).

stressors), and possibly harmful algal blooms.<sup>12</sup> Accordingly, avoidance of such incidental takes is crucial.

### 1.2.1 Net Entanglement

One of the greatest threats to the health of right whales is entanglement<sup>13</sup> in fishing gear.<sup>14</sup> Studies have demonstrated most Atlantic right whales have experienced entanglement at least once.<sup>15</sup> In a study of whale entanglements, right whale entanglements involved mostly buoy lines or groundlines.<sup>16</sup> The majority of entanglements involved floating and sinking lines spliced together.<sup>17</sup> Given the transboundary nature of the habitat as well as the transboundary nature of fishing gear/ghost fishing gear, the reduction of gear entanglement requires the coordination of both U.S. and Canadian fishing practices as well as marine debris policies.<sup>18</sup> Testing the effects of experimental gear modifications and zonal closures in a real world setting can pose a problem, which makes gathering data on what gear modifications work in a real world setting a difficult process. Instead, gear tests<sup>19</sup> are usually done in a controlled environment and then regulations based on the results of these experiments are implemented.<sup>20</sup>

### 1.2.2. Vessel Traffic

The foraging pattern of right whales, their slow speed, their sensitivity to acoustic stressors, and their low visibility in the water column makes them

<sup>12</sup> Edward Durbin et al., *North Atlantic Right Whales, Eubalaena glacialis, Exposed to Paralytic Shellfish Poisoning (PSP) Toxins via a Zooplankton Vector, Calanus finmarchicus*, 1.3 HARMFUL ALGAE 243–251 (2002); G.J. Doucette et al., *Paralytic Shellfish Poisoning (PSP) Toxins in North Atlantic Right Whales Eubalaena glacialis and their Zooplankton Prey in the Bay of Fundy, Canada*, 306 MAR. ECOL. PROG. SER. 303–313 (2006).

<sup>13</sup> For entanglement rates see A.S.M. Vanderlaan, R.K. Smedbol, & C.T. Taggart, *Fishing-gear Threat to Right Whales (Eubalaena glacialis) in Canadian Waters and the Risk of Lethal Entanglement*, 68(12) CAN. J. FISH. AQUAT. SCI. 2174–2193 (2011); A.R. Knowlton et al., *Monitoring North Atlantic Right Whale Eubalaena glacialis Entanglement Rates: A 30 Yr. Retrospective*, 466 MAR. ECOL. PROG. SER. 293–302 (2012).

<sup>14</sup> Michael J. Moore, *Current Issues Facing North Atlantic Right Whales and Stakeholders*, 36 B.C. ENVTL. AFF. L. REV. 309, 314 (2009).

<sup>15</sup> Amanda Johnson et al., *Fishing Gear Involved in Entanglements of Right and Humpback Whales*, 21 MAR. MAM. SCI. 635, 636 (2005).

<sup>16</sup> *Id.* at 641.

<sup>17</sup> *Id.*

<sup>18</sup> *Id.*; see also Ransom A. Myers et al., *Saving Endangered Whales at No Cost*, 7 CURR. BIOL. R10–R11 (2007) (comparing lobster management in U.S. and Canadian waters, and concluding that lobsters caught in Canadian waters have one percent of the impact of U.S. caught lobsters due to the much higher efforts employed in U.S. waters, even though these efforts do not result in increased catch).

<sup>19</sup> For more information see S.W. Brillant & E.A. Trippel, *Elevations of Lobster Fishery Groundlines in Relation to Their Potential to Entangle Endangered North Atlantic Right Whales in the Bay of Fundy, Canada*, 67 ICES J. MAR. SCI. 355–364 (2010).

<sup>20</sup> T.M. Cox et al., *Comparing Effectiveness of Experimental and Implemented Bycatch Reduction Measures: The Ideal and the Real*, 21 CONS. BIO. 1155 (2007).

the most vulnerable whale species to vessel strikes worldwide.<sup>21</sup> Deaths of right whales by vessel strikes are often not immediate—a whale may survive the initial injuries but eventually die when the injuries reopen and become infected years or decades later.<sup>22</sup> Based on a study of 40 North Atlantic right whale corpses found between 1970 and 2006, 53 percent of these deaths were caused by vessel strikes.<sup>23</sup> Trauma included sharp trauma (such as propeller lacerations), blunt trauma (such as strikes by boat hulls), and constrictive lacerations caused by gear entanglement. Of those mortalities studied, 56 percent of the deaths were caused by sharp trauma and 20 percent were caused by blunt trauma.<sup>24</sup> Vessel strikes are highly detrimental to the small, endangered population of the right whale.<sup>25</sup> A summary of the deaths reported over a 16-month period showed eight reported right whale deaths, six of which were pregnant females, representing a potential reproductive loss to the population of at the most 21 animals.<sup>26</sup> However, small changes in human activities can have important impacts: a reduction of vessel speed to less than 12 knots decreases the probability of a lethal strike substantially.<sup>27</sup>

Vessel traffic in the Gulf of Maine has also been examined for vessel strike risk<sup>28</sup> as well as its impacts on the ability of whales to maintain acoustic contact throughout the region, with the conclusion that noise produced by commercial vessels is at levels high enough to mask the ability of

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<sup>21</sup> Elvin & Taggart, *supra* note 9, at 379; S.E. Parks et al., *Dangerous Dining: Surface Foraging of North Atlantic Right Whales Increases Risk of Vessel Collisions*, 8(1) *BIO. LETT.* 57–60 (2012) (“North Atlantic right whales have the largest per capita record of vessel strikes of any large whale population in the world. Right whale feeding behaviour in Cape Cod Bay (CCB) probably contributes to risk of collisions with ships. In this study, feeding right whales tagged with archival suction cup tags spent the majority of their time just below the water’s surface where they cannot be seen but are shallow enough to be vulnerable to vessel strike. Habitat surveys show that large patches of right whale prey are common in the upper 5m of the water column in CCB during spring.”); R.M. Rolland et al., *Evidence That Ship Noise Increases Stress in Right Whales*, 279 *PROC. ROY. SOC. B* 1737 (2012) (“reduced ship traffic in the Bay of Fundy, Canada, following the events of 11 September 2001, resulted in a 6 dB decrease in underwater noise with a significant reduction below 150 Hz. This noise reduction was associated with decreased baseline levels of stress-related faecal hormone metabolites (glucocorticoids) in North Atlantic right whales (*Eubalaena glacialis*). . . . evidence that exposure to low-frequency ship noise may be associated with chronic stress in whales, and has implications for all baleen whales in heavy ship traffic areas, and for recovery of this endangered right whale population.”).

<sup>22</sup> R. Campbell-Malone et al., *Gross and Histologic Evidence of Sharp and Blunt Trauma in North Atlantic Right Whales (*Eubalaena glacialis*) Killed by Vessels*, 39 *J. ZOO WILDL. MED.* 37 (2008).

<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

<sup>25</sup> Elvin & Taggart, *supra* note 9, at 379.

<sup>26</sup> S.D. Kraus et al., *North Atlantic Right Whales in Crisis*, 309 *SCIENCE* 561 (2005). See also A.R. Knowlton & S.D. Kraus, *Mortality and Serious Injury of Northern Right Whales (*Eubalaena glacialis*) in the Western North Atlantic Ocean*, 2 *J. CETACEAN RES. MANAGE.* 193 (2001).

<sup>27</sup> A.S.M. Vanderlaan & C.T. Taggart, *Vessel Collisions with Whales: The Probability of Lethal Injury Based on Vessel Speed*, 23 *MAR. MAM. SCI.* 144–156 (2007).

<sup>28</sup> A.S.M. Vanderlaan et al., *Probability and Mitigation of Vessel Encounters with North Atlantic Right Whales*, 6 *ENDANGER. SPECIES RES.* 273–285 (2009).

the whales to communicate.<sup>29</sup> Impacts resulting from increased noise levels range from loss of communication, detrimental changes in feeding and mating behaviour, to chronic stress.<sup>30</sup> While we can generally say that acoustic pollution is deleterious, models have been developed that could point towards a better understanding of the types of sounds that are most detrimental to right whale populations and their “communication spaces,” which could help inform effective regulatory and technological responses.<sup>31</sup>

### 1.2.3 Contaminants

During the summer months, the right whales feed on the copepod *Calanus finmarchicus* in the northern parts of the Gulf of Maine, which feeds largely on the dinoflagellate *Alexandrium fundyense* that is known to produce harmful toxins.<sup>32</sup> This food chain can lead to bioaccumulation of paralytic shellfish poisons (PSPs) and chronic exposure in right whales due to the volume of copepods consumed.<sup>33</sup> Chronic exposure to PSPs in mammals can cause neuropathology, such as muscle paralysis, interference with respiratory patterns, altered feeding behaviours, and, ultimately, overall change in reproductive cycles.<sup>34</sup> Measurements of toxins in *C. finmarchicus* during a toxic algal bloom of *A. fundyense* during a 2002 study, and extrapolation to whale consumption of copepods based on feeding efficiency, demonstrated that right whales in the area were ingesting substantial amounts of PSP toxins.<sup>35</sup> Based on the known frequent occurrence of blooms of *A. fundyense* and the likelihood of these blooms being toxic, it is apparent that toxin exposure is chronic and long term.<sup>36</sup>

<sup>29</sup> L. Hatch et al., *Characterizing the Relative Contributions of Large Vessels to Total Ocean Noise Fields: A Case Study Using the Gerry E. Studds Stellwagen Bank National Marine Sanctuary*, 42 ENVIRON. MANAGE. 735 (2008).

<sup>30</sup> R.M. Rolland et al., *Evidence That Ship Noise Increases Stress in Right Whales*, PROC. ROY. SOC. B, DOI: 10.1098/RSPB.2011.2429 (2012). See also S.E. Parks et al., *Individual Right Whales Call Louder in Increased Environmental Noise*, 7 BIO. LETT. 33 (2011).

<sup>31</sup> C.W. Clark et al., *Acoustic Masking in Marine Ecosystems as a Function of Anthropogenic Sound Sources*, Paper SC/61/E10 presented to the IWC Scientific Committee, June 2009, Madeira, Portugal (unpublished) (2009); S.E. Mussoline et al., *Seasonal and Diel Variation in North Atlantic Right Whale Up-Calls: Implications for Management and Conservation in the Northwestern Atlantic Ocean*, 17 ENDANGER. SPECIES RES. 17–26 (2012) (demonstrating new understanding about North Atlantic Right Whales, including longer and more frequent presence in the Gulf of Maine and identification of differences in calling frequency over the span of the day (more up-calls during twilight periods than other times); the study was funded by NOAA’s Northeast Fisheries Science Center, Northeast Regional Office, and NOAA’s Stellwagen Bank National Marine Sanctuary).

<sup>32</sup> Edward Durbin et al., *North Atlantic Right Whales, Eubalaena glacialis, Exposed to Paralytic Shellfish Poisoning (PSP) Toxins via a Zooplankton Vector, Calanus finmarchicus*, 1 HARMFUL ALGAE 243 (2002).

<sup>33</sup> *Id.*

<sup>34</sup> *Id.* at 244.

<sup>35</sup> Durbin et al., *supra* note 32, at 244.

<sup>36</sup> *Id.* at 248. See also J.L. Martin & A. White, *Distribution and Abundance of the Toxic Dinoflagellate Gonyaulax excavata in the Bay of Fundy*, 45 CAN. J. FISH. AQUAT. SCI. 1968 (1988); D.W. Townsend,

Similar studies conducted in the Bay of Fundy in 2006 during the summer feeding period directly estimated toxin levels in right whales by determining PSP toxins in whale fecal samples rather than extrapolating toxin levels based on the levels in copepod populations.<sup>37</sup> Toxin levels in the feces were found to mirror toxins in the zooplankton, reflecting a trophic connection between food consumed and the toxins absorbed by the right whales in this area.<sup>38</sup> In addition, analysis demonstrated the alteration and absorption of PSP toxins within the alimentary canal of the right whale, suggesting that PSP toxins were processed rather than just passed through. Although the authors of the study noted that the effects of different levels of toxicity were not fully studied due to the difficulty of sampling the whale, they did state that it is clear that right whales are being exposed to considerable levels of PSP toxins.<sup>39</sup>

### 1.3 Protecting the North Atlantic Right Whale

Protecting the North Atlantic right whale may seem an easy task for several reasons. First, right whales lack natural predators. Second, in our era, there is no market for right whale products. The only commercial value the right whale offers is to the whale-watching industry. Third, there are no moral or cultural constraints involved in right whale protection in respect to other species<sup>40</sup> or Indigenous peoples' traditions. Fourth, migration paths and timing are well known, stable over time, and easy to define geographically. The absence of spatial uncertainties makes policy formation and implementation an easier task. Finally, while there are some differences in the scientific community regarding the actual number of right whales (see Section 1.1 above), growth

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N.R. Pettigrew, & A.C. Thomas, Alexandrium in the Gulf of Maine, 21 *CONT. SHELF RES.* 347 (2001); Bruce A. Keafer et al., Bloom Development and Transport of Toxic Alexandrium fundyense Populations within a Coastal Plume in the Gulf of Maine, 52 *DEEP-SEA RES. Pt II* 2674 (2005).

<sup>37</sup> G.J. Doucette et al., *Paralytic Shellfish Poisoning (PSP) Toxins in North Atlantic Right Whales Eubalaena glacialis and Their Zooplankton Prey in the Bay of Fundy, Canada*, 306 *MAR. ECOL. PROG. SER.* 303 (2006); G.J. Doucette et al., *Endangered North Atlantic Right Whales (Eubalaena Glacialis) Experience Repeated, Concurrent Exposure to Multiple Environmental Neurotoxins Produced by Marine Algae*, 112 *ENVIRON. RES.* 67–76 (2012) (“It will thus be essential to consider both the direct (i.e., neurotoxicity) as well as the indirect (i.e., enhanced susceptibility to vessel strikes, pathogens, and pollutants) impacts of these naturally occurring biotoxins in developing effective conservation and management strategies.”).

<sup>38</sup> Doucette et al. (2006), *id.*

<sup>39</sup> *Id.* at 311. See also B.L. Hlista et al., *Seasonal and Interannual Correlations between Right-Whale Distribution and Calving Success and Chlorophyll Concentrations in the Gulf of Maine, USA*, 394 *MAR. ECOL. PROG. SER.* 289 (2009) (building on use of remote sensing of CHL concentrations to better understand population patterns and calving activity).

<sup>40</sup> Jeffrey A. Hutchings et al., *Climate Change, Fisheries, and Aquaculture: Trends and Consequences for Canadian Marine Biodiversity*, 20(4) *ENVIRON. REV.* 220 (2012); Erik Franckx, Koen Van den Bossche, & David L. VanderZwaag, *Canada, the European Union and Regional Fisheries Management in the North Atlantic: Conflict, Cooperation and Challenges*, in *UNDERSTANDING AND STRENGTHENING EUROPEAN UNION-CANADA RELATIONS IN LAW OF THE SEA AND OCEAN GOVERNANCE* 265–344 (T. Koivurova et al. eds., 2009).

rates, and the like, there is a wide consensus on the threats to the right whale population and on the necessary steps to protect it. All the above-mentioned points should have made any conservation policy easy to agree upon. However, this is not the case.

While some of the threats to the right whale are shared by the entire marine ecosystem (i.e., contaminants, loss of habitat, and the like), others are unique to the right whale, and need to be specifically addressed by right whale conservation plans. The main current threat to right whales is vessel strikes.

With the rapid growth of shipping fleets, and constant increase in vessel strikes resulting in right whale death or severe injury, two preventive strategies can be adopted to avoid vessel strikes or reduce them to a minimum. First, when possible, one can reroute shipping lanes to avoid right whale areas. This can be done either by narrowing shipping lanes to a minimum, or bypass the entire area. This will lead to a safe area clear of traffic, known as an “area to be avoided” (ATBA).<sup>41</sup> Second, when rerouting is not a viable option, reduced speed should be employed. Both strategies have proven to reduce the probability of death from vessel strikes.<sup>42</sup> With the active support of the International Maritime Organization (IMO),<sup>43</sup> these strategies were implemented to varying degree in several locations on the U.S. and Canadian Atlantic seaboard.<sup>44</sup> However, implementing these strategies, either on an annual or seasonal basis, may, but not necessarily, come with an economic cost in terms of extended shipping time and/or extra fuel.

Determining the ATBA or the area for reduced speed is based on the probability of right whale presence, and is calculated on data collected in the past. However, as the marine environment changes, so might the migration routes, feeding areas, and time of passage. Therefore, the above strategies can be both expensive and impractical. To overcome these uncertainties and costs, new tracking technologies can be used to help mariners adjust, in near real time, either by rerouting or reducing speed to avoid lethal strikes.

## 2. TRACKING THE RIGHT WHALE

Although the general migration routes of the right whale are well known in the northwestern Atlantic, determining the exact current location of a right

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<sup>41</sup> For example, the Roseway Basin on the southwestern Scotian Shelf is such an area.

<sup>42</sup> G.K. Silber, J. Slutsky, & S. Bettridge, *Hydrodynamics of a Ship/Whale Collision*, 391(1–2) *J. Exp. MAR. BIOL. ECOL.* 10–19 (2010); Vanderlaan & Taggart, *supra* note 27.

<sup>43</sup> A specialized agency of the United Nations.

<sup>44</sup> For example, in the Massachusetts Bay, the traffic separation scheme (TSS) was moved north to avoid a dense right whale area in July 2007; in June 2009, the north-south lanes of the TSS servicing Boston were modified by narrowing them from 2 to 1.5 miles in width. See further below.



whale, or a group, remains a challenge. In recent years, we have witnessed the emergence of new marine animal tracking technologies.<sup>45</sup> These biotelemetry technologies provide scientists with a wealth of new information,<sup>46</sup> and create alternative possibilities for marine conservation. Mobilizing such knowledge from its sources of origin (whether the academy, research institutes, environmental non-governmental organizations [NGOs], or governmental agencies) to the end-users is a lengthy and complicated process.<sup>47</sup> In most cases, this knowledge is an end-result of a long process of data gathering, analysis, and interpretation. Traditionally, this task has been performed by well-trained scientists and technicians who serve as “translators” or “interpreters” of raw data into knowledge, understandable not only by their peer groups, but also by policy-makers and other stakeholders. This transformation from raw data, and the resulting knowledge, places science at the core of every conservation plan. However, to protect right whales from vessel strikes, this information needs to be streamed as quickly as possible to the end-user: the mariner who navigates the vessel.

The case of the North Atlantic right whale is rather unique. As a result of right whale body characteristics, behaviour patterns, and current tagging attachment techniques, tagging the right whale for an extended time period is close to impossible. Therefore, there are only limited ways of tracking the right whale. These include photo-identification, sighting reports, and active systems such as the Marine Mammal Detection System.<sup>48</sup> These methods are either unreliable, expensive, limited in operation time, or require further extensive analysis for identification. Therefore, they are not suitable for preventing vessel strikes.

In an effort to solve these problems, and provide a reliable tracking system, a line of ten passive acoustic auto-detection buoys was installed in January 2008 along 88 km of the main shipping route to and from the port of Boston and shipping terminals in Massachusetts Bay. These acoustic detection devices monitor right whale sounds 24 hours per day within a range of five nautical miles. A unique algorithm is used to determine the probability of right whale presence. This information is then transmitted approximately

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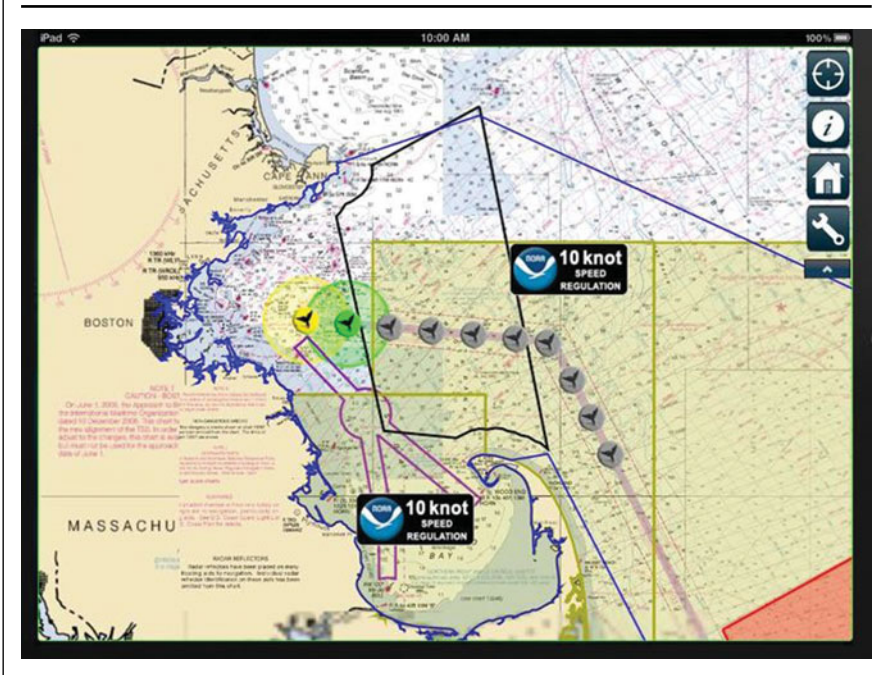
<sup>45</sup> Tsafirir Gazit, Richard Apostle, & Robert Branton, *Deployment, Tracking and Data Management: Technology and Science for a Global Ocean Tracking Network*, J. INT. WILDL. LAW POLICY (2013, in press).

<sup>46</sup> S.J. Cooke et al., *Biotelemetry: A Mechanistic Approach to Ecology*, 19(6) TRENDS ECOL. EVOL. 334–343 (2006); TAGGING AND TRACKING OF MARINE ANIMALS WITH ELECTRONIC DEVICES (J.L. Nielsen et al., eds., 2009).

<sup>47</sup> Nathan Young et al., *Mobilizing New Science into Management Practice: The Challenge of Biotelemetry for Fisheries Management, a Case Study of Canada's Fraser River*, J. INT. WILDL. LAW & (2013, in press).

<sup>48</sup> For more information on the Marine Mammal Detection System see <http://mmds.co>.

FIGURE 1. Whale Alert app designed to augment existing ship navigation tools informing mariners of the safest and most current information to reduce the risk of vessels striking right whales in the approaches to Boston. Courtesy of the Gerry E. Studds Stellwagen Bank National Marine Sanctuary, Scituate, MA, USA (Color figure available online).



every 20 minutes for further analysis to Cornell's Bioacoustics Research Program lab where, if a right whale is identified, an alert is issued. The bioacoustics analysts provide alerts, updates, and summaries. The National Oceanic and Atmospheric Administration (NOAA) makes these alerts and reports available to any ship or boat via the right whale Sighting Advisory System. The reports are also available online and distributed by e-mail and the Automated Identification System (AIS). As of April 2012, this information became available, free of charge, on Apple iOS devices (iPhone, iPad) through a free application (Figure 1).

Introducing and placing technological solutions for right whale tracking (currently only in the Massachusetts Bay area) is only the first step in protecting the right whale from vessel strikes. This technical innovation must be supported by a legal and regulatory framework, which enforces the use of the new technology. In the following sections we will examine the legal status of the right whale in the United States and Canada, and conclude with a discussion of the challenges that lie ahead and options to better protect the right whale.

### 3. ASSESSMENTS OF TRANSBOUNDARY COOPERATION IN THE GULF OF MAINE

Ecosystem based management (EBM) often leads to the development of transboundary cooperation through the identification of problems that span jurisdictional boundaries. As individual jurisdictions identify transboundary species of value, this can spawn the development of transboundary information sharing, communications, governance structures, and, ultimately, formalized legal mechanisms that may involve international agreements and responsive national legislation. Rather than being based on a centralized authority, governance networks are “self-organizing, non-hierarchical, yet contain leaders and managers within the network.”<sup>49</sup> For the most part, EBM has been operating under systems of governance and on the assumption that the value of a resilient ecosystem is a strong enough enticement to forgo more formalized authority.<sup>50</sup>

Non-legally binding instruments may help create a framework or general standards that can then inform legally binding instruments at the regional level and within jurisdictions that would otherwise divide a given ecosystem.<sup>51</sup> Establishing umbrella governance frameworks that serve to focus on regional concerns, rather than bend to the will of local interests, is an important step in developing effective EBM practices.<sup>52</sup> Recent assessments of EBM efforts have revealed that EBM is not always a matter of creating a new framework; instead it involves removing the road blocks (such as agency discord) or clarifying areas of use and sensitive habitats that overlap.<sup>53</sup> Means of overcoming jurisdictional lines and lines among non-governmental stakeholders may, more often than not, come in the form of an overarching symbolic cause that serves as the impetus behind ecosystem-based initiatives.<sup>54</sup>

In an article published in 2002, Hildebrand et al. explored transboundary programmes in the Gulf of Maine, Great Lakes, and Georgia Basin/Puget

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<sup>49</sup> Troy W. Hartley, *Fishery Management as a Governance Network: Examples from the Gulf of Maine and the Potential for Communication Network Analysis Research in Fisheries*, 34 MAR. POL'Y 1060–1067 (2010).

<sup>50</sup> *Id.*

<sup>51</sup> *Id.* See also L. Fanning et al., *A Large Marine Ecosystem Governance Framework*, 31 MAR. POL'Y 434 (2007).

<sup>52</sup> *Creating the Necessary Management Capacity for Marine EBM*, 3 (1) MARINE ECOSYSTEMS AND MANAGEMENT (Marine Affairs Research and Education, University of Washington), March–May 2008.

<sup>53</sup> See, for example, Council on Environmental Quality, The White House, *Roadmap for Restoring Ecosystem Resiliency and Sustainability* (March 2010). Among other things, this roadmap includes the continued affirmation of cooperative efforts between state and federal agencies, such as the 2009 establishment of the Louisiana-Mississippi Gulf Coast Ecosystem Restoration Working Group, which aims to promote a federal-state vision of EBM rather than one divided by jurisdictional lines.

<sup>54</sup> See Eastern Research Group, *Marine Spatial Planning Stakeholder Analysis*, Conducted for NOAA Coastal Services Center (NOAA Contract # EAJ33C-09-0034, 22 January 2010).

Sound.<sup>55</sup> The authors describe the Gulf of Maine area as a sea within a sea given its geographical structure and a highly productive area of ocean in terms of fisheries resources. The Gulf of Maine Council on the Marine Environment forms the main governance body in this area and includes members from the governments of Canada and the United States at the federal and provincial/state levels. The aims of the Gulf of Maine Council are to (1) convene partners; (2) marshal resources and decide how best they should be used to further the Council's mission; (3) support projects, when possible, as part of a region-wide focus; and (4) educate the public and raise awareness of the value of the Gulf of Maine.<sup>56</sup> Hildebrand et al. note that this structure is unique in that it was formed only five years after the two countries had to resort to having the International Court of Justice decide on a final boundary in EEZ waters, the so-called "Hague Line."<sup>57</sup>

In sessions held in 2004 to discuss zoning in the Gulf of Maine, stakeholders included representatives from government (41%), Fisheries and Oceans Canada representatives from several regions (22%), non-governmental organizations (22%), academia (19%), students (8%), industry (5%), and consultants (5%).<sup>58</sup> These participants identified the Hague Line as a major impediment to integrated management and multiple-use zoning in the Gulf of Maine because of the different management regimes and priorities on each side of the border.<sup>59</sup> In addition, stakeholders identified lack of human capital in terms of ecosystem-based science and differences in political frameworks among state and province governments as impediments.<sup>60</sup> In terms of ocean zoning, participants emphasized the importance of integrating local knowledge into scientific assessments of ecosystem boundaries.<sup>61</sup>

Regional ocean governance (ROG) is a term that has been used to encompass cross-jurisdictional ocean planning that involves both EBM and the management of economic interests in marine resources.<sup>62</sup> Hershman and Russel point out that, in some cases, ROG stops at environmental management, pointing to the Gulf of Maine Council as an example of attempted ROG that focuses primarily on environmental quality and fails to "engage in regional

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<sup>55</sup> Lawrence P. Hildebrand, Victoria Pebbles, & David A. Fraser, *Cooperative Ecosystem Management across the Canada-US Border: Approaches and Experiences of Transboundary Programs in the Gulf of Maine, Great Lakes and Georgia Basin/Puget Sound*, 45 OCEAN COAST. MANAGE. 421 (2002).

<sup>56</sup> *Id.*

<sup>57</sup> *Id.* (referring to the Delimitation of Maritime Boundary in Gulf of Maine Area (Can. v. U.S.), 1984 I.C.J. 246 (Oct. 12)).

<sup>58</sup> Penny A. Doherty & Mark Butler, *Ocean Zoning in the Northwest Atlantic*, 30 MAR. POL'Y 389–391 (2006).

<sup>59</sup> *Id.*

<sup>60</sup> *Id.*

<sup>61</sup> *Id.*

<sup>62</sup> Marc J. Hershman & Craig W. Russel, *Regional Ocean Governance in the United States: Concept and Reality*, 16 DUKE ENVTL. L. & POL'Y F. 227 (2006).

economic coordination or other non-environmental objectives.”<sup>63</sup> Without integrating the exploitative value of maintaining watershed/ecosystem services into the environmental management regime, there is little impetus in the political context to implement protective regulation.<sup>64</sup>

A 2009 article examining governance across the Canada-United States water borders, considered water-related governance instruments and found that 57 percent were federal and 43 percent were “sub-national” (e.g., state-provincial, multi-level, or local) with the former relying on formal agreements and the latter on informal agreements.<sup>65</sup> The authors note that the number of transboundary instruments has been increasing, as has the rate of growth, since the 1980s, and while instruments prior to this period consisted of formal national agreements, those created since the 1980s have largely consisted of sub-national agreements and organizations.<sup>66</sup> One major issue noted by interviewees during the study was the inability to share data across the United States-Canada border as well as a lack of knowledge about the political structure and environmental law in the other country.<sup>67</sup> In their conclusion, the authors also noted that the rescaling of transboundary agreements to the local scale has not been accompanied by the authority and resources necessary to make these efforts effective.<sup>68</sup>

## 4. INTERNATIONAL LAW AND POLICY FRAMEWORK

### 4.1 United Nations Convention on the Law of the Sea

The 1982 United Nations Convention on the Law of the Sea (LOSC) empowers nations to protect and preserve the marine environment within territorial seas and also within their exclusive economic zones (EEZs). While the U.S. is not a party to the Convention it applies most of its provisions as reflections of customary international law. Laws adopted by coastal nations to protect the marine environment under the Convention can also apply to foreign vessels within these areas. As a highly migratory species (Annex I), the North Atlantic right whale is addressed under Part V, Article 64 of the Convention, which states that any nations having jurisdiction over areas in which such migratory species are found *are required to cooperate to conserve the species within and beyond the EEZ*. The right whale is also protected under Article 65,

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<sup>63</sup> *Id.* at 228.

<sup>64</sup> *Id.* at 233. (The authors outline two EBM-based regional management schemes, which differ largely in that one requires the establishment of authority and ocean zoning, while the other relies on the authority of existing agencies.)

<sup>65</sup> Emma S. Norman and Karen Bakker, *Transgressing Scales: Water Governance across the Canada-U.S. Borderland*, 99 A. ASSOC. AM. GEOG. 99–117 (2009).

<sup>66</sup> *Id.*

<sup>67</sup> *Id.*

<sup>68</sup> *Id.*

which *requires states to cooperate to conserve marine mammals*, especially cetaceans, through international cooperation, management, and study. Under Article 120, the Convention applies Article 65 to the conservation and management of marine mammals on the high seas, that is, the area beyond the boundary of states' EEZs.<sup>69</sup> LOSC also restricts coastal state powers to unilaterally establish vessel routing measures. States are required to seek the approval of the IMO for vessel routing measures in the EEZ, on the high seas, and within international straits.<sup>70</sup>

#### 4.2 IUCN Red List of Threatened Species

The International Union for Conservation of Nature (IUCN), established in 1948 as a global environmental organization, includes a membership of approximately 1,100 government and non-government organizations and approximately 11,000 volunteer scientists in some 160 countries.<sup>71</sup> The IUCN acts as a professional network compiling information about endangered species and conservation measures that are being implemented on local and international levels.<sup>72</sup> The North Atlantic right whale is currently listed on the IUCN Red List of Threatened Species as "endangered" meaning that all available data indicate a very high risk of extinction.<sup>73</sup> IUCN members include an extensive list of U.S.-based NGOs in addition to federal agencies, including NOAA, the U.S. Department of State, the U.S. Department of the Interior (Fish and Wildlife Service), and the U.S. Environmental Protection Agency.<sup>74</sup> Similarly, Canadian members include multiple NGOs and government agencies, including Fisheries and Oceans Canada, the Canadian Wildlife Service, and Environment Canada.<sup>75</sup> The IUCN also partners with other international organizations to produce international maps of both marine and terrestrial protected areas.<sup>76</sup> These maps serve as a centralized data platform for conservation decision-making and ecological gap analysis.

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<sup>69</sup> United Nations Convention on the Law of the Sea [hereinafter LOSC], 10 December 1982, 1833 U.N.T.S. 396.

<sup>70</sup> Elvin & Taggart, *supra* note 9, at 382. Under Article 38 of LOSC, right of transit is guaranteed to all ships and aircrafts through straits around which there are no other means of passage through the high seas or through the EEZ of similar convenience with respect to navigational and hydrographical characteristics.

<sup>71</sup> International Union for Conservation of Nature, *About IUCN*, at <http://www.iucn.org/about/> (visited 25 March 2013).

<sup>72</sup> *Id.*

<sup>73</sup> S.B. Reilly et al., *Eubalaena glacialis*, in THE IUCN RED LIST OF THREATENED SPECIES, VERSION 2012.2 (IUCN, 2012), at <http://www.iucnredlist.org> (visited 9 April 2013).

<sup>74</sup> IUCN, *Members Database*, at [http://www.iucn.org/about/union/members/who\\_members/members\\_database/](http://www.iucn.org/about/union/members/who_members/members_database/) (visited 25 March 2013).

<sup>75</sup> *Id.*

<sup>76</sup> UNEP, WCMC, IUCN, WCPA, *World Database on Protected Areas*, at <http://protectedplanet.net/> (visited 30 May 2012).

Scaling the IUCN listings to the national and regional level presents certain problems in terms of estimating extinction risks in individual nations versus the transboundary areas among which listed species move,<sup>77</sup> which may bring into question the utility of an IUCN listing. However, the listing of species has also laid the groundwork for stakeholder partnerships leading to large-scale species assessments.<sup>78</sup> In addition, the listing of whale species such as the right whale allows formal comments by IUCN representatives in the context of International Whaling Commission (IWC) meetings, which have been key to the development and improvement of IWC conservation efforts.<sup>79</sup>

### 4.3 International Maritime Organization

The IMO was established by the 1948 Geneva Convention and first met in 1959 with the purpose of developing international regulations for shipping that would address issues of safety, environmental concerns, legal matters, security, and shipping efficiency.<sup>80</sup> The Sub-Committee on Safety of Navigation in particular has considered the threats posed by international maritime traffic in the western Atlantic Ocean to the right whale.<sup>81</sup> Under Resolution MSC.85(70) adopted in 1998, the IMO established a mandatory ship reporting system off, *inter alia*, the northeastern and southeastern coasts of the United States for the protection of right whales.<sup>82</sup> The Resolution requires ships to report ship identification information as well as course, speed, route, and destination. If applicable, ships are alerted as to when they are entering an area of critical importance for the protection of the right whale, whether whales are present, and the fact that vessel strikes pose a serious threat to whales and may cause damage to the ships themselves. Sighting information can also be accessed through the Coast Guard Broadcast Notice to Mariners, NAVTEX, NOAA Weather Radio, and in the northeast reporting system, the Cape Cod Canal Vessel Traffic Control and the Bay of Fundy Vessel Traffic Control. This resolution asks that responding ships report whale sightings as well as sightings of dead, injured, or entangled marine mammals. Canadian vessels

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<sup>77</sup> U. Gärdenfors et al., *The Application of IUCN Red List Criteria at Regional Levels*, 15 CONSERV. BIOL. 1206 (2001).

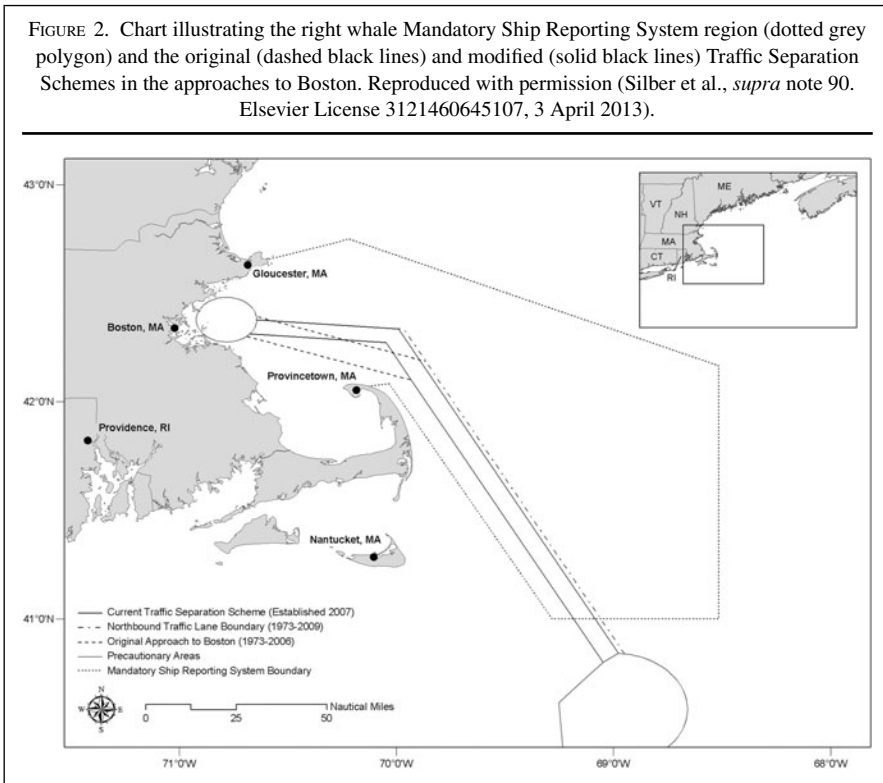
<sup>78</sup> M.H. Godfrey, D.L. Roberts, & B.J. Godley, *Taking It as Red: An Introduction to the Theme Section on the IUCN Red List of Threatened Species*, 6 ENDANGER. SPECIES RES. 109 (2008).

<sup>79</sup> A. D'Amato & S.K. Chopra, *Whales: Their Emerging Right to Life*, 85 AM. J. INT. L. 21–62 (1991).

<sup>80</sup> Judith van Leeuwen & Kristine Kern, *The External Dimension of European Union Marine Governance: Institutional Interplay between the EU and the International Maritime Organization*, 13 GLOBAL ENVIRON. POLIT. 1 (2013).

<sup>81</sup> See IMO, *Report to the Maritime Safety Committee*, NAV 44/14 (September 4, 1998), Annex 8; IMO, *Routeing of Ships, Ship Reporting and Related Matters (Including Voyage Planning); Ship Strikes of Endangered North Atlantic Right Whales in the Waters of Eastern Canada*, Canada, NAV 45/INF.3 (13 July 1999).

<sup>82</sup> Maritime Safety Committee, IMO, *Mandatory Ship Reporting Systems*, Resolution MSC.85(70), MSC 70/23/Add.2, Annex 16 (7 December 1998).



in these waters are required to comply with this reporting system and report to the U.S. shore-based authority as required.<sup>83</sup>

Based on the evolving understanding of population distributions, the IMO has subsequently adopted other measures to protect right whales from vessel strikes. Following on the proposal for mandatory ship reporting on the Atlantic coast in 1998,<sup>84</sup> the United States generated proposals for the Boston TSS in 2006,<sup>85</sup> a narrowing of the Boston Traffic Separation Scheme (TSS) in 2008 (Figure 2),<sup>86</sup> and an Area to be Avoided (ATBA) in the Great South Channel of the Gulf of Maine (Figure 3).<sup>87</sup> As well,

<sup>83</sup> Transport Canada, 10A Mandatory Ship Reporting System (Non-Canadian Waters), Annual Edition April 2013 to March 2014-Notice to Mariners 1 to 46 (2013).

<sup>84</sup> IMO, *Ship Reporting System for the Eastern Coast of the United States*, United States, NAV 44/3/1 (10 April 1998).

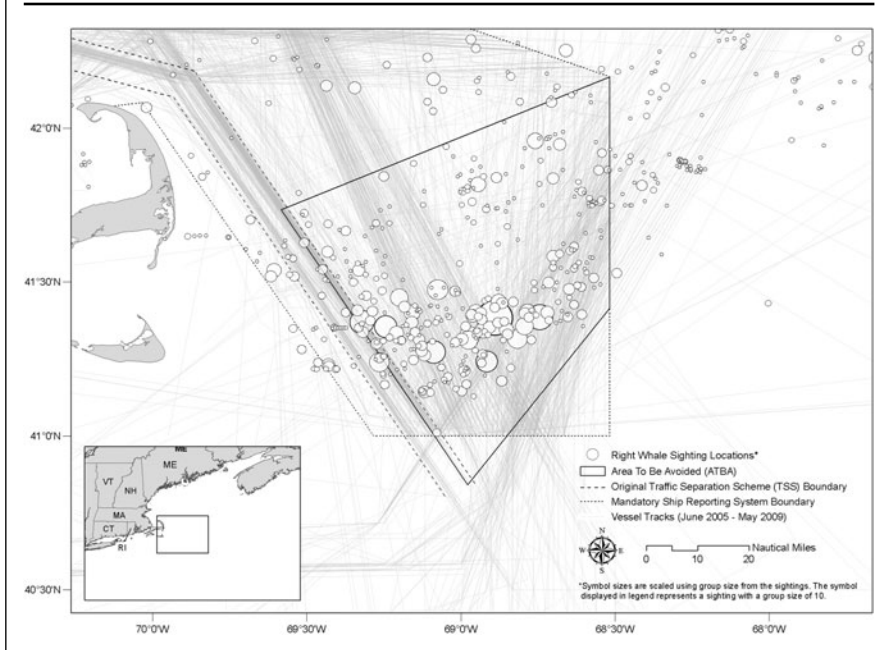
<sup>85</sup> IMO, *Amendment of the Traffic Separation Scheme "In the Approach to Boston, Massachusetts,"* United States, NAV 52/3/3 (27 March 2006).

<sup>86</sup> IMO, *Amendment of the Traffic Separation Scheme "In the Approach to Boston Massachusetts,"* United States, NAV 54/3 (27 March 2008).

<sup>87</sup> IMO, *Routing of Ships, Ship Reporting and Related Matters: Area to Be Avoided "In the Great South Channel,"* United States, NAV 54/3/1 (27 March 2008).



FIGURE 3. Chart of the approaches to Boston illustrating right whale sighting locations (abundance-scaled open circles), the right whale Mandatory Ship Reporting System region (dotted grey polygon), the original Traffic Separation Scheme (dashed black lines), and vessel traffic patterns (solid grey lines) for the period June 2005 through May 2009. Reproduced with permission (Silber et al., *supra* note 90. Elsevier License 3121460645107, April 3, 2013.)



Canada proposed to amend the existing Bay of Fundy TSS in 2002<sup>88</sup> and, in 2007, to establish the seasonal Roseway Basin Voluntary ATBA south of Nova Scotia<sup>89</sup> (Figures 4, 5). All of these proposals were submitted to the IMO before being codified in regulations and reflected in the respective countries' nautical charts.<sup>90</sup> The Canadian TSS and ATBA was prepared and submitted by Transport Canada; in the United States, TSS proposals were developed with leadership from NOAA.<sup>91</sup> In the United States, two TSSs in waters off New England were developed by NOAA in coordination with the U.S. Coast Guard (USCG). The first proposal, in 2006–2007 in Cape Cod Bay (amended

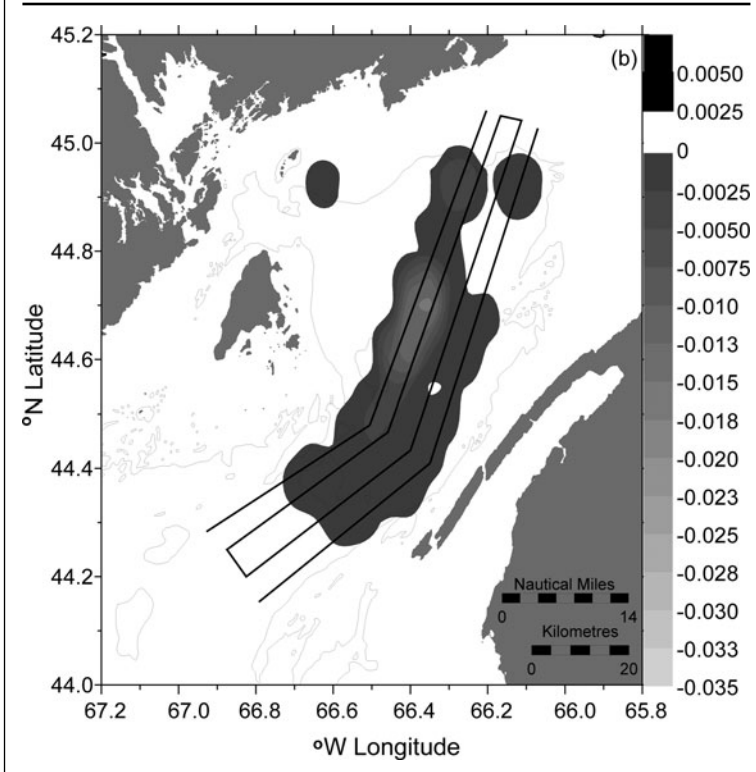
<sup>88</sup> IMO, *Amendment of the Traffic Separation Scheme in the Bay of Fundy and Approaches*, Canada, NAV 48/3/5 (5 April 2002).

<sup>89</sup> IMO, *Routing Measures Other than Traffic Separation Schemes, Areas to Be Avoided "In Roseway Basin, South of Nova Scotia,"* Canada, NAV 53/3/13 (20 April 2007).

<sup>90</sup> G. K. Silber et al., *The Role of the International Maritime Organization in Reducing Vessel Threat to Whales: Process, Options, Action and Effectiveness*, 36(6) MAR. POL. 1221–1233 (2012), at 1226.

<sup>91</sup> *Id.* at 1223.

FIGURE 4. Chart of the original Bay of Fundy traffic separation scheme showing the residual relative risk of a lethal collision between a vessel and a right whale if a 10-knot speed restriction was imposed in the region. Negative residuals indicate reduced risk. Reproduced with permission (Silber et al., *supra* note 90. Elsevier License 3121460645107, 3 April 2013).



in 2009),<sup>92</sup> changed shipping lanes and took effect with their publication in NOAA's navigational charts and in the USA Code of Federal Regulations by the USCG.<sup>93</sup> The ATBA off Maine took effect in 2009.<sup>94</sup>

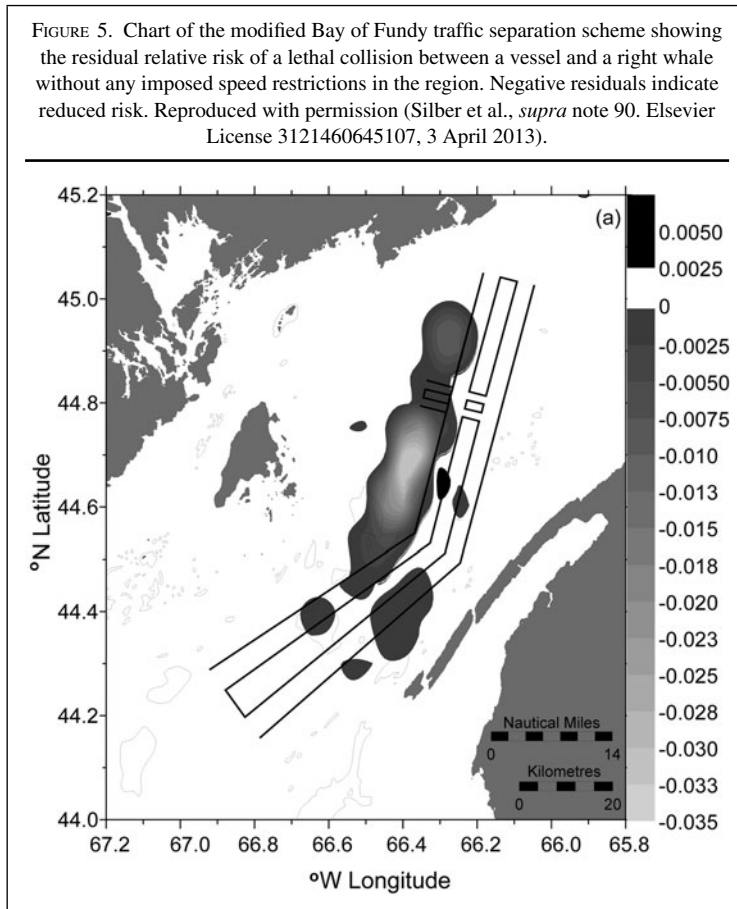
In 1999 the IMO created a Guidance Document for Minimizing the Risk of Ship Strikes with Cetaceans,<sup>95</sup> requiring that each member government take action minimizing the risk of vessel strikes and identifying vessel strikes as a growing issue of international concern. This document also provided a framework for problem identification including determining the behaviour of an endangered cetacean that makes it vulnerable to vessel strikes, the

<sup>92</sup> IMO, *supra* notes 84–89.

<sup>93</sup> Silber et al., *supra* note 90, at 1228.

<sup>94</sup> *Id.*

<sup>95</sup> IMO, *Guidance Document for Minimizing the Risk of Ship Strikes with Cetaceans*, MEPC.1/Circ.674 (31 July 2009).



time of year and areas in which the threat is the greatest, and the types of vessel traffic that pose the greatest threats. Problem responses include creating routes that avoid known population distributions and reducing vessel speeds in sensitive areas. At the international level, the guidance encourages sharing of information and coordination.<sup>96</sup>

Information on vessel speed and traffic patterns has been identified as a key means of monitoring the effectiveness of IMO measures and determining adherence, and the need to improve the spatial resolution and coverage could lead to a more comprehensive and global approach to marine planning via IMO measures.<sup>97</sup> In addition, while the most successful measures taken by the IMO are followed by legal implementation at the national level, the success

<sup>96</sup> *Id.* at para. 13.

<sup>97</sup> Silber et al., *supra* note 90, at 1229.

of measures are also founded on the existence of substantial information on whale occurrence and distribution.<sup>98</sup>

The IMO also establishes particularly sensitive sea areas (PSSAs) based on ecological criteria including uniqueness or rarity of an area or ecosystem, critical habitat, spawning or breeding grounds, and fragility.<sup>99</sup> Based on ecological criteria and identifiable threats, a member government can submit a proposal to designate a PSSA to the IMO with recommended protective measures. Currently, the Gulf of Maine area has not been designated as a PSSA.<sup>100</sup>

#### 4.4 The International Whaling Commission

The International Whaling Commission (IWC) was established in 1946 and has 89 members.<sup>101</sup> Canada ratified the International Convention for the Regulation of Whaling February 25, 1949, but subsequently withdrew effective 30 June 1982.<sup>102</sup> The United States ratified the Convention effective 10 November 1948, and remains a member today.<sup>103</sup> The management of whales as stocks was part of the purpose at the time of the creation of the IWC,<sup>104</sup> but this changed in the 1970s to protecting whales as opposed to managing them as stocks and a commercial moratorium was instituted in 1985/86.<sup>105</sup> The global effectiveness of the IWC is reinforced by the development of national legislation in countries such as the United States.<sup>106</sup> The IWC has served as a valuable platform for the conservation of whales. However, its conservation efforts are limited by the tactics that it uses, which are focused on commercial and scientific whaling as opposed to activities that result in the incidental killing of whales, such as vessel strikes and entanglement in fishing gear.

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<sup>98</sup> *Id.*

<sup>99</sup> IMO, *Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas*, A 24/Res.982 (6 February 2006), paras. 4.4.1–4.4.11.

<sup>100</sup> See IMO, *Particularly Sensitive Sea Areas*, at <http://www.imo.org/ourwork/environment/pollutionprevention/pssas/Pages/Default.aspx> (visited 25 March 2013).

<sup>101</sup> IWC, *List of Member Nations*, at <http://iwcoffice.org/commission/iwcmain.htm#nations> (visited 25 March 2013).

<sup>102</sup> IWC, *Member Status*, at [http://iwcoffice.org/\\_documents/commission/convention\\_status.pdf](http://iwcoffice.org/_documents/commission/convention_status.pdf) (visited 25 March 2013).

<sup>103</sup> *Id.*

<sup>104</sup> D.D. Caron, *The International Whaling Commission & the North Atlantic Marine Mammal Commission: The Institutional Risks of Coercion for Consensual Structures*, 89 AM. J. INT. L. 154 (1995).

<sup>105</sup> *Id.* at 156.

<sup>106</sup> The 1971 Pelly Amendment to the Fisherman's Protective Act of 1967, 22 U.S.C. S.1978 (1988) (required closure of U.S. markets to countries that impeded the effectiveness of the IWC, and the 1979 Packwood-Magnuson Amendment to the Fishery Conservation and Management Act of 1976 (16 U.S.C. s.1821(e)(2)(A), which denied access to U.S. fishing waters to countries that impeded the IWC). See Caron, *supra* note 104, at 158.

The IWC governs international whaling activities in addition to activities that may indirectly impact whale populations. Under Article IV of the IWC Convention, the Commission is authorized to study and to disseminate publications concerning the current conditions of whale populations and activities affecting whale populations.<sup>107</sup> Although the overall emphasis of the Convention is to allow the IWC to create regulations affecting the direct hunting of whales by member countries, Article VI does state that

[t]he Commission may from time to time make recommendations to any or all Contracting Governments *on any matters which relate to whales* or whaling and to the objectives and purposes of this Convention.<sup>108</sup>

The scope of the IWC could potentially include aspects of fisheries and shipping practices. Adopting more rigorous IWC policy regarding shipping and fishing practices on the high seas that could reduce the incidental killing of whales could be supported by whaling and non-whaling countries alike as they are equally interested in protecting whale stocks. The Convention sets catch limits on different types of whales, just as national fishing agencies set a total allowable catch for certain species in specific areas. This suggests that the IWC could conceivably start to manage whale stocks at the global scale by gathering information on fishing and shipping impacts on the stocks and suggesting management strategies to increase the size of the stocks.

The IWC's Schedule is updated annually.<sup>109</sup> Section V of the Schedule includes requirements for measurements that must be taken for captured whales for the purpose of determining that the size of the whales are within allowable catch ranges. Additional required information includes the time, species, capture markings, sex, and whether the whale was pregnant at the time of capture.<sup>110</sup> Given this unique opportunity for information gathering, additional record keeping requirements could be added to help inform the IWC about previous injuries to the captured whales, such as vessel strikes and gear entanglements. These data could inform the development of regulations or advocacy for shipping and fishing practices that better protect whales.

## 5. REGIONAL/MULTINATIONAL INITIATIVES

### 5.1 Commission for Environmental Cooperation

Established in 1994, the Commission for Environmental Cooperation (CEC) is a regional intergovernmental body with the objective of fostering the

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<sup>107</sup> International Convention for the Regulation of Whaling, 2 December 1946, 2124 U.N.T.S. 161.

<sup>108</sup> *Id.* (emphasis added).

<sup>109</sup> IWC, *International Convention for the Regulation of Whaling, 1946*, Schedule, as amended by the Commission at the 64th Annual Meeting, Panama City, Panama (July 2012). The Schedule to the Convention sets out measures that govern the conduct of whaling worldwide.

<sup>110</sup> *Id.* at ss. V(23) & VI(24).

protection and improvement of the environment in the territories controlled by Mexico, the United States, and Canada.<sup>111</sup> The main aims of the CEC include addressing regional environmental concerns, preventing environmental conflicts, and promoting the enforcement of environmental law. The CEC facilitates cooperation on transboundary enforcement of member environmental laws through the North American Working Group on Environmental Enforcement and Compliance Cooperation (EWG). The EWG is composed of senior-level environmental enforcement officials from the three countries.<sup>112</sup>

Under the Conserving Marine Species and Spaces of Common Concern project, the parties shared data and information about marine habitats of ecological importance in the North American region.<sup>113</sup> The North Atlantic right whale was listed as a marine species of common conservation concern.<sup>114</sup> The North American Marine Protected Areas Network (NAMPAN) aims to strengthen the protection of marine biodiversity by creating a network of MPAs that span jurisdictions and user groups. In addition to sharing spatial information on ecosystem boundaries, NAMPAN is developing common priorities through a listing of migratory and transboundary species that are at risk, a list of important habitat areas, and common marine conservation targets and indicators.<sup>115</sup>

North American Conservation Action Plans (NACAPs) involve the coordination of Mexico, Canada, and the United States and cooperation among scientists, academics, and environmentalists.<sup>116</sup> Given that the range of the Atlantic right whale does not include Mexican waters, there is no NACAP for this species. However, there is an NACAP for the humpback whale, whose range intersects that of the right whale in the Gulf of Maine. Action items identified in this NACAP, such as reducing entanglement through gear modification and/or fishery closures, preventing vessel strikes through speed and approach modifications, and identifying sound sources that cause acoustic stress, would also benefit the right whale.<sup>117</sup> However, the lack of an NACAP specifically for right whales means that the species is not monitored and

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<sup>111</sup> North American Agreement on Environmental Cooperation, 14 September 1993, 32 I.L.M. 1482 (1993).

<sup>112</sup> *Id.*

<sup>113</sup> Paolo Solano & Dane Ratliff, *Commission for Environmental Cooperation (CEC)*, 21 Y.B. INT'L ENVTL. L. 1 (2010).

<sup>114</sup> CEC, *Species of Common Conservation Concern*, at [http://www.cec.org/Storage/32/2363\\_SOE\\_SpeciesCommon\\_en.pdf](http://www.cec.org/Storage/32/2363_SOE_SpeciesCommon_en.pdf) (visited 10 April 2013).

<sup>115</sup> CEC, *The North American Marine Protected Areas Network*, at [http://www.cec.org/Storage/45/3730\\_NA-MPA-Network.pdf](http://www.cec.org/Storage/45/3730_NA-MPA-Network.pdf) (last visited 25 March 2013) (provides contact information for NAMPAN initiatives).

<sup>116</sup> CEC, *North American Conservation Action Plans (NACAPs)*, at [http://www.cec.org/Page.asp?PageID=1291&ContentID=2300&SiteNodeID=241&BL\\_ExpandID=104](http://www.cec.org/Page.asp?PageID=1291&ContentID=2300&SiteNodeID=241&BL_ExpandID=104) (visited 13 March 2013).

<sup>117</sup> CEC, NORTH AMERICAN CONSERVATION ACTION PLAN FOR THE HUMPBACK WHALE (2005).

there is no compilation of sighting data that would support action measures specifically geared towards the conservation of right whales.

## 5.2 Canada-U.S. Transboundary Resources Steering Committee

The Canada-U.S. Transboundary Resources Steering Committee (Steering Committee) was established in 1995 to facilitate biannual discussion between Canada and the United States on transboundary integrated ecosystem management issues in the Gulf of Maine and Georges Bank marine environment. The Steering Committee's collaborative approach to fisheries resource management in the Gulf of Maine was prompted by the establishment of the "Hague Line" maritime boundary delimitation. Scientific collaboration has been focused in the Transboundary Resource Assessment Committee; the Transboundary Management Guidance Committee provides a mechanism for developing sustainable harvesting strategies for selected straddling fish stocks on Georges Bank.<sup>118</sup> In recent years, the Steering Committee has broadened its focus to include advisory working groups on various aspects of integrated marine management.

The Species at Risk Working Group (SARWG) focuses on coordinated assessments, complementary threat mitigation strategies, and collaborative recovery planning for candidate and listed aquatic species at risk of common concern to Canada and the United States.<sup>119</sup> SARWG has provided regular updates on, among others, the North Atlantic right whale since its establishment in 2003. In its report to the September 2012 Steering Committee meeting, SARWG noted that although it had been unable to meet in 2012, information continued to be shared on right whale entanglements and ship strike mitigation. SARWG has plans to discuss short- and long-term plans of action for the right whale. The report concludes that "data suggest that the right whale population is on the upswing due to recovery efforts in both countries, including revised shipping lanes."<sup>120</sup> However, SARWG did not offer any evidence on how it reached the conclusion that the upswing was due to recovery efforts.

## 6. CANADIAN LAW

### 6.1 Oceans Act

Canada's Oceans Act states that the national strategy will be based on principles of "sustainable development . . . the integrated management of activities

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<sup>118</sup> See, for example, G. Shepherd et al., TRANSBOUNDARY RESOURCES ASSESSMENT COMMITTEE GULF OF MAINE/GEORGES BANK ATLANTIC HERRING STOCK ASSESSMENT UPDATE (2009).

<sup>119</sup> See DFO, *Canada/USA Species at Risk Working Group (SARWG)*, at <http://www2.mar.dfo-mpo.gc.ca/science/sc/sar/sar-eng.html> (visited 12 April 2013).

<sup>120</sup> U.S./CANADA TRANSBOUNDARY RESOURCES STEERING COMMITTEE, FINAL MINUTES, BOSTON, 13 SEPTEMBER 2012 (2012), at 6.

in estuaries, coastal waters and marine waters . . . and . . . the precautionary approach.”<sup>121</sup> Under the Act, management plans must be integrated through coordination among ministers, boards, and agencies.<sup>122</sup> The Act provides for the establishment of marine protected areas in Canadian waters designated for

. . . the conservation and protection of commercial and non-commercial fishery resources, including marine mammals, and their habitats . . . , the conservation and protection of endangered or threatened marine species, and their habitats; . . . the conservation and protection of unique habitats. . . areas of high biodiversity or biological productivity.<sup>123</sup>

Under Section 42, the Minister of Fisheries and Oceans has the power to collect data for the purpose of understanding ecosystems by conducting surveys, applied research, and investigations, and then disseminating the data.

The Gulf of Saint Lawrence includes the Basin Head MPA and two areas of interest (AOI), the Manicouagan AOI and the St. Lawrence Estuary AOI.<sup>124</sup> The St. Lawrence Estuary AOI would help ensure the conservation and long-term protection of year-round and migratory marine mammals, including the right whale in the Gulf of St. Lawrence.<sup>125</sup> While sightings of the right whale in this area are rare,<sup>126</sup> an MPA could improve the quality of marine environmental management in the Gulf of St. Lawrence by bringing attention to levels of toxins in the food chain, noise exposure, shipping practices, and fishing gear entanglements in the region.<sup>127</sup> Fisheries and Oceans Canada also conducts scientific research in the Gully MPA, located on the Scotian Shelf, which may concern the right whale, including acoustic backscatter data and the geographic and vertical distribution of zooplankton.<sup>128</sup>

## 6.2 Marine Mammal Regulations

Under the Fisheries Act,<sup>129</sup> right whales are protected under the Marine Mammal Regulations,<sup>130</sup> which prohibit fishing, trapping, or injuring right whales

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<sup>121</sup> Oceans Act, S.C. 1996, c. 31 (30).

<sup>122</sup> *Id.* at (32, 33).

<sup>123</sup> *Id.* at (35).

<sup>124</sup> DFO, *Marine Protected Areas*, <http://www.dfo-mpo.gc.ca/oceans/marineareas-zonesmarines/lomazego/atlantique-atlantique/gsl/3/325-eng.htm> (visited 25 March 2013).

<sup>125</sup> DFO, *The St. Lawrence Estuary Marine Protected Area Project*, <http://www.qc.dfo-mpo.gc.ca/ZPMEstuaire/en/proj.asp> (visited 25 March 2013).

<sup>126</sup> Canadian Whale Institute, *Whale Facts, Gaspé Peninsula*, <http://www.rightwhale.ca/gaspepeninsula-peninsulegaspesienne.e.php> (visited 25 March 2013).

<sup>127</sup> DFO, *supra* note 124.

<sup>128</sup> Species at Risk Public Registry, *Species Profile, North Atlantic Right Whale* (provides an explanation for issuing permit (#DFO-MAR-2009-005), pursuant to the provisions of section 73 of SARA (2009) and explanation for issuing permit (#DFO-MAR-2011-010), pursuant to the provisions of section 73 of SARA (2011)).

<sup>129</sup> Fisheries Act, R.S.C. 1985, c. F-14.

<sup>130</sup> Marine Mammal Regulations, SOR/93-56.



and place reporting requirements on any individual who does trap or injure a right whale. Under the Regulations, “No person shall disturb a marine mammal except when fishing for marine mammals under the authority of these Regulations.”<sup>131</sup> However, the Regulations were designed to regulate the commercial seal and Aboriginal seal and whale harvests as opposed to imposing restrictions on fishing in general.<sup>132</sup>

### 6.3. Species at Risk Act

The Species at Risk Act (SARA) includes the right whale (*E. glacialis* and *E. japonica*) on the List of Wildlife Species at Risk (Schedule 1).<sup>133</sup> The Species at Risk Act Environmental Assessment Checklists for Species under the Responsibility of the Minister Responsible for Environment Canada and Parks Canada provides guidance on considerations for assessing effects on species at risk in the context of federal environmental assessments under the Canadian Environmental Assessment Act.<sup>134</sup> It complements the Addressing Species at Risk Act Considerations under the Canadian Environmental Assessment Act for Species under the Responsibility of the Minister Responsible for Environment Canada and Parks Canada (2010), which shows how a federal environmental assessment can address certain SARA requirements.<sup>135</sup> While this document develops regional ecosystem assessment frameworks, including impact assessment, monitoring, and planning,<sup>136</sup> no regulations have been published under SARA to implement this framework.<sup>137</sup> SARA gives the minister authority to “adopt a multispecies or an ecosystem approach when preparing the recovery strategy.”<sup>138</sup>

Under SARA, Fisheries and Oceans Canada first developed a recovery plan for the right whale in 2000; the most recent version, released in 2009, is the Final Recovery Strategy for the North Atlantic Right Whale in Canadian Waters.<sup>139</sup> Two areas of SARA compliant critical habitat adjacent to the Gulf of

<sup>131</sup> *Id.* at Part 1(7).

<sup>132</sup> M.L. Campbell & V.G. Thomas, Protection and Conservation of Marine Mammals in Canada: A Case for Legislative Reform, 7 OCEAN & COAST. L. J. 221, 229 (2001).

<sup>133</sup> Species at Risk Act, S.C. 2002, c. 29 [hereinafter SARA].

<sup>134</sup> SARA-CEAA GUIDANCE WORKING GROUP (CANADA), THE SPECIES AT RISK ACT ENVIRONMENTAL ASSESSMENT CHECKLISTS FOR SPECIES UNDER THE RESPONSIBILITY OF THE MINISTER RESPONSIBLE FOR ENVIRONMENT CANADA AND PARKS CANADA (2010).

<sup>135</sup> SARA-CEAA GUIDANCE WORKING GROUP (CANADA), ADDRESSING SPECIES AT RISK ACT CONSIDERATIONS UNDER THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT FOR SPECIES UNDER THE RESPONSIBILITY OF THE MINISTER RESPONSIBLE FOR ENVIRONMENT CANADA AND PARKS CANADA (2010).

<sup>136</sup> *Id.*

<sup>137</sup> Government of Canada, *Species at Risk Public Registry*, at [http://www.sararegistry.gc.ca/approach/act/regulations\\_e.cfm](http://www.sararegistry.gc.ca/approach/act/regulations_e.cfm) (last 21 visited March 2013).

<sup>138</sup> SARA, *supra* note 133, at s. 41(3).

<sup>139</sup> M.W. BROWN ET AL., RECOVERY STRATEGY FOR THE NORTH ATLANTIC RIGHT WHALE (*EUBALAENA GLACIALIS*) IN ATLANTIC CANADIAN WATERS [FINAL], *Species at Risk Act Recovery Strategy Series, Fisheries and Oceans Canada* (2009).

Maine have been identified in Canadian waters: Roseway Basin on the Scotian Shelf and Grand Manan Basin in the Bay of Fundy.<sup>140</sup> Objectives under the Recovery Plan include the overall aim of reducing human caused mortality to a level where the population can recover by reducing vessel strikes, gear entanglements, habitat degradation, and exposure to contaminants.<sup>141</sup> Each of these objectives is paired with measures of progress and performance indicators.<sup>142</sup>

#### 6.4 National Marine Conservation Area Act

Under the National Marine Conservation Area Act, the Minister responsible for the Parks Canada Agency manages and oversees the establishment of Marine Conservation Areas and must coordinate with the Minister of Fisheries and Oceans and the Minister of Transport when provisions of a management plan involve, *inter alia*, marine navigation and safety.<sup>143</sup> Currently, there are no designated or proposed Marine Conservation Areas in the Gulf of Maine region.<sup>144</sup>

#### 6.5 Federal Marine Protected Areas Strategy and National Framework for Canada's Network of Marine Protected Areas

Pursuant to Canada's Oceans Action Plan, the Federal Marine Protected Areas Strategy aims to create a network of MPAs that will serve to protect species at risk and fulfill the aims of SARA.<sup>145</sup> The Strategy recognizes that different areas can serve as key points of conservation during a species' life cycle. Implementing this strategy is also based on the understanding that cross-jurisdictional and cross-departmental cooperation is essential.<sup>146</sup> Locating MPAs is based on an ecosystem approach and the precautionary principle, which means that "action on conservation measures can and will be taken in the absence of scientific certainty."<sup>147</sup> However, it is notable that precautionary intent stated at the overarching management scale is often "diluted through either decision making institutions or processes or more specific instruments that do not incorporate resilience concepts."<sup>148</sup>

<sup>140</sup> *Id.*, Figure 2, at 8 (the map shows that the areas designated as critical habitat corresponds to high densities of whale sightings from 1951–2005.).

<sup>141</sup> *Id.* at 33–38.

<sup>142</sup> *Id.*, Table 2, at 38–39.

<sup>143</sup> National Marine Conservation Area Act, S.C. 2002, c. 18, s. 9(4.1).

<sup>144</sup> Parks Canada, *Creating New National Marine Conservation Areas of Canada* at [http://www.pc.gc.ca/progs/amnc-nmca/cnamnc-cnmca/index\\_e.asp](http://www.pc.gc.ca/progs/amnc-nmca/cnamnc-cnmca/index_e.asp) (visited 21 March 2013).

<sup>145</sup> DFO, CANADA'S FEDERAL MARINE PROTECTED AREAS STRATEGY (2005).

<sup>146</sup> *Id.* at 12–17.

<sup>147</sup> *Id.* at 10.

<sup>148</sup> Janis Searles Jones & Steven Ganey, *Building the Legal and Institutional Framework, in ECOSYSTEM-BASED MANAGEMENT FOR THE OCEANS* (Karen McLeod and Heather Leslie eds., 2009).

In September 2011, Canada's federal, provincial, and territorial governments approved in principle the National Framework for Canada's Network of Marine Protected Areas.<sup>149</sup> The Framework divides Canada into marine bioregions (the Scotian Shelf bioregion includes the Gulf of Maine and Bay of Fundy) and sets out the guiding principles for the development of a national network of MPAs. Although there are several federal or provincial MPAs in the Gulf or Maine/Bay of Fundy region or on the Scotian Shelf, none have been designated for the purpose of protecting right whales.<sup>150</sup>

## 6.6 Atlantic Fisheries Regulation

Fishing activities impacting the survival of the right whale in the Gulf of Maine in Canadian waters are regulated under the Fisheries Act.<sup>151</sup> Under Part IV, paragraph 37, the Canadian government sets restrictions on the spacing of mobile fishing gear and size requirements for lobster traps.<sup>152</sup> However, Canada has not mandated changes in the Scotia-Fundy fisheries directed at reducing right whale entanglements.<sup>153</sup> In an article examining whale behavioural spatial patterns and gear use, Vanderlaan et al. suggest fishery- and area-specific seasonal closures in Canadian waters that could be implemented under the Fisheries Act to this end.<sup>154</sup>

## 6.7 Canada Shipping Act 2001

The Canada Shipping Act 2001 is the principal legislation governing marine safety and protection of the marine environment.<sup>155</sup> The Act provides that the Minister of Transport can make regulations establishing vessel traffic services zones in Canadian waters (Section 136(1a)) and regulations "respecting the information to be provided and the procedures and practices to be followed by

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<sup>149</sup> GOVERNMENT OF CANADA, NATIONAL FRAMEWORK FOR CANADA'S NETWORK OF MARINE PROTECTED AREAS (2011).

<sup>150</sup> Government of Canada, *Marine Protected Areas: Borders, Oceans Info*, at <http://www.oceans.info.gc.ca/map-carte/index-eng.asp> (visited 21 March 2013) (federal MPAs include the Machias Seal Island Migratory Bird Sanctuary, Grand Manan Migratory Bird Sanctuary, Musquash Estuary Marine Protected Area, John Lusby National Wildlife Area; marine-related areas protected under provincial law include inland river areas such as the Little Salmon River and the Musquash).

<sup>151</sup> See, for example, Myers, *supra* note 18.

<sup>152</sup> *Atlantic Fishery Regulation*, 1980-81-82-83, c. 172, §61(4) (1985) (Closure times are set for the different areas of lobster fishing zones in the Gulf of Maine area, with significant restrictions set on all areas throughout the year. Trap quotas are set for the various fishing areas, with greater fees corresponding to a greater number of permitted traps and the overall maximum numbers of traps allowed depending on the management area. Under paragraph 58 of this same Act, the transport of lobster traps during a close time is regulated and restricted to transportation for the purpose of the sale, repair, and storage of those traps (125 × 90 × 50 cm))

<sup>153</sup> A.S.M. Vanderlaan et al., *Fishing-Gear Threat to Right Whales (Eubalaena Glacialis) in Canadian Waters and the Risk of Lethal Entanglement*, 68 CAN. J. FISH. AQUAT. SCI. 2174, 2191 (2011).

<sup>154</sup> *Id.*

<sup>155</sup> Canada Shipping Act, 2001, S.C. 2001, c. 26.

vessels that are about to enter, leave or proceed within a VTS zone” (Section 136(1b)). The Bay of Fundy VTS was established under the Vessel Traffic Services Zone Regulations<sup>156</sup> (SOR/89-98), which were promulgated under the Canada Shipping Act 2001. The Regulations do not, however, include any specific reporting requirements concerning vessel strikes with marine mammals. With regards to vessel strikes, the main application of the Canada Shipping Act is effected through Rule 10 of the Collision Regulations, which applies any TSS adopted by the IMO to vessels covered under the Act.<sup>157</sup> Details on the compulsory and voluntary routing requirements adopted by the IMO (see below) under Rule 10 in the Bay of Fundy and approaches are published annually in the Notice to Mariners.<sup>158</sup> In addition, General Guidelines for Important Marine Mammal Areas are published in the Notice to Mariners.<sup>159</sup> The Guidelines include provisions regarding North Atlantic right whale critical habitats, including reporting of any collisions with whales, entangled whales, or dead whales, and instructions regarding seasonal transit through the Grand Manan Basin and Roseway Basin ATBA. As noted above, Canadian vessels are also required to comply with the mandatory ship reporting system adopted by IMO off the northeastern coast of the United States.<sup>160</sup>

Mentioned previously is Canada’s implementation of several conservation area measures based on right whale sightings in Canadian waters in the Gulf of Maine. The Bay of Fundy TSS was approved by the IMO in 1982<sup>161</sup> and implemented by Transport Canada in 1983. It was later recognized that the TSS intersected seasonal aggregations of right whales in the Grand Manan Basin. Following approval by the IMO,<sup>162</sup> the TSS was modified on 1 July 2003.<sup>163,164</sup> In 2008, with the support of the IMO, Transport Canada also established the Roseway Basin ATBA south of Nova Scotia to protect whales from vessel strikes from ships 300 gross tonnage and upwards in transit from 1 June through 31 December.<sup>165</sup> Although avoidance is voluntary, studies of vessel transits around the designated area showed 70 percent compliance after the

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<sup>156</sup> Vessel Traffic Services Zone Regulations, SOR/89-98.

<sup>157</sup> Collision Regulations, C.R.C., c. 1416.

<sup>158</sup> TRANSPORT CANADA, 10 ROUTING OF SHIPS, ANNUAL EDITION APRIL 2013 TO MARCH 2014, NOTICE TO MARINERS (2013).

<sup>159</sup> TRANSPORT CANADA, 5 GENERAL GUIDELINES FOR IMPORTANT MARINE MAMMAL AREAS, ANNUAL EDITION APRIL 2013 TO MARCH 2014, NOTICE TO MARINERS (2013).

<sup>160</sup> Transport Canada, *supra* note 80.

<sup>161</sup> IMO (formerly Inter-Governmental Maritime Organization), *Report of the Maritime Safety Committee on Its Forty-sixth Session* 46/19, Annex 11 (1982).

<sup>162</sup> IMO, *Report of the Maritime Safety Committee on Its Seventy-sixth Session*, MSC 76/23 (2002), at 58.

<sup>163</sup> IMO, *New and Amended Traffic Separation Schemes*, COLREG.2/Circ.52 (6 January 2003), Annex 5.

<sup>164</sup> Silber et al., *supra* note 90.

<sup>165</sup> IMO, *Routing Measures Other than Traffic Separation Schemes*, SN.1/Circ.263 (October 2007).

first year of implementation and 80 percent compliance after the second year<sup>166</sup> and that the voluntary compliance resulted in an 82 percent reduction in the per capita rate of lethal vessel strikes.<sup>167</sup>

## 7. UNITED STATES LAW

### 7.1 Federal Regulation

#### 7.1.1 *Endangered Species Act and Marine Mammal Protection Act*

In U.S. waters, the right whale is protected under the Marine Mammal Protection Act (MMPA),<sup>168</sup> as well as the Endangered Species Act (ESA).<sup>169</sup> The North Atlantic right whale is protected as “endangered” under the ESA.<sup>170</sup> Under the ESA, the National Oceanic and Atmospheric Administration (NOAA) is authorized to regulate activities that may increase whale mortality.<sup>171</sup> NOAA Fisheries is required to develop and implement plans for the species listed under the ESA following a formal process, in part involving a determination of whether a variety of activities will reduce the likelihood of species recovery. This determination is based on the best available information.<sup>172</sup> In 2008, NOAA Fisheries completed a status review of right whales in the North Pacific and North Atlantic oceans under the ESA and issued a rule determining that the populations in the two oceans should be listed as two separate endangered species.<sup>173</sup>

The MMPA focuses on monitoring bycatch and gives NOAA the power to regulate for the purpose of reducing the numbers of bycatch via take reduction teams (TRTs), which develop and implement plans to reduce the mortality of protected species.<sup>174</sup> The Act directs NOAA

to immediately undertake a program of research and development for the purpose of devising improved fishing methods and gear so as to reduce to the maximum extent practicable the incidental taking of marine mammals in connection with commercial fishing.<sup>175</sup>

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<sup>166</sup> A. S. M. Vanderlaan & C. T. Taggart, *Efficacy of a Voluntary Area to Be Avoided to Reduce Risk of Lethal Vessel Strikes to Endangered Whales*, 23 CONSERV. BIOL. 6 (2009).

<sup>167</sup> J.M. Van der Hoop, A.S.M. Vanderlaan, & C.T. Taggart, *Absolute Probability Estimates of Lethal Vessel Strikes to North Atlantic Right Whales in Roseway Basin, Scotian Shelf*, 22 ECOL. APPL. 7 (2012).

<sup>168</sup> Marine Mammal Protection Act, 16 U.S.C. §1361.

<sup>169</sup> Endangered Species Act, 16 U.S.C. §1531.

<sup>170</sup> 16 U.S.C. §1532; 50 C.F.R. §224.101.

<sup>171</sup> 16 U.S.C. §1533, 1538; 50 C.F.R. §226.203.

<sup>172</sup> 16 U.S.C. §1533, 1539; NOAA Fisheries, Office of Protected Resources, *Recovery Plan for the North Atlantic Right Whale, (Eubalaena Glacialis)* Revision (2005).

<sup>173</sup> Endangered Marine and Anadromous Species, 50 C.F.R. § 224.101 (*E. japonica*, the North Pacific right whale; *E. glacialis*, the North Atlantic right whale).

<sup>174</sup> 16 U.S.C. § 1387.

<sup>175</sup> *Id.* at § 1381.

This suggests that changing gear types, as opposed to reducing effort, is the preferred strategy. The MMPA also operates under a more quantitative response to bycatch in comparison to the ESA, requiring the TRTs to reduce mortality within six months “to levels less than the potential biological removal level established for that stock” and within five years to “insignificant levels approaching a zero rate,” while providing flexibility as to how that target is reached.<sup>176</sup> However, it is notable that a U.S. Government Accountability Office (GAO) report from 2008 identified actually assessing the effectiveness of take reduction teams and programmes as a major weakness of the NMFS strategy.<sup>177</sup>

In addition to monitoring compliance and the true impact of the regulations, the GAO report also notes that NMFS, Marine Mammal Commission, and Scientific Review officials all view the six-month time frame untenable given the scarcity of data and the length of time it takes to process what data they have.<sup>178</sup> Perhaps most significant is the fact that while the MMPA sets clear take reduction goals, there are no consequences for NMFS or the regulated fisheries if the goal is not met—thus reducing the incentive to monitor, to report progress towards, or to actually meet the goal.<sup>179</sup> The North Atlantic right whale is currently “depleted” under the MMPA.<sup>180</sup> Under the MMPA, NMFS prepares a “List of Fisheries” classifying U.S. commercial fisheries by the frequency of gear entanglements with marine mammals that result from fishing activity in three regions: the Pacific Ocean; Atlantic, Gulf of Mexico, and Caribbean; and the high seas.<sup>181</sup> This listing could potentially influence or be used to influence consumer choice given the recent trend towards advertising fish on the basis of sustainability and/or low environmental impacts.

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<sup>176</sup> 16 U.S.C. §1387.

<sup>177</sup> U.S. Government Accountability Office, National Marine Fisheries Service: Improvements Are Needed in the Federal Process Used to Protect Marine Mammals from Commercial Fishing, GAO-09-78 (2008), at 37–38.

<sup>178</sup> *Id.*

<sup>179</sup> *Id.* at 38.

<sup>180</sup> NOAA Fisheries, Office of Protected Resources (OPR), *North Atlantic Right Whales (Eubalaena glacialis)*, at [http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/rightwhale\\_northatlantic.htm](http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/rightwhale_northatlantic.htm) (visited 10 April 2013) (The MMPA defines “depleted” as any case in which (A) the Secretary, after consultation with the Marine Mammal Commission and the Committee of Scientific Advisors on Marine Mammals established under Title II of this Act, determines that a species or population stock is below its optimum sustainable population; (B) a State, to which authority for the conservation and management of a species or population stock is transferred under section 109, determines that such species or stock is below its optimum sustainable population; or (C) a species or population stock is listed as an endangered or threatened species under the ESA (16 U.S.C. 1362(1)).).

<sup>181</sup> NOAA Fisheries, OPR, *2012 List of Fisheries*, <http://www.nmfs.noaa.gov/pr/interactions/lof/final2012.htm> (visited 10 April 2013) (interactions with the North Atlantic right whale have been reported in the northeast sink gillnet, the northeast/ mid-Atlantic American lobster trap/pot, and the southeastern U.S. Atlantic shark gillnet fisheries).

### 7.1.2 Atlantic Large Whale Take Reduction Plan

Under the MMPA, §229.32, the Atlantic Large Whale Take Reduction Plan (ALWTRP) Regulations are implemented with the purpose of reducing “incidental mortality and serious injury of the fin, humpback, and right whales . . . from Maine through Florida.” In the Gulf of Maine, Northern Near Shore Trap/Pot Waters and Northern Inshore Trap/Pot Waters under the ALWTRP overlap with Lobster Management Area 1, Area 2, and the Outer Cape Lobster Management Area established under the Magnuson-Stevens Act.<sup>182</sup> While the Plan focuses on the North Atlantic right whale, it is also intended to reduce entanglements of humpback and fin whales.<sup>183</sup>

The Plan regulates gear types, including gillnets and traps or pots. At depths equal to or greater than 280 fathoms, ground lines are exempted from the sinking line requirements and anchored gillnets are exempted from the weak link requirement.<sup>184</sup> In addition, the Plan requires gear markings depending on the type of gear and the area in which the gear is used, and establishes a winter restricted period for the Cape Cod Bay Area from 1 January to 15 May, with weak buoy line links.<sup>185</sup> The Regulation specifically applies the vessel and gear requirements year-round to state as well as federal waters.<sup>186</sup> Based on an assessment of the availability of sinking line and the economic burden of switching to the new line, the NMFS has recommended periodic delays for implementing sinking groundline requirements for Atlantic trap and pot fishermen through the Regulatory Impact Review.<sup>187</sup> At the same time NMFS moved ahead in 2005 to encourage sinkline use through buyback programmes and other management measures.<sup>188</sup>

The ALWTRP also involves a disentanglement and entanglement reporting effort, research on the whale populations, and a system of sighting reporting.<sup>189</sup> In January 2007, NMFS issued a short summary of whale research needs in the context of the ALWTRP, which included a need to further investigate whale behaviour and migration trends as well as research into whale prey distribution, entanglement research on such issues as the required weakness of fishing line, and using simulations, available entanglement data, and carcass studies to determine the types of gear modifications that could reduce entanglement issues.<sup>190</sup> In 2009, the NMFS Northeast Regional

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<sup>182</sup> 50 C.F.R. §697.18.

<sup>183</sup> Guide to ALWTRP 2010, at 3.

<sup>184</sup> *Id.* at 4–5.

<sup>185</sup> *Id.* at 9–10.

<sup>186</sup> 50 C.F.R. §229.32.

<sup>187</sup> 50 C.F.R. §229 (delaying implementation through 5 April 2009).

<sup>188</sup> NMFS, *Regulatory Impact Review of Proposed Rule to Delay a Broad-Based Gear Requirement and Remove a Gear-Based Term under the Atlantic Large Whale Take Reduction Plan* (May 2008).

<sup>189</sup> *Id.*

<sup>190</sup> *Id.*

Office Protected Resources Division (PRD) convened an internal workshop to discuss the development of a comprehensive monitoring strategy for the ALWTRP.<sup>191</sup>

As the plan has evolved, it has employed adaptive marine spatial management tools based on both long- and short-term data streams. The dynamic spatial management tools utilized by NMFS, seasonal area management (SAMs), and dynamic area management (DAMs) aimed to allow a flexible approach to spatially based gear modification and restrictions.<sup>192</sup> SAMs were those areas where patterns of whale sightings were seen on a regular basis whereas DAMs had unexpected occurrences of whale sightings. This programme lasted from 2002 through 2009, at which time NMFS issued a final rule implementing broad-based gear modifications replacing the seasonal and dynamic spatial management programmes.<sup>193</sup> NMFS published the three final rules implementing gear modifications in 2002. A parallel programme spatially designated areas of reduced vessel speed to address collision mortalities: seasonal management areas (SMAs) and dynamic management areas (DMAs). Both DMAs and DAMs were established based on two criteria: a whale density trigger and the absence of either SAMs or SMAs.<sup>194</sup>

Like other federal actions to protect natural resources, the ALWTRP has also developed partnerships with states and offered cash incentives. The NOAA Fisheries Office of Law Enforcement (OLE) has joint enforcement agreements with Massachusetts, Maine, and New Hampshire, all of which received funds from NMFS PRD in fiscal year 2010 to conduct direct at-sea enforcement of the ALWTRP gear regulations.<sup>195</sup> These funds resulted in 21 warnings and eight citations issued in Maine waters and 17 warnings in New Hampshire waters.<sup>196</sup> State partners also benefit from NER PRD Gear Team outreach, which provides industry members and fishermen with compliance assistant training and demonstrations.<sup>197</sup>

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<sup>191</sup> NOAA Fisheries, Northeast Region Protected Resources Division, *Atlantic Large Whale Take Reduction Plan Monitoring Strategy* (December 2011).

<sup>192</sup> For example, on 10 February 2009, the Regional Administrator issued a DAM Action requiring gear restrictions in a limited area, action which was triggered by “a single, reliable report from a qualified individual of three or more right whales within an area (75 nm<sup>2</sup>) such that right whale density is equal to or greater than 0.04 whales per nm<sup>2</sup>.” NOAA, *DAM Zone East of Portsmouth, New Hampshire*, Northeast Region (19 February 2009).

<sup>193</sup> NOAA Fisheries, *ALWTRP Fact Sheet*, 10A COMMERCIAL FISHERIES NEWS (April 2009); M.J. Asaro, *Geospatial Analysis of Management Areas Implemented for Protection of the North Atlantic Right Whale along the Northern Atlantic Coast of the United States*, 36 MAR. POL’Y 915 (2012) (Asaro examines the 63 DAMs and 61 DMAs established from 2002–2009 to determine those areas of highest density outside the seasonal areas, signaling that these areas should be considered for more permanent protection under the ALWTRP).

<sup>194</sup> *Id.*

<sup>195</sup> NMFS, NOAA, NORTH ATLANTIC RIGHT WHALE (*EUBALAENA GLACIALIS*), 5-YEAR REVIEW: SUMMARY AND EVALUATION (2012), at 19–20.

<sup>196</sup> *Id.* at 2.

<sup>197</sup> *Id.* at 3.



The USCG plays an essential role in terms of providing vessel and aerial infrastructure for state agencies enforcing ALWTRP violations.<sup>198</sup> A partnership between USCG and NOAA in the northeast has culminated in the Sighting Advisory System, which provides map data on whale sightings that can be overlaid with management area maps.<sup>199</sup> As noted earlier, collaboration between government agencies, academic institutions,<sup>200</sup> and NGOs, led by NOAA's Stellwagen Bank National Marine Sanctuary, has resulted in the development of an online application which provides data on SMAs, DMAs, Atlantic mandatory ship reporting boundaries, Atlantic Recommended Routes, designated ATBAs, near real-time information from acoustic whale detection buoys, nautical chart data, and GPS position tracking and alerts when ships enter management areas (Figure 1).<sup>201</sup>

While not part of the ALWTRP, the issue of vessel strikes is entwined with NMFS's efforts to reduce right whale mortality.<sup>202</sup> Under the MMPA, NMFS developed the Speed Restrictions to Reduce the Threat of Ship Collisions with North Atlantic Right Whales Rule, under which all vessels of 65 feet or longer must travel at ten knots or less in designated areas along the Atlantic coast of the United States depending on the time of year.<sup>203</sup> NMFS determines the areas seasonally based on data on the location of right whales.<sup>204</sup> State and U.S. government vessels are exempted from the rule, and all vessels are exempted from the speed restriction in the case of poor sea and weather conditions.<sup>205</sup> USCG data gathering and analysis of AIS data from transmitting vessels has allowed the agency to partner with NOAA Fisheries OLE to develop a Web-based monitoring tool that pinpoints vessels in violation of speed limits in SMAs.<sup>206</sup> However, analysis by NOAA NMFS Office of Protected Resources found average vessel transit speeds within DMAs exceeded the recommended maximum ten knot speed and differed little from vessel

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<sup>198</sup> *Id.* at 6.

<sup>199</sup> NOAA Fisheries Service, Northeast Fisheries Science Center, *North Atlantic Right Whale, Sighting Survey and Sighting Advisory System*, at <http://www.nefsc.noaa.gov/psb/surveys/> (visited 21 March 2013).

<sup>200</sup> Eric Spaulding et al., *An Autonomous, Near-Real-Time Buoy System for Automatic Detection of North Atlantic Right Whale Calls*, in PROCEEDINGS OF MEETINGS ON ACOUSTICS, VOL. 6 010001 (Acoustical Society of America, 2010), DOI: 10.1121/1.3340128.

<sup>201</sup> See Section 4.3 above.

<sup>202</sup> NOAA Fisheries, *ALWTRP Enforcement Update* (5–8 April 2011), at 3–4.

<sup>203</sup> 50 C.F.R. § 224.105 (a)(3)(i–iii) (Northeast United States (north of Rhode Island): (i) In Cape Cod Bay, MA: Vessels shall travel at a speed of 10 knots or less over ground during the period of 1 January to 15 May in Cape Cod Bay, . . . (ii) Off Race Point: Vessels shall travel at a speed of 10 knots or less over ground during the period of 1 March to 30 April each year. . . (iii) Great South Channel: Vessels shall travel at a speed of 10 knots or less over ground during the period of 1 April to 31 July each year. . .).

<sup>204</sup> *Id.* at 4 (A DMA is triggered by a verified sighting of a group of three or more whales in a density of more than four whales/nm<sup>2</sup>. A DMA is in place for 15 days from the date it is triggered.).

<sup>205</sup> 50 C.F.R. § 224.105 (a).

<sup>206</sup> NOAA Fisheries, *supra* note 193, at 7.

speeds outside the DMAs, and few vessels navigated around the DMAs.<sup>207</sup> Most recently, NMFS gave notice of the initiation of a five-year review for the North Atlantic right whale and the North Pacific right whale in 2012,<sup>208</sup> soliciting new material from the public, agencies, Aboriginal peoples, scientists, industry, environmental NGOs, and any other concerned parties. The review was published in August 2012.<sup>209</sup>

### 7.1.3 Atlantic Coastal Cooperative Management Act

Under the Atlantic Coastal Cooperative Management Act, the Secretary of Commerce is given the power to regulate the lobster fishery in the Gulf of Maine.<sup>210</sup> A 2009 amendment to the Act expanded reporting requirements “to all Federal lobster dealers and revising the maximum carapace length regulations and v-notch definition.”<sup>211</sup> Under the Act, there is a trap reduction schedule based on historic trap numbers.<sup>212</sup> The Act exempts those holding permits from the state of Maine from restrictions on lobster fishing in certain EEZ areas.<sup>213</sup>

In addition, 50 C.F.R. §697.19 limits the number of lobster traps allowed in various designated areas of the EEZ (Areas 1–6) depending on the nature of the permit issued to the particular vessel. Under 50 C.F.R. § 697.19(d), vessels with a federal lobster permit and a New Hampshire full commercial lobster licence can deploy a maximum of 1,200 traps in New Hampshire state waters, but may be restricted to a number of traps below this by state fishery regulations. In Area 1, these same vessels cannot haul back more than 800 traps in federal waters and may not fish more than a combined total of 1,200 lobster traps. Under (b) (1–5), the Regional Administrator sets the limits on traps for Area 3 as well as the reduction schedule for traps based on historical deployment.<sup>214</sup> Under (e), vessels issued a temporary permit are limited to set a maximum of 1,800 traps in Area 3.

<sup>207</sup> G.K. Silber, J.D. Adams, & S. Bettridge, *Vessel Operator Response to a Voluntary Measure for Reducing Collisions with Whales*, 17 ENDANGER. SPECIES RES. 245–254 (2012).

<sup>208</sup> Fed. Reg. 77:55, 16538–9 (March 21, 2012), citing 16 U.S.C. §1531 *et seq.*

<sup>209</sup> NMFS, *supra* note 195.

<sup>210</sup> Atlantic Coastal Cooperative Management Act, 16 U.S.C. §5101.

<sup>211</sup> 50 C.F.R. §697.1.

<sup>212</sup> Atlantic Coastal Cooperative Management Act, *supra* note 210, at Table 1 to Part 697—Area 3 Trap Reduction Schedule.

<sup>213</sup> 50 C.F.R. §697 ((a) West of Monhegan Island in the area located north of the line 43.5 deg. 42'08" N. lat., 69.5 deg. 34'18" W. long., and 43.5 deg. 42'15" N. lat., 69.5 deg. 19'18" W. long. (b) East of Monhegan Island in the area located west of the line 43.5 deg. 44'00" N. lat., 69.5 deg. 15'05" W. long., and 43.5 deg. 48'10" N. lat., 69.5 deg. 08'01" W. long. (c) South of Vinalhaven in the area located west of the line 43.5 deg. 52'11" N. lat., 68.5 deg. 39'54" W. long., and 43.5 deg. 48'10" N. lat., 67.5 deg. 40'33" W. long. (d) South of Boris Bubert Island in the area located north of the line 44.5 deg. 19'15" N. lat, 67.5 deg. 49'30" W. long. and 44.5 deg. 23'45" N. lat., 67.5 deg. 40'33" W. long.).

<sup>214</sup> *Id.*

## 7.2 State Regulations

### 7.2.1 *Massachusetts*

Massachusetts laws protect the right whale in state waters in several ways. Under the Massachusetts Endangered Species Act Regulations, the right whale is listed as endangered.<sup>215</sup> Under the Division of Water Pollution Control Regulations, the Massachusetts Department of Environmental Protection “may include specific conditions related to time-of-year disposal restrictions to protect the right whale.”<sup>216</sup> The Division of Marine Fisheries Protected Species regulations complement federal regulations protecting such species as the northern right whale.<sup>217</sup> Based on studies of the practices that most threaten right whale populations, these regulations prohibit floating lines, positively buoyant lines, and the abandonment of fixed gear in Massachusetts’s waters.<sup>218</sup> In addition, this section implements seasonal gillnet closures and restrictions, requires pingers (acoustic deterrents) in certain areas and seasons,<sup>219</sup> requires certain breakaway standards for gillnets and trap gear, and establishes a right whale buffer zone of 500 yards in all directions out from a right whale.<sup>220</sup>

### 7.2.2 *New Hampshire*

New Hampshire does not protect the right whale as an endangered or threatened species under the state Endangered Species Conservation Act.<sup>221</sup> While the state Marine Fishing Rules prohibits the take, landing, or possession of certain shark species,<sup>222</sup> there are no parallel protections for the right whale which could have implications on gear use and fishing effort given the broad interpretation of “take” under endangered species law.<sup>223</sup>

### 7.2.3 *Maine*

Under Maine law, the Commissioner of the Maine Department of Marine Resources is given authority to “establish such programs as are necessary for the protection of [endangered or threatened] marine species . . . in order to achieve compliance with the United States Endangered Species Act of 1973.”<sup>224</sup>

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<sup>215</sup> 321 C.M.R. §10.90.

<sup>216</sup> 314 C.M.R. §9.07(7).

<sup>217</sup> 322 C.M.R. §12.00, et seq.

<sup>218</sup> *Id.* at 12.03–6.

<sup>219</sup> *Id.* at 12.03(3).

<sup>220</sup> *Id.* at §12.07.

<sup>221</sup> N.H. Rev. Stat. §212-A:9; NH ADC Fis 1001.01.

<sup>222</sup> NH ADC Fis 603.20.

<sup>223</sup> M.L. Warden & K.T. Murray, *Reframing Protected Species Interactions with Commercial Fishing Gear: Moving toward Estimating the Unobservable*, 110 FISH. RES. 387–390 (2011).

<sup>224</sup> 631 M.R.S. §6972.

Maine has also identified the right whale as an endangered marine species under the Maine Endangered or Threatened Marine Species Regulations.<sup>225</sup>

## 8. CONCLUSION

In the complex and crowded reality of the Northwest Atlantic, where the right whale shares the marine environment with fishermen and a growing shipping industry, the main threats to the North Atlantic right whale are vessel strikes followed by fishing gear entanglement. There are two ways to protect right whales from these deleterious human impacts: vessel speed reduction or avoidance of concentrated areas of right whales and modification of fishing gear or provision of area-specific seasonal closures. In both cases, there is consensus on most of the scientific information and this information is available to formulate policies to reduce risks to right whales. The technology required to track the location of right whales in near real time is readily available and deployed in the Massachusetts Bay area, so large vessels and fishing vessels can adjust their activities accordingly. This technology limits the need for seasonal closures and long bypasses, and reduces the overall costs of avoiding right whales.<sup>226</sup>

To support this strategy of right whale conservation, regulations that minimize the risk must be put in place and backed by an effective enforcement system in both Canada and the United States. Both countries have established either mandatory or recommended areas of avoidance based on right whale distribution. They have engaged in periodic review of and modification to shipping lanes in response to new data and knowledge about whale concentrations and distribution. They have also put in place voluntary measures to reduce the risk of vessel strikes. Spatial and temporal planning have been used to address the impacts of shipping, but only the United States has directly addressed fishing gear impact on the species.

Neither nation's regulatory structures strongly address chronic problems impacting the whale populations, for example, sound and marine contaminants. However, the legal protections in both Canada and the United States are flexible enough that, given a body of science behind connecting chronic exposure to measurable impacts, both countries could develop responsive regulations. Currently, laws concerning the protection of right whales do not strongly or explicitly reflect the impact that coastal land pollution has on the

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<sup>225</sup> 12 M.R.S. §6975.

<sup>226</sup> Despite the benefits of the right whale acoustic detection system, it holds some risks for the right whale. The easy and free real time access to information on right whale presence in proximity to the shoreline attracts many whale watching boats. With the absence or reduced speed of larger vessels the access to right whales is easier than ever. There is scientific evidence that large number of small boats can cause changes in whales' behaviour patterns.

habitat, feeding habits, or health of this species. However, both Canadian and American implementation documents acknowledge that harmful algal blooms and land-based pollution are creating measurable problems for the right whale population in the Gulf of Maine.<sup>227</sup>

Protecting right whales and their critical habitat could serve as an impetus for land-based conservation efforts and for the coastal marine spatial planning that is moving forward at the federal and state levels in the United States. One difficulty may be developing a convincing and politically viable connection between non-point source land-based pollution and threats to the Atlantic right whale.<sup>228</sup> Although this will be difficult, it is essential for the health of the right whale population in the Gulf of Maine.

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<sup>227</sup> See, for example, Brown et al., *supra* note 139, 24–25 (“the number of harmful algal blooms in the northwestern Atlantic has increased in recent years, and humpback whale (*Megaptera novaeangliae*) deaths in Cape Cod Bay have been attributed to biotoxins in their prey fish, to date there has not been a recorded case of toxic algal blooms affecting right whales.”).

<sup>228</sup> See, for example, *Bays’ Legal Fund v. Browner*, 828 F. Supp. 102, 108–9 (D. Mass. 1993) (Finding the connection between increased nutrients due to the new outfall and damage to right whales as tenuous and speculative at best, even according to scientists concerned about rising nutrient levels, stating, “If and when there is concrete, scientific evidence that substantiates the likelihood of a threat, it will be appropriate to reconsider the wisdom, not to mention the legality, of the outfall tunnel as a means of effluent discharge. Until then, however, the ESA does not require the cessation of activities because of ‘concerns’ that some may have. Such a grave response is only required by statute when there is a ‘likelihood’ of an adverse impact to endangered species.”).