

Endangered Blue Whale Survival in the North Atlantic: Lagging Scientific and Governance Responses, Charting Future Courses

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Abstract

Populations of blue whales were heavily depleted across the globe by industrial whaling and are still considered globally endangered today. In the Northwest Atlantic, an estimated 400–600 individuals remain, but these numbers are highly uncertain. Ship strikes, fishing gear entanglement, and marine debris are thought to be leading causes of contemporary human-caused mortality in blue whales, with anthropogenic noise possibly causing sublethal stress and injury. Climate change is recognised as an emerging and intensifying threat that is likely to affect food supply and could limit the capacity of the population to recover. Both Canada and the United States have protected blue whales through their domestic legislation. This article reviews law and policy responses in the two countries, as well as bilateral, regional and international frameworks that address anthropogenic threats to blue whales. Future scientific directions, as well as recommendations for improvements to domestic legislation and multilevel cooperation are outlined.

Keywords

blue whale – endangered species – North Atlantic – Canada – United States

Introduction

Blue whales (*Balaenoptera musculus*) are considered the largest animals to have ever existed on Earth, reaching a length of over 30 metres and a weight of over 150 tonnes in some specimens. Like most large whales, this species was heavily depleted across its global range by industrial whaling, with a >95 per cent reduction in population abundance and a few thousand living individuals remaining by the time it became legally protected by the International Whaling Commission (IWC) in 1966.¹ Since then, some populations have begun to slowly recover. Yet the species' global population status is still uncertain, with an estimated 5,000–15,000 mature individuals, and a listing as globally endangered according to the International Union for Conservation of Nature (IUCN).² Here we focus mainly on the plight of the Northwest (NW) Atlantic population of blue whales, which is currently listed as endangered under both the United States (US) *Endangered Species Act of 1973* and the Canadian *Species at Risk Act* (SARA) with a minimum estimate of 402, and a plausible range of 400–600 individuals remaining.³ Despite this dire status, there has been surprisingly little effort to help recover this population in NW Atlantic waters. This is in stark contrast to a similarly endangered species, the North Atlantic right whale, which has received unprecedented attention and multiple measures to mitigate threats in both US and Canadian jurisdictions.⁴

- 1 This research was undertaken thanks in part to funding from the Canada First Research Excellence Fund, through the Ocean Frontier Institute. The support of the Social Sciences and Humanities Research Council of Canada is also acknowledged. National Marine Fisheries Service (NMFS), *Recovery Plan for the Blue Whale (Balaenoptera musculus)–First Revision* (NMFS, Silver Spring, MD, 2020) 33 [NMFS Recovery Plan].
- 2 JG Cooke, '*Balaenoptera musculus* (errata version published in 2019)', The IUCN Red List of Threatened Species 2018: e.T2477A156923585, <https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T2477A156923585.en>.
- 3 NMFS, 'BLUE WHALE (*Balaenoptera musculus musculus*): Western North Atlantic Stock (2020)' available at https://media.fisheries.noaa.gov/dam-migration/2019_sars_atlantic_blue_whale.pdf; accessed 21 December 2021.
- 4 O Koubrak, DL VanderZwaag and B Worm, 'Saving the North Atlantic right whale in a changing ocean: Gauging scientific and law and policy responses' (2021) 200 *Ocean & Coastal Management* 105109.

In this article we ask how this disconnect in threatened species governance may have arisen, and what can be done to address the lack of conservation action for blue whales and similar species in NW Atlantic waters. A summary of limited scientific understandings is first provided, including uncertainties over the blue whale's population structure, natural history, distribution, threats and regional conservation status. Canadian and US laws and policies and their laggings related to the blue whale are next reviewed followed by a synopsis of relevant bilateral, regional and global governance frameworks. The article concludes by suggesting future directions in scientific efforts and multilevel law and policy responses to enhance blue whale conservation and recovery.

Scientific Understandings

Population Structure

The blue whale is a baleen whale belonging to the family Balaenopteridae, which includes the group of large, plankton-feeding cetaceans known as rorquals. Although there is only one species of blue whale recognised today, five subspecies are currently described:⁵ *Balaenoptera musculus* is found in the North Atlantic and North Pacific; the somewhat larger *B. m. intermedia* resides around Antarctica; *B. m. brevicauda*, a significantly smaller and morphologically distinct 'pygmy' form, is found in the southern Indian and southwestern Pacific Ocean; *B. m. indica* lives in the northern Indian Ocean; and a recently recognised, unnamed subspecies occurs in the southeastern Pacific Ocean off Chile and migrates to waters off Peru, Ecuador, and up to the Galapagos Islands. Each subspecies may have a number of distinct populations, although considerable uncertainty exists as to the status of these individual populations.

In the North Atlantic, an eastern and a western population of *Balaenoptera musculus* have been recognised, with regional feeding subgroups.⁶ Photo-identification work suggests that blue whales seen in the waters of the

5 Society for Marine Mammalogy, Committee on Taxonomy, 'List of marine mammal species and subspecies' available at <https://www.marinemammalscience.org>; accessed 6 November 2021.

6 G Christensen, 'The stocks of blue whales in the northern Atlantic' (1955) 44 *Norsk Hvalfangst-tid* 640–642; A Jonsgard, 'The stocks of blue whales (*Balaenoptera musculus*) in the northern Atlantic Ocean and adjacent Arctic waters' (1955) 44 *Norsk Hvalfangst-Tidende* 505–519; J Sigurjónsson and T Gunnlaugsson, 'Recent trends in abundance of blue (*Balaenoptera musculus*) and humpback whales (*Megaptera novaeangliae*) off West and Southwest Iceland, with a note on occurrence of other cetacean species' (1990) 40 *Report of the International Whaling Commission* 537–551.

Canadian Gulf of St. Lawrence, Newfoundland, Nova Scotia, New England, and Greenland all belong to the same population, whereas blue whales photographed off Iceland and the Azores appear to be part of a separate population.⁷ Genetic differences have recently been elucidated, indicating low population structuring, but high genetic diversity, suggesting a single, panmictic population in the North Atlantic.⁸ In this article, we focus primarily on blue whales in the Northwest Atlantic Ocean.

Natural History

Like most baleen whales, blue whales are large, filter-feeding mammals that primarily exploit dense concentrations of zooplankton in coastal and open-ocean waters worldwide. The blue whale is considered a specialist, feeding on various euphausiid krill species, prevalent especially at higher latitudes. Feeding may occur at the surface or at depths greater than 100 metres, following their prey's diel vertical migration through the water column.⁹ In some cases individual whales forage at around 250–300 metres depth.¹⁰ Energetic models suggest that the prey biomass requirement for an average-sized blue whale is substantial, an estimated $1,120 \pm 359$ kilograms of krill intake per day.¹¹ Blue whales do not typically frequent foraging areas if prey concentration is below a minimum threshold and are thus sensitive to changes in prey distribution and abundance.¹²

Due to their slender body form and powerful flukes, blue whales can swim rapidly and may migrate over large distances. These migrations are not well understood and appear less predictable than for other species of baleen whales. However, blue whales are thought to generally avoid the low-productivity

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- 7 R Sears and J Calambokidis, *Update COSEWIC status report on the blue whale *Balaenoptera musculus* (Atlantic population, Pacific population) in Canada* (Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Ottawa, 2002) 1–32.
- 8 S Jossey *et al.*, 'Blue whale (*Balaenoptera musculus musculus*) genome: Population structure and history in the North Atlantic' (14 April 2021) *Authorea* 1–17, DOI: 10.22541/au.161842590.09830459/v1.
- 9 R Sears and WF Perrin, 'Blue whale, *Balaenoptera musculus*' in WF Perrin, B Wursig and JGM Thewissen (eds), *Encyclopedia of Marine Mammals, Second Edition* (Academic Press, San Diego, 2009) 120–124.
- 10 J Calambokidis *et al.*, 'Insights into the underwater diving, feeding, and calling behavior of blue whales from a suction-cup-attached video-imaging tag (CRITTERCAM)' (2008) 41 *Marine Technology Society Journal* 19–29.
- 11 PF Brodie, 'Cetacean energetics, an overview of intraspecific size variation' (1975) 56(1) *Ecology* 152–161.
- 12 JA Goldbogen *et al.*, 'Mechanics, hydrodynamics and energetics of blue whale lunge feeding: Efficiency dependence on krill density' (2011) 214 *Journal of Experimental Biology* 131–146.

open-ocean gyres in the Indian, Pacific, and Atlantic Oceans, and to associate with more dynamic oceanographic processes found around upwelling areas and oceanic fronts where plankton densities are high.¹³ Blue whales generally migrate seasonally toward temperate and polar regions in spring, targeting areas with abundant summer zooplankton, and toward the subtropics in the fall, possibly to avoid ice entrapment in polar areas and to reproduce in warmer waters where energetic costs are lowered.

Lifetime reproductive output is low with calf production thought to be determined by a combination of age and food availability. Few calves are being observed in nearshore feeding areas. For example, only 13 blue whale calves were observed among unique 362 whales that were photo-identified from 1979–2002 along the northern Gulf of St. Lawrence.¹⁴ Gestation period lasts approximately 10 to 11 months,¹⁵ and generation length may average about 30 years with a maximum age of 70 years. These life-history attributes make blue whales vulnerable to additional mortality and slow to recover from historical overexploitation.

Regional Distribution

Blue whales in the western North Atlantic Ocean generally extend from the Arctic to at least mid-latitude waters, but are most frequently sighted in the waters off eastern Canada, with the majority of recent records in the Gulf of St. Lawrence.¹⁶ The largest concentrations are found in the lower St. Lawrence Estuary, around the eastern tip of the Gaspé Peninsula, along the north shore of the Jacques-Cartier Passage, and in the waters adjacent to Sept-Îles. Blue whales predictably feed there between April and January, and 435 unique individuals have been catalogued over several decades.¹⁷

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- 13 TA Branch *et al.*, 'Past and present distribution, densities and movements of blue whales *Balaenoptera musculus* in the Southern Hemisphere and northern Indian Ocean' (2007) 37(2) *Mammal Review* 116–175; A de Vos, CB Pattiaratchi and EMS Wijeratne, 'Surface circulation and upwelling patterns around Sri Lanka' (2014) 11 *Biogeosciences* 5909–5930.
- 14 C Ramp, M Berube, W Hagen and R Sears, 'Survival of adult blue whales *Balaenoptera musculus* in the Gulf of St. Lawrence, Canada' (2006) 319 *Marine Ecology Progress Series* 287–295.
- 15 NA Mackintosh and JFG Wheeler, 'Southern blue and fin whales' (1929) 1 *Discovery Reports* 257–540.
- 16 GT Waring, E Josephson, K Maze-Foley and PE Rosel, *U.S. Atlantic and Gulf of Mexico marine mammal stock assessments-2010*, NOAA Technical Memorandum, NMFS-NE-219 (US Department of Commerce, Woods Hole, MA, 2010).
- 17 R Sears *et al.*, 'Photographic identification of the blue whale (*Balaenoptera musculus*) in the Gulf of St. Lawrence, Canada' (1990) (Special Issue 12) *Report of the International Whaling Commission* 335–342.

Outside the Gulf of St. Lawrence, more scattered sightings have occurred across the Scotian Shelf and the lower Bay of Fundy.¹⁸ In US waters, New England showed concentrations of blue whales off Cape Cod, MA, in summer and fall.¹⁹ Information obtained from individuals tagged in the Gulf of St. Lawrence indicated seasonal movements towards New England, the Mid-Atlantic Bight, the shelf edge and high seas waters associated with the New England Seamount Chain.²⁰ In addition, acoustic detections by the US Navy's Sound Surveillance System and other sources indicate blue whales can travel over great distances throughout the western North Atlantic, including to waters north of the Caribbean Sea and deep waters east of the US exclusive economic zone (EEZ);²¹ the full range of acoustic detections is spanning most of the NW Atlantic from Florida to Greenland and Baffin Island.²² Evidence from historical whaling records also indicate frequent catches of blue whales in subtropical waters of the North Atlantic Ocean throughout the fall and winter.²³

Critical habitat for the species has not been formally described, but multiple data sources indicate an important habitat suitable to foraging blue whales in the shelf, slope and deep waters of the lower St. Lawrence Estuary and in the northwest Gulf of St. Lawrence. It is estimated that 20 to 100 blue whales use this habitat each year, with some individuals using it year-round.²⁴

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- 18 WH Sutcliffe, Jr and PF Brodie, 'Whale distributions in Nova Scotia waters' Fisheries and Marine Service (Canada) Technical Report No. 722 (1977) 1–89; Cetacean and Turtle Assessment Program (CETAP), *A Characterization of Marine Mammals and Turtles in the Mid- and North-Atlantic Areas of the U.S. Outer Continental Shelf*, Bureau of Land Management BLM/YL/TR-82/03 (CETAP, Bureau of Land Management, Washington, DC, 1982).
- 19 FW Wenzel, DK Mattila and PJ Clapham, '*Balaenoptera musculus* in the Gulf of Maine' (1988) 4 *Marine Mammal Science* 172–175.
- 20 V Lesage, K Gavrilchuk, RD Andrews and R Sears, *Wintering Areas, Fall Movements and Foraging Sites of Blue Whales Satellite-tracked in the Western North Atlantic*, Canadian Science Advisory Secretariat Research Document 2016/078 (Fisheries and Oceans Canada, Ottawa, 2016).
- 21 CW Clark, 'Application of U.S. Navy underwater hydrophone arrays for scientific research on whales' (1995) 45 *Report of the International Whaling Commission* 210–212.
- 22 NOAA Fisheries, 'Passive Acoustic Cetacean Map' available at <https://apps-nefsc.fisheries.noaa.gov/pacm/#/blue>; accessed 22 December 2021.
- 23 RR Reeves *et al.*, 'Historical observations of humpback and blue whales in the North Atlantic Ocean: Clues to migratory routes and possibly additional feeding grounds' (2004) 20 *Marine Mammal Science* 774–786.
- 24 Fisheries and Oceans Canada (DFO), *Identification of Important Habitats for the Blue Whale in the Western North Atlantic*, Canadian Science Advisory Secretariat Science Advisory Report 2018/003 (DFO, Ottawa, 2018).

Threats

The major historic threat was directed exploitation, resulting in large losses and near-extinction of some populations. Blue whales experienced intensive mortality from industrial whaling throughout the late 19th and 20th centuries, with over 380,000 blue whales taken globally from 1868–1978, mostly from Antarctic waters.²⁵ Since its legal protection in 1966, few individuals have been taken by whalers, and as such other human causes of mortality or injury have become dominant. As for other large whales, ship strikes, fishing gear entanglement, and marine debris are thought to be leading causes of contemporary human-caused mortality in blue whales, with anthropogenic noise representing a fourth possible cause of sublethal stress and injury.²⁶ Estimates of mortality are uncertain due to the fact that dead blue whales do not remain at the surface and sink to depth where they may remain undetected.

Ship strikes are a leading cause of mortality for many large whales, including blue whales. For example, nine blue whales were observed to be killed and one seriously injured by ship strikes between 2007 and 2010 in California waters.²⁷ However, these numbers are certainly underestimates as many of these events will go unobserved, and vessel strike detection rate of blue whales may be as low as one per cent.²⁸ Model estimates of total blue whale ship strike mortality off the US West Coast range from 18 to 40 per year, significantly exceeding safe potential biological removal (PBR) levels²⁹ that would allow the stock to recover to or remain within its optimum sustainable population range.

In the western North Atlantic, 20 blue whales were found dead between 2004 and 2019 in Canadian waters.³⁰ Of these, 18 were killed in the Gulf of St. Lawrence, which has some of the highest vessel traffic in the region. Unfortunately, only two blue whales were examined in such a way that the cause of death could be determined. Across all species examined over that

25 TA Branch *et al.*, 'Historical catch series for Antarctic and pygmy blue whales' (2008) International Whaling Commission Scientific Committee, Doc SC/60/SH9, 1–11.

26 NMFS Recovery Plan (n 1).

27 JV Carretta, SM Wilkin, MM Muto and K Wilkinson, *Sources of Human-related Injury and Mortality for U.S. Pacific West Coast Marine Mammal Stock Assessments, 2007–2011*, NOAA Technical Memorandum, NMFS-SWFSC-514 (US Department of Commerce, 2013).

28 JV Carretta *et al.*, *U.S. Pacific Marine Mammal Stock Assessments: 2018*, NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-617 (US Department of Commerce, 2019).

29 RC Rockwood, J Calambokidis and J Jahncke, 'High mortality of blue, humpback and fin whales from modeling of vessel collisions on the U.S. West Coast suggests population impacts and insufficient protection' (2017) *PLoS one* 12: e0183052, <https://doi.org/10.1371/journal.pone.0183052>.

30 T Wimmer and C Maclean, *Beyond the Numbers: A 15-year Retrospective of Cetacean Incidents in Eastern Canada* (Marine Animal Response Society, Halifax, 2021).

time period, entanglements in rope or fishing gear were the most predominant determined cause of death (46%) with disease or emaciation and vessel strikes comprising most of the remaining incidents (22% and 15%, respectively).³¹

Entanglement in fishing gear and other marine debris has generally been described as another major source of mortality or sublethal stress in large whales, including blue whales. A recent study from the Gulf of St. Lawrence estimated entanglement rates between 6.5 per cent for fin and 13.1 per cent for blue whales using photo-identification images of individuals.³² Yet, some of the most intense scarring was observed around the tail and caudal peduncle, which are often not visible in these species when photographed from a vessel. For the subset of pictures which captured the caudal peduncle, entanglement rates ranged between 60 per cent for blue and 80 per cent for fin whales; these numbers are comparable to humpback whales which more frequently expose their tail during diving.³³

Another human stressor that is impacting marine species and their habitat through acute, chronic, and cumulative effects is underwater noise.³⁴ Like many marine mammals, blue whales are thought to be sensitive to increasing ocean noise, especially in the lower-frequency bands used for their communication. Blue whale calls are among the loudest and lowest-frequency sounds made by any animal, and typically range from 8 to 25 Hz.³⁵ Increasing anthropogenic noise can interfere with the species' ability to communicate, locate prey, and may result in behavioural, physiological, or auditory effects and associated stress responses. Few studies have explored this threat specifically for blue whales. As an example, Redfern *et al.* examined the co-occurrence of blue, fin, and humpback whales with sound from commercial shipping off southern California and identified several regions of overlap where the acoustic habitat of these species was degraded by noise.³⁶ Similar studies have not yet been conducted for blue whales in the Northwest Atlantic (NWA), but it has been suggested that most of the St. Lawrence Estuary and Gulf is considered

³¹ *Ibid.*

³² C Ramp *et al.*, 'Up in the air: Drone images reveal underestimation of entanglement rates in large rorqual whales' (2021) 44 *Endangered Species Research* 33–44.

³³ *Ibid.*

³⁴ AN Radford, E Kerridge and SD Simpson, 'Acoustic communication in a noisy world: Can fish compete with anthropogenic noise?' (2014) 25 *Behavioral Ecology* 1022–1030, DOI:10.1093/beheco/aru029.

³⁵ KM Stafford, CG Fox and DS Clark, 'Long-range acoustic detection and localization of blue whale calls in the northeast Pacific Ocean' (1998) 104 *Journal of the Acoustical Society of America* 3616–3625.

³⁶ JV Redfern *et al.*, 'Assessing the risk of chronic shipping noise to baleen whales off Southern California' (2017) 32 *USA Endangered Species Research* 153–167.

quiet across the low-frequency band commonly used by blue whales.³⁷ However, several habitats considered important for blue whales occur in proximity to shipping lanes. Major sources of underwater noise to be considered include vessel engine noise, seismic airguns used for oil and gas exploration and noise associated with underwater low-frequency sonar, such as used during military exercises.

Finally, climate change is increasingly recognised as an emerging and intensifying threat to blue whales and other large whales that depend on predictable food concentrations to fuel their population recovery from whaling.³⁸ Model predictions for the Southern hemisphere, for example, suggest that ongoing climate change could stall and even reverse the recovery of a number of large whale species, including blue whales.³⁹ In the North Atlantic, the recovery trajectory of North Atlantic right whales has already been reversed following the collapse of large copepod biomass in their summer feeding grounds.⁴⁰ Projecting into the future, the North Atlantic is likely to be impacted more severely than other ocean basins by the effects of climate change⁴¹ and consequent losses of biomass that amplify up the food chain.⁴² While the effects on blue whales in this region have not yet been investigated, it is very likely that some changes in food supply will occur, which may affect the capacity of this population to recover, requiring better monitoring of this and other baleen whale species and their prey sources.⁴³

In contrast to human-related threats, stressors and sources of mortality, natural predation mortality is considered very low, mainly due to the species' large size. At maturity, blue whales have little vulnerability to natural predators; however, young or ailing blue whales are likely vulnerable to shark and

37 DFO (n 24).

38 VJ Tulloch *et al.*, 'Future recovery of baleen whales is imperiled by climate change' (2019) 25 *Global Change Biology* 1263–1281.

39 *Ibid.*

40 EL Meyer-Gutbrod, CH Greene and KT A Davies, 'Marine species range shifts necessitate advanced policy planning: The case of the North Atlantic right whale' (2018) 31 *Oceanography* 19–23; N Record *et al.*, 'Rapid climate-driven circulation changes threaten conservation of endangered North Atlantic right whales' (2019) 32 *Oceanography* 162–169.

41 A Bryndum-Buchholz *et al.*, 'Twenty-first-century climate change impacts on marine animal biomass and ecosystem structure across ocean basins' (2019) 25 *Global Change Biology* 459–472.

42 HK Lotze *et al.*, 'Global ensemble projections reveal trophic amplification of ocean biomass declines with climate change' (2019) 116 *Proceedings of the National Academy of Sciences* 12907–12912.

43 K Gavrilchuk *et al.*, 'Trophic niche partitioning among sympatric baleen whale species following the collapse of groundfish stocks in the Northwest Atlantic' (2014) 497 *Marine Ecology Progress Series* 285–301.

killer whale predation. In some locations, ice entrapment is another source of natural mortality, for example along the southwest coast of Newfoundland during late winter and early spring.⁴⁴ An overall annual adult survival rate of 0.975 (95% confidence interval 0.960–0.985) was estimated for whales occurring in the Gulf of St. Lawrence region based on sightings records from 1979 to 2002.⁴⁵

Regional Conservation Status

Many uncertainties surround the current population and conservation status of blue whales in the North Atlantic. Historical abundance has been estimated around 15,000 individuals across the entire North Atlantic,⁴⁶ with over 10,000 blue whales killed between 1868 and 1978, most of which were taken before 1914.⁴⁷ Based on compiled survey and photo identification data, it is likely that the number of blue whales throughout the entire North Atlantic Ocean now ranges between 600 to 1,500 animals,⁴⁸ or roughly 4–10 per cent of original abundance prior to industrial whaling. As a result of these low numbers, and due to uncertain population trends, the species is listed as endangered in Canada and the United States.⁴⁹

The western North Atlantic population was likely significantly smaller than the eastern one. Based on cumulative catches from 1898 to 1915, researchers estimate that between 1,100 and 1,500 blue whales frequented the western North Atlantic before modern whaling began.⁵⁰ Today's numbers are much

44 PC Beamish, 'Behaviour and significance of entrapped baleen whales' in HE Winn and BL Olla (eds), *Behavior of Marine Animals: Current Perspectives in Research Vol. 3: Cetaceans* (Plenum Press, New York, 1979) 291–309; DE Sergeant, 'Some biological correlates of environmental conditions around Newfoundland during 1970–79: Harp seals, blue whales and fulmar petrels' NAFO Scientific Council Studies No. 5 (Northwest Atlantic Fisheries Organization, Halifax, 1982) 107–110.

45 Ramp, Berube, Hagen and Sears (n 14).

46 DE Sergeant, 'Populations of large whale species in the western North Atlantic with special reference to the fin whale' Fisheries Research Board of Canada, Arctic Biological Station Circular 9 (1966); KR Allen, 'A note on baleen whale stocks of the northwest Atlantic' (1970) 20 *Report of the International Whaling Commission* 112–113; CJ Rørvik and Å Jonsgård, 'Review of balaenopterids in the North Atlantic Ocean' in *Mammals in the Seas. Volume III. General Papers and Large Cetaceans*, FAO Fisheries Series No. 5 (Food and Agriculture Organization of the United Nations, Rome, 1981) 269–286.

47 Branch *et al.* (n 25).

48 Sears and Calambokidis (n 7).

49 NMFS Recovery Plan (n 1).

50 Sergeant (n 46); Allen (n 46).

lower and have been estimated between 400 and 600 blue whales,⁵¹ yet these estimates are speculative and highly uncertain due to the absence of dedicated surveys. Currently, the US National Marine Fisheries Service Blue Whale Recovery Plan does not recognise a credible estimate of blue whale abundance or population trend for the Northwest Atlantic.⁵²

Canadian Laws and Policies

Species at Risk Act

With the listing of the Northwest Atlantic population of the blue whale as endangered under Canada's SARA in January 2005,⁵³ various protections were set in motion. Section 32(1) of SARA prohibits any person from killing, harming, harassing, capturing or taking an individual of a listed endangered species⁵⁴ subject to a number of exceptions. Those exceptions include, among others, an activity authorised pursuant to an incidental harm permit or agreement⁵⁵ or activities permitted by a recovery strategy or action plan.⁵⁶

SARA requires a proposed recovery strategy to be placed in the public registry within one year of an endangered species' listing,⁵⁷ and for the blue whale this legal requirement was not met. A recovery strategy for the blue whale was not finalised until December 2009.⁵⁸ The recovery strategy sets out an overall goal, objectives, strategies and approaches. The strategy's recovery goal is to reach a level of 1,000 mature blue whale individuals which is based on the Committee on the Status of Endangered Wildlife in Canada's criteria for moving the blue whale from a status of endangered to 'not at risk'.⁵⁹ The recovery strategy's three objectives are to (1) assess the number of Northwest Atlantic blue whales, their population structure and trends, their range and

51 E Mitchell, 'Present status of northwest Atlantic fin and other whale stocks' in WE Schevill (ed), *The Whale Problem* (Harvard University Press, Cambridge, 1974) 108–169; Waring (n 16).

52 NMFS Recovery Plan (n 1).

53 J Beauchamp *et al.*, *Recovery Strategy for the blue whale (Balaenoptera musculus), Northwest Atlantic population, in Canada [FINAL]* (DFO, Ottawa, 2009) 1–62, iv; *Species at Risk Act*, SC 2002, c 29 [SARA].

54 Possession and trade in listed species, their parts and derivatives are prohibited under section 32(2) of SARA (n 53).

55 *Ibid.*, sections 73–74.

56 *Ibid.*, section 83(4).

57 *Ibid.*, section 42(1).

58 Beauchamp (n 53).

59 *Ibid.*, at p. 26.

critical habitat within Canadian waters; (2) implement control measures for activities which could disrupt the recovery of the blue whale in its Canadian range; and (3) increase knowledge concerning the principal threats to the blue whale, such as anthropogenic noise, reduced food resource availability, whale-watching, ship traffic, coastal and offshore developments, and contaminants.⁶⁰

The recovery strategy recommends twenty-four approaches to blue whale recovery grouped under three broad strategies: research and monitoring, conservation, and awareness and education. The greatest focus is on promoting research and monitoring activities with many general approaches suggested, such as implementing a Northwest Atlantic blue whale population monitoring programme, identifying high blue whale concentration areas, filling in knowledge gaps in terms of population and their prey, assessing the degree of noise exposures, and studying the feeding behaviour and diet of blue whales.⁶¹ Recommended conservation approaches stand out for their generality and include, among others, implementing adequate mitigation measures for all inshore and offshore projects within the range of the blue whale, minimising blue whale exposure to vessel noise and risk of collisions in the areas known to be frequented by blue whales, continuing the moratorium on the exploitation of forage species, designating marine protected areas (MPAs) in the range of the blue whale, and enhancing Canadian participation in international conservation efforts for marine mammals and for the blue whale in particular.⁶² Broad directions are also set out for raising the awareness of boaters, shipowners and other industries regarding the negative impacts of high noise levels on the blue whale population and for raising the awareness of whale-watching enthusiasts to the issue of blue whale disturbance.⁶³

SARA requires one or more action plans to be prepared based on the recovery strategy, but it does not set a time limit.⁶⁴ As a result of the timing discretion, an action plan for the Northwest Atlantic blue whale population was not finalised until 2020.⁶⁵

The action plan proposes thirty-eight recovery measures. The majority of measures are devoted to research and monitoring activities. For example, the

60 *Ibid.*, at p. 26–27.

61 *Ibid.*, at Table 1.

62 *Ibid.*

63 *Ibid.*

64 SARA (n 53), section 47.

65 Government of Canada, 'Blue Whale, Northwest Atlantic population: Action plan, 2020 (final)' available at <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/action-plans/blue-whale-northwest-atlantic-population-2020.html>; accessed 1 November 2021 [Blue Whale Action Plan].

action plan calls for a continued delineating of high-density seasonal areas, especially in southwestern Newfoundland and on the Scotian Shelf; assessing the extent to which biological processes (krill aggregations) and physical processes (currents, tides) affect blue whale distribution, behaviour and migrations; studying blue whale responses to various noise sources; determining the threats of fishing gear and entanglements on blue whales; and establishing international research partnerships to enhance understanding of blue whale distribution and migration routes.⁶⁶ Nine conservation measures are listed with most being very general, such as studying how to reduce the risk of vessel collisions in the St. Lawrence Estuary and Gulf of St. Lawrence, developing projects to promote the recovery of ghost or lost fishing gear, and studying/implementing measures to reduce the negative impact of noise caused by human activities.⁶⁷

SARA also includes provisions for the protection of critical habitats. Recovery strategies and action plans are required to identify the species' critical habitat to the extent possible.⁶⁸ Within 180 days after the recovery strategy or action plan that identified the critical habitat is included in the public registry, the competent minister, who is the Minister of Fisheries and Oceans for aquatic species, must issue a critical habitat protection order if the critical habitat is not legally protected under legislation or agreements, or the minister must include a statement in the public registry explaining how the critical habitat or parts of it are legally protected.⁶⁹ For critical habitat specified in a ministerial order, no person is allowed to destroy any part of the critical habitat.⁷⁰

For the blue whale, critical habitat identification and protections have lagged. No critical habitat areas have been identified in the blue whale recovery strategy or action plan. The recovery strategy included a schedule of studies to help identify critical habitat,⁷¹ and various studies have been carried out and summarised in a recovery strategy progress report published in 2016.⁷² A 2018 Canadian Science Advisory Report did identify important habitat areas for the blue whale in the western North Atlantic.⁷³ An amended recovery

66 *Ibid.*, at Table 1.

67 *Ibid.*

68 SARA (n 53), sections 41(1)(c), 49(1)(a).

69 *Ibid.*, section 58(5).

70 *Ibid.*, section 58(1).

71 Beauchamp (n 53), at Table 2.

72 DFO, *Report on the Progress of Recovery Strategy Implementation for the Blue Whale (Balaenoptera musculus) Northwest Atlantic Population, in Canada for the Period 2009–2014, Species at Risk Act Recovery Strategy Report Series* (DFO, Ottawa, 2016).

73 DFO (n 24).

strategy under development will include the identification of critical habitat for the species based on that information.⁷⁴

An additional action plan under SARA that is relevant to the blue whale should also be noted. An Action Plan to Reduce the Impact of Noise on the Beluga Whale (*Delphinapterus leucas*) and Other Marine Mammals at Risk in the St. Lawrence Estuary⁷⁵ sets out thirty-two recovery measures. Some are aimed at better understanding noise sources and impacts in the St. Lawrence Estuary not only on the beluga whale but also on the blue whale, the fin whale and the North Atlantic right whale.⁷⁶ Various general measures relating to noise in the marine environment are also included, for example commitments to establish better operational procedures and practices adapted to the various fleets;⁷⁷ adjust shipping lanes according to areas highly frequented by marine mammals at risk, while taking into account navigational constraints;⁷⁸ review the zoning of the Saguenay-St. Lawrence Marine Park in order to reduce the impact of noise;⁷⁹ and implement technologies that are known to reduce noise when designing, repairing, refurbishing or building ships.⁸⁰

Fisheries Act, Regulations and Policies

A number of measures under the *Fisheries Act*, its regulations and policies are helpful to blue whale conservation. The blue whale and its habitat are covered by the *Fisheries Act* because the definition of 'fish' includes marine mammals.⁸¹ The Act regulates fisheries that interact with the species and gives the Minister authority to issue fisheries management orders to respond to threats 'to the proper management and control of fisheries and the conservation and protection of fish'.⁸² These orders have not yet been used to respond to a marine mammal concern. The *Fisheries Act* also prohibits activities, subject to exceptions, that harm, alter, disrupt or destruct blue whale habitat.⁸³

Additional provisions useful to blue whale protection and recovery are found in the *Fishery (General) Regulations*. The regulations require stationary gear to be marked with the vessel registration number or the name of the person

74 Blue Whale Action Plan (n 65), at p. 16.

75 DFO, *Action Plan to Reduce the Impact of Noise on the Beluga Whale and other Marine Mammals at Risk in the St. Lawrence Estuary* (DFO, Ottawa, 2020).

76 *Ibid.*, at Table 2.

77 *Ibid.*, at Recovery Measure 17.

78 *Ibid.*, at Recovery Measure 21.

79 *Ibid.*, at Recovery Measure 23.

80 *Ibid.*, at Recovery Measure 26.

81 *Fisheries Act*, RSC, 1985, c F-14, section 2(1) 'fish'.

82 *Ibid.*, section 9.1.

83 *Ibid.*, section 35.

who owns the gear and in cases of incidental capture, the animal has to be released alive with least harm.⁸⁴ Licence conditions stipulate colour schemes for non-tended, fixed gear, including lobster and crab, based on the type of fishery and region.⁸⁵ These regulations also give the Regional Director-General of Fisheries and Oceans Canada authority to issue variation orders that have been used extensively to minimise the risk of entanglement of North Atlantic right whales in lobster and crab gear in the Gulf of St. Lawrence.⁸⁶

The *Marine Mammal Regulations* contain whale-watching guidelines aimed at protecting all marine mammals, including the blue whale. The regulations prohibit disturbance of marine mammals with activities such as feeding and interacting, as well as approaching the animals closer than the prescribed distance.⁸⁷ For blue whales the allowable distance varies from 400 metres in parts of the St. Lawrence Estuary and the Saguenay River to 100 metres everywhere else.⁸⁸ Any accidental contact between a vessel or fishing gear, unless reported as bycatch in the log book, has to be communicated to the Minister in the prescribed format.⁸⁹

Activities authorised under the *Fisheries Act* and its regulations, as well as SARA, are exempt from the disturbance prohibitions.⁹⁰ The Minister may also authorise disturbance of marine mammals in certain circumstances, such as easing pain and suffering or scientific research.⁹¹ These exemptions allow the implementation of the Marine Mammal Response Program which helps marine mammals in distress, including in cases of entanglement.⁹²

84 *Fishery (General) Regulations*, SOR/93-53, sections 27, 33.

85 DFO, 'Update to the conditions of licences related to the mandatory colour scheme in Eastern Canada (14 August 2020)' available at <https://www.dfo-mpo.gc.ca/fisheries-peches/commercial-commerciale/doc/colour-notice-avis-couleur-eng.pdf>; accessed 21 December 2021.

86 *Fishery (General) Regulations* (n 84), section 6(1); Koubrak, VanderZwaag and Worm (n 4).

87 *Marine Mammal Regulations*, SOR/93-96, section 7.

88 *Ibid.*, section 7(3) and Schedule VI.

89 *Ibid.*, section 39.

90 *Ibid.*, section 7(1).

91 *Ibid.*, section 38(1).

92 DFO, 'Marine Mammal Response Program' (modified 15 September 2020) available at <https://www.dfo-mpo.gc.ca/species-especes/mammals-mammiferes/program-programme/index-eng.html>; accessed 22 September 2021; DFO, 'Application instructions for the authorization of marine mammal disturbance' (modified 21 August 2019) available at <https://www.dfo-mpo.gc.ca/species-especes/mammals-mammiferes/section38/index-eng.html>; accessed 22 September 2021.

The issue of blue whale entanglement is addressed by the Policy on Managing Bycatch and its Guidance on Implementation.⁹³ The objectives of this policy, which includes minimising the risk of serious or irreversible harm to bycatch species, as well as SARA obligations, are to be implemented through the regional, fishery-specific integrated fisheries management plans (IFMPs). At the very least, all IFMPs are supposed to describe the state of knowledge on bycatch in each fishery, and if there are gaps, explain how these gaps are being addressed and how risk and uncertainty are being managed in the meantime.⁹⁴ However, in practice this is not the case. Review of the publicly available IFMPs for the Gulf, Maritimes, and Newfoundland and Labrador fishing regions shows that this information is not provided.⁹⁵ Only one IFMP mentions the presence of blue whales in its fisheries waters, but does not address the risk of interaction with these animals.⁹⁶ Two IFMPs covering extensive areas off the coast of Atlantic Canada acknowledge the risk of entanglement to other cetaceans, but do not mention the blue whale.⁹⁷

Canada Shipping Act, 2001

The *Canada Shipping Act, 2001* contributes to blue whale protection and recovery by regulating marine pollution and vessel movement to prevent ship strikes.⁹⁸ In 2020 and 2021, Transport Canada relied on the powers granted under subsection 10.1(1) to issue interim orders implementing a system of

93 DFO, 'Policy on managing bycatch' available at <https://waves-vagues.dfo-mpo.gc.ca/Library/40584690.pdf>; accessed 20 September 2021; DFO, 'Guidance on Implementation of the Policy on Managing Bycatch' available at <https://waves-vagues.dfo-mpo.gc.ca/Library/40816588.pdf>; accessed 20 September 2021 [Guidance on Bycatch Policy]; DFO, 'Preparing an integrated fisheries management plan (IFMP)' (modified 30 January 2013) available at <https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/guidance-guide/preparing-ifmp-pgip-elaboration-eng.html>; accessed 20 September 2021.

94 Guidance on Bycatch Policy (n 93).

95 DFO, 'Integrated fisheries management plans' available at <https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/index-eng.html>; accessed 20 September 2021.

96 DFO, 'Groundfish Newfoundland and Labrador Region NAFO Subarea 2 + Divisions 3KLMNO' (date modified 26 April 2019) available at https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/groundfish-poisson-fond/2019/groundfish-poisson-fond-2_3klmno-eng.htm; accessed 28 August 2021.

97 See, for example, DFO, 'Offshore lobster and Jonah Crab – Maritimes Region' (modified 3 March 2020) available at <https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/lobster-crab-homard/2019/index-eng.html>; accessed 28 August 2021; DFO, '4VWX5 groundfish – Maritimes Region' (modified 21 December 2018) available at <https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/groundfish-poisson-fond/groundfish-poisson-fond-4vwx5-eng.html>; accessed 28 August 2021.

98 *Canada Shipping Act, 2001*, SC 2001, c 26.

static and dynamic speed restriction zones to minimise the risk to the North Atlantic right whales in the Gulf of St. Lawrence.⁹⁹ Although blue whales are not the target of this intervention, they may indirectly benefit from the slowed down vessels.

Oceans Act and Regulations

The *Oceans Act* and its regulations provide a mechanism for establishing marine protected areas for the protection of endangered species, including specifically marine mammals, and their habitats.¹⁰⁰ Three recently established MPAs, the Laurentian Channel, Banc-des-Américains, and St. Anns Bank, as well as an older one, the Gully, are located in areas frequented by whales, including blue whales.¹⁰¹ Activities or actions that disturb, damage, destroy or remove any marine species or parts of their habitat within an MPA are prohibited.¹⁰² Any accidental engagement in these activities within the Gully

99 Transport Canada, 'Interim order for the protection of North Atlantic right whales (*Eubalaena glacialis*) in the Gulf of St. Lawrence, 2021' (28 April 2021) available at <https://tc.canada.ca/en/ministerial-orders-interim-orders-directives-directions-response-letters/interim-order-protection-north-atlantic-right-whales-eubalaena-glacialis-gulf-st-lawrence-2021>; accessed 22 September 2021; Transport Canada, 'Interim order for the protection of North Atlantic right whales (*Eubalaena glacialis*) in the Gulf of St. Lawrence' (27 April 2019) available at <https://tc.canada.ca/en/marine-transportation/marine-pollution-environmental-response/interim-order-protection-north-atlantic-right-whales-eubalaena-glacialis-gulf-st-lawrence>; accessed 22 September 2021; Transport Canada, 'Interim order for the protection of North Atlantic right whales (*Eubalaena glacialis*) in and near the Shediac Valley' (1 August 2020) available at <https://tc.canada.ca/en/ministerial-orders-interim-orders-directives-directions-response-letters/interim-order-protection-north-atlantic-right-whales-eubalaena-glacialis-near-shediac-valley>; accessed 22 September 2021.

100 *Oceans Act*, SC 1996, c 31, sections 35(1)(a)–(b).

101 DFO, 'Laurentian Channel marine protected area (MPA)' (modified 18 September 2019) available at <https://www.dfo-mpo.gc.ca/oceans/mpa-zpm/laurentian-laurentien/index-eng.html>; accessed 22 September 2021; DFO, 'Banc-des-Américains marine protected area (MPA)' (modified 19 March 2021) available at <https://www.dfo-mpo.gc.ca/oceans/mpa-zpm/american-americains/index-eng.html>; accessed 22 September 2021; DFO, 'St. Anns Bank marine protected area (MPA)' (modified 13 December 2019) available at <https://www.dfo-mpo.gc.ca/oceans/mpa-zpm/stanns-sainteanne/index-eng.html>; accessed 22 September 2021; DFO, 'The Gully marine protected area (MPA)' (modified 14 October 2020) available at <https://www.dfo-mpo.gc.ca/oceans/mpa-zpm/gully/index-eng.html>; accessed 12 October 2021; E Marotte and H Moors-Murphy, 'Seasonal occurrence of blue whale (*Balaenoptera musculus*) vocalizations in the Gully Marine Protected Area' (2015) 43(3) *Proceedings of the Acoustics Week in Canada* 1–2.

102 *Laurentian Channel Marine Protected Area Regulations*, SOR/2019–105, section 4 [Laurentian Channel MPA]; *Banc-des-Américains Marine Protected Area Regulations*, SOR/2019–50, section 4 [Banc-des-Américains MPA]; *St. Anns Bank Marine Protected Area*

MPA has to be reported to the Coast Guard within two hours.¹⁰³ Commercial and recreational fishing is prohibited in the Laurentian Channel MPA, while allowed in certain zones in the Banc-des-Américains, St. Anns Bank and the Gully.¹⁰⁴ Shipping is allowed in all four MPAs with prohibitions on sewage and greywater discharge by large ships in the Banc-des-Américains.¹⁰⁵ Other activities, including scientific research and monitoring, have to be approved by the Minister before proceeding.¹⁰⁶

Notices to Mariners explicitly mention the blue whale as one of the main species of concern in the Gully MPA.¹⁰⁷ Mariners are advised to avoid the area if possible; reduce speed to 10 knots or less and post a look-out; travel parallel to a marine mammal; and maintain a minimum distance of 100 metres.¹⁰⁸

Saguenay-St. Lawrence Marine Park Act, Regulations and Policies

The Saguenay-St. Lawrence Marine Park, established under the legislation bearing its name, contributes to the protection of blue whales in Canadian waters as approximately 250 to 300 individuals use this area.¹⁰⁹ According to the park's management plan, recovery of species at risk and protection of their habitat is one of the priorities, while implementation of the blue whale recovery strategy under SARA is identified as an ongoing management action.¹¹⁰ Behaviour that may kill, injure or disturb a marine mammal is prohibited within the park.¹¹¹ The definition of 'disturb' is similar to the one in the *Marine Mammal Regulations* and includes feeding and interacting with the animals.¹¹²

Regulations, SOR/2017-106, section 4 [St. Anns Bank MPA]; *Gully Marine Protected Area Regulations*, SOR/2004-112, section 4 [Gully MPA].

103 Gully MPA (n 102), section 7.

104 Laurentian Channel MPA (n 102), section 5; Banc-des-Américains MPA (n 102), section 5; St. Anns Bank MPA (n 102), section 5; Gully MPA (n 102), section 8.

105 Laurentian Channel MPA (n 102), section 5; Banc-des-Américains MPA (n 102), section 6; St. Anns Bank MPA (n 102), section 6; Gully MPA (n 102), section 11(c).

106 Laurentian Channel MPA (n 102), section 7; Banc-des-Américains MPA (n 102), section 10; St. Anns Bank MPA (n 102), section 10; Gully MPA (n 102), section 5.

107 DFO, 'Notices to Mariners 1 to 46. Annual Edition 2021' available at <https://www.notmargc.ca/publications/annual-annuel/annual-notices-to-mariners-eng.pdf>; accessed 12 October 2021, Notice 5A [Notices to Mariners].

108 *Ibid.*

109 *Saguenay-St. Lawrence Marine Park Act*, SC 1997, c 37; Saguenay-St. Lawrence Marine Park, 'Protect species at risk – Blue whale' available at <https://parcmarin.qc.ca/protect/>; accessed 12 October 2021.

110 Parks Canada, 'Saguenay-St. Lawrence Marine Park plans and policies' (modified 7 December 2020) available at <https://www.pc.gc.ca/en/amnc-nmca/qc/saguenay/info/plan>; accessed 23 September 2021.

111 *Marine Activities in the Saguenay-St. Lawrence Marine Park Regulations*, SOR/2002-76, section 14(1).

112 *Ibid.*, section 14(2).

Operations of a marine tour business, cruise ship or shuttle service, as well as conduct of scientific research and special events require permits.¹¹³ Those who hold permits for research and special events that involve marine mammals have to undergo additional training.¹¹⁴ Whale-watchers have to stay at least 400 metres away from a blue whale, and there are restrictions on the number of boats allowed in one area to observe the animals.¹¹⁵ Speed limits vary between 25 knots and ‘the minimum speed required to manoeuvre the vessel’ depending on the location within the park and position in relation to marine mammals.¹¹⁶ Any collision with a marine mammal has to be immediately reported to the park warden.¹¹⁷

Notices to Mariners identify an area within the Saguenay-St. Lawrence Marine Park as ‘an important blue whale area’ and ask ship operators to avoid this area if possible or in the alternative, slow down to 10 knots or less.¹¹⁸

Oceans Protection Plan

Three initiatives under Canada’s CDN\$1.5 billion national Oceans Protection Plan that focus on the recovery of the Southern Resident killer whales, the North Atlantic right whale, and the St. Lawrence Estuary beluga offer indirect benefits to blue whales in Canadian waters.¹¹⁹ Launched in 2018 with a budget of CDN\$167.4 million, the Whales Initiative supports activities such as static and dynamic fisheries and shipping management measures in the Gulf of St. Lawrence, development of non-entangling ropeless or ‘whale safe’ gear, and the Marine Mammal Response Program.¹²⁰ The Whale Detection Initiative (CDN\$9.1 million over 5 years) funds the development of technologies that detect whales in real-time in order to minimise ship strikes.¹²¹ The Marine Environmental Quality Initiative (CDN\$26.6 million over 5 years) aims

113 *Ibid.*, section 3.

114 *Ibid.*, section 11.1.

115 *Ibid.*, sections 15, 16–17.

116 *Ibid.*, sections 19–24.

117 *Ibid.*, section 14(4).

118 Notices to Mariners (n 107), Notice 5.

119 Transport Canada, ‘Ocean Protection Plan’ (modified 8 July 2020) available at <https://tc.canada.ca/en/initiatives/oceans-protection-plan>; accessed 12 October 2021.

120 Transport Canada, ‘Report to Canadians: Investing in our coasts through the Oceans Protection Plan’ (modified 22 July 2021) available at <https://tc.canada.ca/en/initiatives/oceans-protection-plan/report-canadians-investing-our-coasts-through-oceans-protection-plan#whales-initiative>; accessed 22 September 2021.

121 DFO, ‘Protecting whales from vessel collisions’ (modified 16 February 2021) available at <https://www.dfo-mpo.gc.ca/species-especes/mammals-mammiferes/cetacean-cetaces/protecting-protection/index-eng.html>; accessed 12 October 2021.

to measure the level of ambient underwater noise in the habitats of the three priority whale species and understand the effects of this noise.¹²²

United States Laws and Policies

With the blue whale being listed as endangered throughout its range under the precursor to the *Endangered Species Act of 1973* (ESA)¹²³ and with that listing being continued,¹²⁴ two main prohibitions have been applicable.¹²⁵ The ESA prohibits the take of any endangered species,¹²⁶ with the Act defining 'take' to mean 'harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct'.¹²⁷ The ESA also prohibits any federal agency action that is likely to jeopardise the continued existence of a listed species or to result in the destruction or adverse modification of a species' critical habitat.¹²⁸ Where a federal agency action is likely to affect a listed species, the ESA sets out a consultation process¹²⁹ which for most marine and anadromous fish species involves the National Marine Fisheries Service (NMFS).¹³⁰

The ESA requires the development of recovery plans for listed species,¹³¹ and a recovery plan for the blue whale was first issued in 1998 but revised in 2020.¹³² The plan delineates nine blue whale management units around the globe for recovery purposes,¹³³ with blue whales in the eastern and western

122 DFO, 'Understanding the marine environment to better protect whales' (modified 15 October 2020) available at <https://www.dfo-mpo.gc.ca/science/partnerships-partenariats/research-recherche/marine-environment-milieu-marin/index-eng.html>; accessed 12 October 2021.

123 16 USC §1531 *et. seq.*

124 NMFS Recovery Plan (n 1), at p. 1.

125 WL Andreen, 'Separating fact from fiction in evaluating the Endangered Species Act: Recognizing the need for ongoing conservation management and regulation' (2020) 56 *Idaho Law Review* 39–47, at p. 41.

126 16 USC §1538(a)(1)(B)(C).

127 *Ibid.*, §1532(19).

128 *Ibid.*, §1536(a)(2). See D Owen, 'Critical habitat' in DC Baur and Ya-Wei Li (eds), *Endangered Species Act: Law, Policy, and Perspectives*, third edition (American Bar Association, Chicago, 2021) 55–75.

129 *Ibid.*, §1536(a)(3), 1536(b)(c).

130 D Owen, 'Critical habitat and the challenge of regulating small harms' (2012) 64 *Florida Law Review* 141–198, at p. 151.

131 16 USC §1533(f). See Ya-Wei Li, 'Recovery' in Baur and Li (eds) (n 128), 77–110.

132 NMFS Recovery Plan (n 1).

133 They are: Northern subspecies – North Atlantic population; Northern subspecies – Eastern North Pacific population; Northern subspecies – Western/Central North Pacific population; Northern Indian Ocean subspecies; Pygmy subspecies – Madagascar population;

portion of the North Atlantic Ocean considered as one management unit in light of the uncertainty in population structure.¹³⁴ The plan has a long-term goal of promoting blue whale recovery to the point of delisting under the ESA and an intermediate goal of reaching a sufficient recovery status to reclassify the species as threatened.¹³⁵ The plan sets detailed downlisting and delisting criteria, all of which must be met before reclassifications are to be considered.¹³⁶ These criteria include minimum abundance for each of the nine management units, trends in abundance as stable or increasing, and the identification and minimisation of anthropogenic threats.¹³⁷ The minimum abundance for North Atlantic blue whales is 2,000 whales for downlisting and 2,500 whales for delisting.¹³⁸

The recovery plan might be described as high in advocating ‘more studies’ but almost nil in addressing management actions. The plan calls for studies relating to blue whale taxonomy, population structure, distribution, habitat, and abundance.¹³⁹ The plan emphasises the uncertainties surrounding the extent current threats are putting the globally listed species at risk of extinction¹⁴⁰ and thus urges a range of studies to determine if *potential* threats, especially anthropogenic noise, vessel collisions, marine debris, fishing gear entanglement and climate change, are limiting blue whale recovery.¹⁴¹ The only concrete management action is a pledge to maintain the international ban on commercial harvesting of whales instituted in 1986.¹⁴² The plan suggests that after the populations and their threats are more fully understood, the plan will be modified to include threat minimisation actions.¹⁴³

The recovery plan, while recognising the importance of a multinational approach to blue whale management,¹⁴⁴ provides only aspirational goals for advancing international collaborations. The need for US agencies and scientists to participate in cooperative blue whale surveys with scientists from other countries is highlighted, and the plan recommends a primary goal should be

Pygmy subspecies – Western Australia/Indonesian population; Pygmy subspecies – Eastern Australia/New Zealand population; Chilean subspecies; Antarctic subspecies.

134 NMFS Recovery Plan (n 1), at p. viii.

135 *Ibid.*

136 *Ibid.*, at pp. ix–xii.

137 *Ibid.*, at pp. 57, 60.

138 *Ibid.*

139 *Ibid.*, at pp. 65–70.

140 *Ibid.*, at p. vi.

141 *Ibid.*, at pp. 71–76.

142 *Ibid.*, at p. vii.

143 *Ibid.*

144 *Ibid.*

to foster international collaborations and cooperation in the study and protection of the worldwide populations of blue whales.¹⁴⁵ Work with appropriate government agencies in other countries is encouraged to develop and maintain blue whale photo-identification programmes.¹⁴⁶ The plan encourages collaboration with foreign governments, including the use of multilateral agreements to protect blue whale habitat in multiple EEZs.¹⁴⁷ The United States is urged to support, endorse and export knowledge on threat reduction efforts employed in the United States,¹⁴⁸ such as speed reduction and routing measures used to mitigate ship strikes to blue whales off Southern California.¹⁴⁹

The identification and protection of blue whale critical habit areas has lagged. The ESA requires the designation of critical habits ‘to the maximum extent prudent and determinable’ concurrently with making listing decisions,¹⁵⁰ and critical habitat designations may be revised from time-to-time.¹⁵¹ While the blue whale recovery plan promotes measures to identify and protect important habitat throughout the species range,¹⁵² no critical habitat areas have been designated under the ESA.

The *Marine Mammal Protection Act* (MMPA),¹⁵³ besides prohibiting the take of marine mammals subject to limited exceptions,¹⁵⁴ is also relevant to the blue whale in two main ways. First, the MMPA requires stock assessments for each marine mammal stock occurring in waters under the jurisdiction of the United States.¹⁵⁵ Annual reviews are mandated for strategic stocks¹⁵⁶ and the blue whale is deemed a strategic stock due to its listing as endangered under the ESA.¹⁵⁷ The latest stock assessment report available at the time of writing for the blue whale documents the continued population uncertainties and notes the lack of observed fisheries-related mortalities or serious injuries.¹⁵⁸

145 *Ibid.*, at p. 68.

146 *Ibid.*

147 *Ibid.*, at p. 70.

148 *Ibid.*

149 *Ibid.*

150 16 USC §1533(a)(3)(A)(i).

151 *Ibid.*, at §1533(a)(3)(A)(ii).

152 NMFS Recovery Plan (n 1), at p. 70.

153 16 USC §1361 *et. seq.*

154 *Ibid.*, §1372(a).

155 *Ibid.*, §1386(a).

156 *Ibid.*, §1386(c)(1)(A).

157 *Ibid.*, §1362(19)(C).

158 SE Hayes, E Josephson, K Maze-Foley and PE Rosel, *US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2019*, NOAA Technical Memorandum, NMFS-NE-264 (US Department of Commerce, July 2020) 99–103.

Second, the MMPA promotes the reduction of incidental mortality and serious injury to marine mammals from commercial fishing activities. The MMPA requires the development and implementation of take reduction plans to assist in the recovery of strategic stocks which interact with a commercial fishery where there is frequent or occasional mortality or serious injury of marine mammals.¹⁵⁹ While an Atlantic Large Whale Take Reduction Plan was developed in 1997 to reduce the level of mortality or serious injury of three strategic stocks of large whales (North Atlantic right, humpback and fin), its various requirements modified over time may tangentially benefit the blue whale. Examples of plan requirements include the use of weak links and sinking groundlines, gear marking, seasonal area closures and minimum number of traps allowed.¹⁶⁰

The MMPA also seeks to ensure that other countries, including Canada, live up to US standards for reducing incidental mortality and serious injury to marine mammals from commercial fishing activities. The Act provides that fish and fisheries products cannot be imported into the United States from commercial fishing operations that result in incidental mortality or serious injury to marine mammals in excess of US standards.¹⁶¹ National Oceanic and Atmospheric Administration (NOAA) Fisheries has issued a list of exempt foreign fisheries and foreign export fisheries, including Canadian fisheries such as snow crab and lobster, which will require a comparability finding with the US regulatory programme before imports will be allowed.¹⁶² NOAA Fisheries has granted extensions to allow harvesting countries time to develop regulatory programmes comparable to the US regulatory programme with the latest extension giving countries until November 30, 2021 to submit their comparability finding applications and until December 31, 2022 to receive comparability findings.¹⁶³

159 16 USC §1387(f)(1).

160 NOAA Fisheries, 'Atlantic Large Whale Reduction Plan' (modified 28 October 2021) available at <http://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-large-whale-take-reduction-plan>; accessed 2 November 2021.

161 16 USC §1371(a)(2).

162 NOAA Fisheries, '2020 final list of foreign fisheries' available at <http://www.fisheries.noaa.gov/foreign/international-affairs/list-foreign-fisheries>; accessed 18 December 2021.

163 NOAA Fisheries, 'NOAA Fisheries establishes international marine mammal bycatch criteria for U.S. imports' available at <http://www.fisheries.noaa.gov/foreign/marine-mammal-protection/noaa-fisheries-establishes-international-marine-mammal-bycatch-criteria-us-imports>; accessed 18 December 2021.

Bilateral Arrangements that Address the Threats to the NWA Blue Whales

Canada–United States

While no specific Canada–United States cooperative mechanisms have been established in relation to the blue whale, bilateral collaboration in addressing cetacean and species at risk management has been facilitated on various fronts and may indirectly benefit the blue whale. Because of the North Atlantic right whale's critical status with only some 366 individuals remaining as of January 2019¹⁶⁴ and with elevated mortalities due to vessel collisions and fishing gear entanglements,¹⁶⁵ considerable bilateral efforts have emerged to share information and assist with the recovery of right whales. The North Atlantic Right Whale Consortium (NARWC), beginning in 1986 as a collaborative data sharing group, now includes over 200 individuals including representatives from US and Canadian government agencies, state and provincial authorities, industries, academia and conservation organisations.¹⁶⁶ The NARWC maintains North Atlantic right whale databases,¹⁶⁷ convenes annual meetings¹⁶⁸ and issues annual 'report cards' on the status of right whales.¹⁶⁹ Transport Canada and Fisheries and Oceans Canada participate in yearly meetings of the US Northeast Implementation Team, an advisory team assisting NOAA with implementation of the North Atlantic right whale recovery plan.¹⁷⁰ Transboundary conservation discussions also occur through informal meetings held between NOAA Fisheries and officials from Canada and through the Canada and United States Bilateral Working Group on Cetaceans which has focused attention on the right whale.¹⁷¹

164 DFO, *Action Plan for the North Atlantic Right Whale (Eubalaena glacialis) in Canada, Species at Risk Act Action Plan Series* (DFO, Ottawa, 2021) 2 [NARW Action Plan].

165 NOAA Fisheries, '2017–2021 North Atlantic Right whale unusual mortality event' (modified 3 September 2021) available at <https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-north-atlantic-right-whale-unusual-mortality-event>; accessed 2 November 2021.

166 North Atlantic Right Whale Consortium (NARWC), 'Partners' available at <http://www.narwc.org/partners.html>; accessed 2 November 2021.

167 NARWC, 'NARWC databases' available at <http://www.narwc.org/narwc-databases.html>; accessed 2 November 2021.

168 NARWC, 'NARWC previous meetings' available at <http://www.narwc.org/previous-meetings.html>; accessed 2 November 2021.

169 NARWC, 'NARWC annual report card' available at <http://www.narwc.org/report-cards.html>; accessed 2 November 2021.

170 NARW Action Plan (n 164), at p. 17.

171 *Ibid.* Some confusion surrounds the name of this Working Group, with the United States referring to the Canada and United States Bilateral Working Group on North Atlantic

A Canada–U.S. Species at Risk Working Group (SARWG) operates under the auspices of the Canada–U.S. Transboundary Resources Steering Committee, an informal arrangement for discussing fisheries and ecosystem management issues in the Gulf of Maine and Georges Bank region.¹⁷² The SARWG continues to serve as a forum for sharing national approaches to species at risk listings and recovery efforts and for identifying potential areas for collaboration.¹⁷³ However, no specific attention has been directed towards the blue whale.

Canada–France (St. Pierre and Miquelon)

Canada and France have a long history of conflict and cooperation over the resources surrounding the islands of St. Pierre and Miquelon, although the issue of protecting marine species at risk such as the blue whale has never been addressed.¹⁷⁴

The Agreement on Regional Cooperation, signed in 1994, broadly outlines key areas for joint efforts and mentions the need to collaborate on the protection and development of the natural environment with an emphasis on scientific studies.¹⁷⁵ The implementation of the Agreement is overseen by the Joint Cooperation Commission with six working groups, including one on the environment and science tasked with enhancing collaboration and knowledge sharing on topics such as climate change and biodiversity protection.¹⁷⁶ The Commission meets once a year to approve major projects and provide

Right Whales; NOAA Fisheries, *Species in the Spotlight: North Atlantic Right Whale. Priority Actions: 2021–2025* (NOAA Fisheries, Silver Spring, 2021) 12. No terms of reference for the Working Group are available.

172 See DL VanderZwaag, M Bailey and NL Shackell, 'Canada–U.S. fisheries management in the Gulf of Maine: Taking stock and charting future coordinates in the face of climate change' (2017) 31 *Ocean Yearbook* 1–26.

173 Government of Canada, Bedford Institute of Oceanography, 'Canada–U.S. Species at Risk Working Group (SARWG)' (modified 18 November 2020) available at <https://www.bio.gc.ca/info/intercol/sc-cd/group/sarwg-gtep-en.php>; accessed 2 November 2021.

174 PM Saunders and DL VanderZwaag, 'Canada and St. Pierre and Miquelon transboundary relations: Battles and bridges' in DA Russell and DL VanderZwaag (eds), *Recasting Transboundary Fisheries Management Arrangements in Light of Sustainability Principles: Canadian and International Perspectives* (Martinus Nijhoff, Boston, 2010) 209–237.

175 Agreement Between the Government of Canada and the Government of the Republic of France Relating to the Development of Regional Cooperation Between the Canadian Atlantic Provinces and the French Territorial Collectivity of St. Pierre and Miquelon (Paris, 2 December 1994, in force 2 December 1994) 1928 *UNTS* 63, Article 3 [Cooperation Agreement].

176 Government of Canada, 'Atlantic Canada and Saint-Pierre and Miquelon' (modified 24 April 2020) available at <https://www.canada.ca/en/atlantic-canada-opportunities/corporate/atlantic-canada-saint-pierre-miquelon.html>; accessed 23 July 2021; Government of Canada, 'Atlantic Canada and Saint-Pierre and Miquelon: 20 years of regional

updates, but the details of its work remain opaque as the meeting reports are not made publicly available online.¹⁷⁷

The 1994 Procès-Verbal Applying the March 27, 1972 Agreement between Canada and France on their Mutual Fisheries Relations and a related administrative arrangement agreed upon in 1995 establish the framework for the management of commercially valuable fish stocks shared by the two countries.¹⁷⁸ It includes a total allowable catch allocation formula, a licensing scheme, and a monitoring system.¹⁷⁹

Over the years, Canada and France have entered into additional arrangements to guide their cooperation on environmental matters, but their joint commitment to species at risk remains uncertain. The Canada-France Enhanced Cooperation Agenda, signed in 2013 and renewed in 2016, focuses on peace, security, and sustainable development within the framework of the 2030 Sustainable Development Goals.¹⁸⁰ The Canada-France Climate and Environment Partnership, signed in 2018, identifies nine priority areas for action, including advancing ecosystem approaches to climate change adaptation and mitigation strategies.¹⁸¹ A renewed version of the partnership is scheduled to be adopted shortly with 'ambitious objectives for the protection of biodiversity'.¹⁸²

Canada–Denmark (Greenland)

Despite the distance between Canada and Greenland being as close as 25 kilometres, bilateral cooperation on environmental matters, including protection of endangered whales, has been lagging.¹⁸³ There is only one treaty, the

co-operation' available at <https://www.canada.ca/en/atlantic-canada-opportunities/services/factsheetsandbrochures17.html>; accessed 23 July 2021 [20 years of co-operation].

177 Cooperation Agreement (n 175), Article 15; 20 years of co-operation (n 176).

178 Saunders and VanderZwaag (n 174).

179 *Ibid.*

180 Government of Canada, 'Canada-France cooperation agenda' available at <https://www.canada.ca/en/environment-climate-change/corporate/international-affairs/partnerships-countries-regions/europe/canada-france-cooperation-agenda.html>; accessed 25 July 2021.

181 Prime Minister of Canada Justin Trudeau, 'Canada-France Climate and Environment Partnership' (16 April 2018) available at <https://pm.gc.ca/en/news/backgrounders/2018/04/16/canada-france-climate-and-environment-partnership>; accessed 25 July 2021.

182 Ministère de l'Europe et des Affaires étrangères, 'Joint Statement by the President of the French Republic, Emmanuel Macron and the Prime Minister of Canada, Justin Trudeau' (12 June 2021), <https://www.diplomatie.gouv.fr/en/country-files/canada/events/article/joint-statement-by-the-president-of-the-french-republic-emmanuel-macron-and-the>; accessed 25 July 2021.

183 A Østhagen, 'Coast Guard Collaboration in the Arctic: Canada and Greenland (Denmark)' (2014) (Munk-Gordon Arctic Security Program, Toronto, 2014).

1983 Canada-Denmark Agreement Related to the Marine Environment, and it focuses on the prevention, reduction and control of marine pollution in the areas of Nares Strait, Baffin Bay and Davis Strait lying between Canada and Greenland.¹⁸⁴ The agreement provides for cooperation in managing vessel traffic in the area, but this provision has not been used.¹⁸⁵

The Canada-Greenland Joint Commission on Narwhal and Beluga provides an example of the two countries cooperating on marine mammal issues.¹⁸⁶ The Commission is responsible for making recommendations on the conservation and management of the shared stocks of the two species to the appropriate authorities of both countries.¹⁸⁷ Three working groups focused on science, traditional knowledge, and allocation of total allowable harvest assist the Commission in its task.¹⁸⁸

Regional Arrangements that Address the Threats to the NWA Blue Whales

OSPAR

The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), which entered into force in 1998 and has 16 parties,¹⁸⁹ covers an area from the Arctic waters to the Iberian coast, including the high seas. Although the focus of the Convention is on elimination of pollution from all sources, general obligations include protection of the OSPAR area from adverse impacts of human activities, as well as ecosystem conservation and when practicable, restoration.¹⁹⁰ Annex 5, titled 'On the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area', elaborates on these commitments. Parties are asked to conserve and protect

184 Agreement between the Government of Canada and the Government of the Kingdom of Denmark for Cooperation Relating to the Marine Environment (Copenhagen, 26 August 1983, in force 26 August 1983) 1348 *UNTS* 113, Articles 1(a), 2.

185 *Ibid.*, Article 7(2)(a).

186 Nunavut Wildlife Management Board, 'Canada-Greenland Commission on Beluga and Narwhal' available at <https://www.nwmb.com/en/2-uncategorised/83-canada-greenland-joint-commission-on-beluga-and-narwhal>; accessed 25 July 2021.

187 *Ibid.*

188 *Ibid.*

189 Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) (Paris, 22 September 1992, in force 25 March 1998) 2354 *UNTS* 67; Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the European Union.

190 *Ibid.*, Articles 2(1)(a), 3-5, 7 and Annexes 1-3.

marine biodiversity,¹⁹¹ while the OSPAR Commission, made up of representative of each of the parties,¹⁹² is directed to develop programmes and measures for the control of harmful human activities, including protective, restorative or precautionary measures for specific species and habitats.¹⁹³

The blue whale was included on the OSPAR List of Threatened and/or Declining Species and Habitats in 2008 following a joint nomination by Iceland, Portugal and the United Kingdom.¹⁹⁴ The non-binding Recommendation 2013/9 was subsequently adopted to guide parties and the Commission in their protective efforts.¹⁹⁵ The Recommendation identifies five actions that should be considered by parties and the Commission acting collectively: (1) develop and implement monitoring and assessment strategies; (2) develop and implement a mitigation strategy against threats; (3) examine whether any of the critical habitat areas should be designated as protected areas; (4) raise awareness of the status and threats to the blue whale among the relevant management authorities and the general public; and (5) cooperate with other international bodies and encourage them to take actions to protect the blue whales.¹⁹⁶ Parties are required to submit implementation reports initially every three, and after 2019, every six years.¹⁹⁷

In 2019/2020, OSPAR parties completed a status assessment of the blue whale in the Convention waters.¹⁹⁸ The assessment concluded that the Northeast Atlantic population was still suffering the effects of commercial whaling, and while there were signs of population increases, recovery is likely to take decades. According to the authors, whaling remains a threat to the population because fin whales continue to be hunted in Iceland, and there are records of blue-fin whale hybrids being taken. Other identified threats were ocean noise, ship strikes, entanglements, pollution, and climate change. With respect to ship strikes, it was noted that in the North Atlantic, records of blue

191 *Ibid.*, Annex 5, Article 2(a).

192 *Ibid.*, Article 10(1).

193 *Ibid.*, Annex 5, Articles 3(1)(a), 3(1)(b)(ii).

194 OSPAR Assessment Portal, '2020 status assessment: Blue whale' available at <https://oap.ospar.org/en/ospar-assessments/committee-assessments/biodiversity-committee/status-assessments/blue-whale/>; accessed 30 July 2021; OSPAR Commission, '2008: Case reports for the OSPAR list of threatened and/or declining species and habitats' available at https://www.ospar.org/site/assets/files/44267/blue_whale.pdf; accessed 30 July 2021.

195 OSPAR (n 189), Article 13(5); OSPAR Commission, Recommendation 2013/9 on furthering the protection and conservation of the North Atlantic blue whale (*Balaenoptera musculus*) in the OSPAR maritime area.

196 Recommendation 2013/9 (n 195), para 3.1.

197 *Ibid.*, para 5.

198 OSPAR Assessment Portal (n 194).

whale ship strikes were very rare. However, the risk is expected to increase due to the increase in activities in the Arctic region. There were also no records of blue whale entanglements in the OSPAR region. The assessors classified this as a potential threat that remains to be quantified. The assessment did not offer management recommendations other than encouraging OSPAR to contact the IWC, North Atlantic Marine Mammal Commission (NAMMCO), and International Maritime Organization (IMO) to inform them of the status and threats to the blue whale and request that they take action to help these whales.

Blue whales are identified as one of the target species in five collective actions adopted by the OSPAR Commission under its 2017–2025 Roadmap.¹⁹⁹ France and the United Kingdom are supporting the development and implementation of a monitoring strategy; Germany is leading the analysis of whether any of the critical habitats should be designated protected areas; France is supporting liaising with competent organisations on the issues of ship noise and ship strikes, as well as entanglement, ingestion of marine litter, and ghost gear and encouraging these organisations to act; and finally, France is also supporting the development of mitigation measures against further anthropogenic threats.²⁰⁰

The OSPAR Network of MPAs also may benefit blue whales in the Northeast Atlantic. The Network is comprised of over 469 areas, including eight on the high seas.²⁰¹ Blue whales are identified as a species of concern in six of the high seas MPAs.²⁰² OSPAR parties are asked to undertake a suite of conservation measures, including environmental impact assessments of activities that may be potentially conflicting with the conservation objective of the high

199 OSPAR Commission, '2017–2025 Roadmap for the implementation of collective actions within the Recommendations for the protection and conservation of OSPAR listed Species and Habitats' (2018), Information document.

200 OSPAR Commission, 'Implementation of species and habitat recommendations' available at <https://www.ospar.org/work-areas/bdc/species-habitats/implementation-of-species-and-habitat-recommendations>; accessed 3 November 2021.

201 OSPAR Assessment Portal, '2018 status report on the OSPAR network of marine protected areas' available at <https://oap.ospar.org/en/ospar-assessments/committee-assessments/biodiversity-committee/status-ospar-network-marine-protected-areas/assessment-reports-mpa/2018/>; accessed 22 December 2021; OSPAR Decision 2021/01 on the establishment of the North Atlantic Current and Evlanov Sea basin marine protected area, OSPAR 21/13/1, Annex 23.

202 North-East Atlantic Fisheries Commission and OSPAR Commission, Collective arrangement between competent international organisations on cooperation and coordination regarding selected areas in areas beyond national jurisdiction in the North-East Atlantic, OSPAR Agreement 2014-09 [Collective arrangement].

seas MPA along with appropriate mitigation measures.²⁰³ Because the OSPAR Commission lacks competence over activities such as fishing, shipping and seabed mining,²⁰⁴ it established the Collective Arrangement together with the North-East Atlantic Fisheries Commission (NEAFC).²⁰⁵ The Arrangement aims to improve management of human activities in selected areas beyond national jurisdiction in the North East Atlantic, including the MPAs, and is open to all international organisations with relevant competencies that agree to cooperate in implementing conservation and management measures in these areas.²⁰⁶

Despite an ambitious programme to protect the listed species, there are concerns that OSPAR lacks the resources and competence to reverse the declines.²⁰⁷ With respect to the collective action to develop mitigation measures against further anthropogenic threats, members of the Biodiversity Committee were unsure whether OSPAR had the authority to adopt any measures to help the large whales.²⁰⁸ Fisheries and shipping matters are explicitly excluded from the purview of the OSPAR Convention.²⁰⁹ The fact that recommendations to protect listed species are non-binding has been identified as a barrier to national-level implementation.²¹⁰

²⁰³ See, for example, OSPAR Recommendation 2010/12 on the management of the Milne Seamount Complex Marine Protected Area, OSPAR 10/23/1-E, Annex 35; OSPAR Recommendation 2010/13 on the management of the Charlie-Gibbs South Marine Protected Area, OSPAR 10/23/1, Annex 37; OSPAR Recommendation 2010/14 on the management of the Altair Seamount High Seas Marine Protected Area, OSPAR 10/23/1-E, Annex 39.

²⁰⁴ OSPAR's Regulatory Regime for establishing Marine Protected Areas (MPAs) in Areas beyond National Jurisdiction (ABNJ) of the OSPAR Maritime Area (2009) available at https://www.ospar.org/site/assets/files/39751/annex06_jl_advice_on_abnj.doc; accessed 28 January 2022.

²⁰⁵ Collective arrangement (n 202).

²⁰⁶ *Ibid.*

²⁰⁷ OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic Meeting of the Biodiversity Committee (BDC), videoconference 12–16 April 2021, paras 5.16–5.21.

²⁰⁸ *Ibid.*, paras 5.19(a)–(b), 5.20(a).

²⁰⁹ OSPAR (n 189), Annex 5, Article 4. Also see OSPAR Agreement on the Meaning of Certain Concepts in Annex V to the 1992 OSPAR Convention on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area, Reference number: 1998–15.2.

²¹⁰ OSPAR Commission, 'Overview assessment of OSPAR Recommendation 2010/5 on assessments of environmental impact in relation to threatened and/or declining species and habitats' (2018) available at <https://www.ospar.org/documents?v=38950>; accessed 3 August 2021.

Sargasso Sea

Many marine species, including blue whales, use the Sargasso Sea at some point in their life history.²¹¹ To protect this unique ecosystem, ten governments have signed the non-binding Hamilton Declaration on Collaboration for the Conservation of the Sargasso Sea.²¹² The Sargasso Sea Commission, composed of 'distinguished scientists and other persons of international repute committed to the conservation of high seas ecosystems',²¹³ is assigned a stewardship role with no management authority.²¹⁴ Two work programmes (2015–2017 and 2016–2018) provide insight into the activities of the Commission and some of the actions that could have indirect benefits to blue whales.²¹⁵ In both instances work is organised around six priorities: (1) international recognition of ecological importance; (2) fisheries and fisheries habitat conservation; (3) impacts from international shipping; (4) impacts to the seafloor and seabed; (5) conservation of migratory species; and (6) defining a role in data and information management. With respect to whales, the Commission facilitated an extension of the Stellwagen National Marine Sanctuary and Bermuda EEZ Sister Sanctuary Agreement to support the protection of migrating humpbacks.²¹⁶

ICCAT, NAFO & NEAFC

The International Commission for the Conservation of Atlantic Tunas (ICCAT), Northwest Atlantic Fisheries Organization (NAFO) and the NEAFC are regional fisheries management organisations (RFMOs) with competence over fisheries management in the North Atlantic. The three organisations manage multiple fisheries utilising a variety of fixed and mobile gears.

To minimise abandoned, lost or otherwise discarded fishing gear that contributes to entanglement risk of marine mammals, all three RFMOs have adopted gear marking requirements, prohibitions on intentional gear abandonment,

211 D Laffoley *et al.*, *The Protection and Management of the Sargasso Sea: The Golden Floating Rainforest of the Atlantic Ocean. Summary Science and Supporting Evidence Case* (Sargasso Sea Alliance, 2011) available at <http://www.sargassoseacommission.org/storage/documents/Sargasso.Report.9.12.pdf>; accessed 3 August 2021.

212 Hamilton Declaration on Collaboration for the Conservation of the Sargasso Sea, signed in Hamilton, Bermuda, 11 March 2014.

213 *Ibid.*, para 6.

214 *Ibid.*, Annex II.

215 Sargasso Sea Commission, Work Programme Priorities (2015–2017), SSC/2014/1/Doc.1; Sargasso Sea Commission, Work Programme Priorities (2016–2018), MOS/SSC/2016/2/Doc.1.

216 Stellwagen Bank Marine Sanctuary, '54th Sanctuary Advisory Council–Minutes of Meeting (18 October 2018)' available at <https://nmsstellwagen.blob.core.windows.net/stellwagen-prod/media/docs/54sacminutes.pdf>; accessed 21 December 2021.

and reporting obligations when gear is lost.²¹⁷ ICCAT also requires fish aggregating devices to be constructed from non-entangling and mostly biodegradable materials, while NEAFC has prohibited fisheries with gillnets, entangling nets and trammel nets in depths greater than 200 metres.²¹⁸

NAMMCO

The North Atlantic Marine Mammal Commission (NAMMCO) was established in 1992 by the whaling nations in the North Atlantic concerned with the lack of science-based management of whaling by the IWC due to the moratorium.²¹⁹ Four governments, Faroe Islands, Greenland, Iceland and Norway, have signed the Agreement on Cooperation in Research, Conservation and Management of Marine Mammals in the North Atlantic. Canada is an observer at NAMMCO and provides information on marine mammal research and management.²²⁰

Blue whales are protected in all NAMMCO countries.²²¹ However, in 2018, a blue-fin whale hybrid was taken in Icelandic waters.²²² NAMMCO countries

²¹⁷ Northwest Atlantic Fisheries Organization Conservation and Enforcement Measures 2021, NAFO/COM Doc 21-01, Articles 13(10)–13(11); North-East Atlantic Fisheries Commission Scheme of Control and Enforcement (in force 6 February 2021), at Articles 7, 7(b)(1); Compendium management recommendations and resolutions adopted by ICCAT for the conservation of Atlantic tunas and tuna-like species 2021, Recommendation by ICCAT concerning the duties of contracting parties and cooperating non-contracting parties, entities, or fishing entities in relation to their vessels fishing in the ICCAT Convention area, 03-12, Article 3; Compendium management recommendations and resolutions adopted by ICCAT for the conservation of Atlantic tunas and tuna-like species 2021, Recommendation by ICCAT on abandoned, lost or otherwise discarded fishing gear, 19-11, Article 1.

²¹⁸ Compendium management recommendations and resolutions adopted by ICCAT for the conservation of Atlantic tunas and tuna-like species 2021, Recommendation by ICCAT to replace recommendation 16-01 by ICCAT on a multi-annual conservation and management programme for tropical tunas, 19-02, Article 40; Recommendation to temporarily prohibit the use of gillnets, entangling nets and trammel nets in the NEAFC regulatory area, Recommendation III (2006).

²¹⁹ AH Hoel, 'Regionalization of international whale management: The case of the North Atlantic Marine Mammal Commission' (1993) 46(2) *Arctic* 116–123.

²²⁰ North Atlantic Marine Mammal Commission (NAMMCO), 'Contributing to a sustainable North' available at <https://nammco.no/>; accessed 8 September 2021; DFO, *Progress Report on Marine Mammal Research and Management in 2017*, SC/25/NPR-C (May 2108).

²²¹ NAMMCO, 'Blue whale' (modified May 2020) available at <https://nammco.no/topics/blue-whale/#1475844586552-bbd974dc-67bc>; accessed 8 September 2021.

²²² Marine and Freshwater Research Institute, 'Press release from the Marine and Freshwater Research Institute (MFRI): Peculiar baleen whale—genetic results' (19 July 2018) available at <https://www.hafogvatn.is/en/about/news-announcements/press-release-from-the-marine-and-freshwater-research-institute-mfri-peculiar-baleen-whale-genetic-results>; accessed 8 September 2021.

have not reported any blue whale entanglements or ship strikes.²²³ The work of the Working Group on By-catch, Entanglements and Live Strandings focused on animal welfare issues could be beneficial to the blue whales in NAMMCO countries. The group mainly has been collecting data, and has developed guidelines on euthanasia for stranded animals and on establishing national response networks, as well as reviewed guidelines from other organisations for sample collection and disentanglement.²²⁴ Ship strikes are currently not considered to be a significant problem in NAMMCO, which may change with an increase in activities in the Arctic.²²⁵

International Frameworks that Address the Threats to the NWA Blue Whales

A number of global conventions set out general obligations relevant to the conservation of the blue whale. The United Nations Convention on the Law of the Sea in Article 192 requires its 168 parties to protect and preserve the marine environment, including by working individually and collectively to minimise pollution from all sources.²²⁶ Parties are also specifically asked to cooperate in the conservation of marine mammals.²²⁷ Additional measures to lessen the impact of fisheries on non-target species can be found in the 1995 United Nations Fish Stocks Agreement and the FAO Code of Conduct for Responsible Fisheries. These include commitments to conserve endangered species, minimise catch by lost and abandoned gear, and promote development of selective gear.²²⁸

Commitments to species conservation, habitat protection and ecosystem approach made by parties to the Convention on Biological Diversity (CBD) are

²²³ NAMMCO (n 221).

²²⁴ NAMMCO, *Report of the Working Group on By-catch, Entanglements and Live Strandings*, 25 February 2021, online meeting.

²²⁵ NAMMCO, 'By-catch, entanglement and ship strike' available at <https://nammco.no/topics/by-catch-entanglement-and-ship-strikes/>; accessed 8 September 2021.

²²⁶ United Nations Convention on the Law of the Sea (Montego Bay, 10 December 1982, in force 16 November 1994) 1833 *UNTS* 396, Article 194.

²²⁷ *Ibid.*, Articles 65, 120.

²²⁸ United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (New York, 4 August 1995, in force 11 December 2001) 2167 *UNTS* 88, Articles 5(e)–(g), (d); FAO Code of Conduct for Responsible Fisheries, paras 7.2.2(d), 7.6.9.

also helpful.²²⁹ A draft document of the post-2020 global biodiversity framework contains a potential target to protect 30 per cent of the planet through a system of protected areas and other effective area-based conservation measures.²³⁰ The goal to reduce the number of threatened species is currently being negotiated.²³¹

In 2008, the CBD parties adopted the scientific criteria for identifying areas in the open ocean that are important to the overall functioning of marine ecosystems.²³² Parties are encouraged to cooperate at the global, regional or sub-regional level to ensure protection and sustainable use of these ecologically or biologically significant areas (EBSAs), including through designation of marine protected areas.²³³ Two EBSAs have been identified in the North Atlantic: the North-West Atlantic EBSA covering the slopes of the Flemish Cap and the Grand Bank, as well as the Sargasso Sea.²³⁴

Commitments to climate change adaptation contained in the United Nations Framework Convention on Climate Change and the Paris Agreement are outside the scope of this discussion.

The following conventions and organisations have adopted measures that are directly applicable to blue whale conservation and warrant additional attention.

IWC

The International Convention for the Regulation of Whaling, signed in 1946, established the IWC and gave it authority to adopt management regulations with respect to the conservation and use of whales by amending the Schedule to the Convention, as well as make recommendations related to whales and

229 Convention on Biological Diversity (Rio de Janeiro, 5 June 1992, in force 29 December 1993) 1760 UNTS 79, Articles 8(a), (d), (f), (k); CBD, X/2. The Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets (2010), UNEP/CBD/COP/DEC/X/2; CBD, V/6. Ecosystem Approach (2000), UNEP/CBD/COP/5/23.

230 CBD, First Draft of the Post-2020 of the Global Biodiversity Framework (5 July 2021), CBD/WG2020/3/3, Annex, para 12, Target 3.

231 *Ibid.*, Annex, para 11, Goal A.2.

232 CBD, 'Background on the EBSA Process' available at <https://www.cbd.int/ebsa/about>; accessed 17 September 2021.

233 CBD, Decision Adopted by the Conference of the Parties to the Convention on Biological Diversity at its Tenth Meeting, X/29: Marine and coastal biodiversity (2010), UNEP/CBD/COP/DEC/X/29.

234 The Clearing-house Mechanism of the Convention on Biological Diversity Information Submission Service (CHM), 'Ecologically or Biologically Significant Areas (EBSAs): Slopes of the Flemish Cap and Grand Bank' (12 June 2015) available at <https://chm.cbd.int/database/record?documentID=204104>; accessed 17 September 2021; CHM, 'Ecologically or Biologically Significant Areas (EBSAs): The Sargasso Sea' (15 June 2015) available at <https://chm.cbd.int/database/record?documentID=200098>; accessed 17 September 2021.

whaling.²³⁵ There are 88 member governments at the IWC; Canada withdrew its membership in 1982.²³⁶

Although the IWC placed an earlier ban on taking blue whales, a general whaling moratorium was put in place beginning from the 1985/1986 season.²³⁷ Norway and Iceland have entered reservations allowing them to pursue commercial whaling in the North Atlantic, but they do not take blue whales.²³⁸ The IWC continues to set catch limits for aboriginal subsistence whaling, which also does not target blue whales.²³⁹ No blue whales have been taken under the scientific whaling programme.²⁴⁰

Four resolutions adopted by the Commission address the issue of entanglement. In 1990, the Commission endorsed the United Nations General Assembly Resolution 44/225 banning large-scale pelagic driftnet fishing and forwarded reports of the Scientific Committee on the issue to the United Nations Secretary-General.²⁴¹ In 1997, the Commission called upon parties to improve their monitoring and reporting of incidental take, especially large whales, and release live cetaceans.²⁴² Subsequently, the Commission requested the Scientific Committee to report on its work on bycatch mitigation methods and release techniques, as well as reiterated its call to release live whales alive with minimum harm.²⁴³ The latest resolution addresses entanglement in abandoned, lost or otherwise discarded gear (ALDFG) by encouraging development of best practices to avoid and mitigate the impact of ghost gear, reporting any relevant information, cooperating with other international organisations and non-governmental entities, as well as joining the IWC Global Whale Entanglement Response Network.²⁴⁴

235 International Convention for the Regulation of Whaling (Washington, DC, 2 December 1946, in force 10 November 1948) 161 *UNTS* 72, Articles 5, 6.

236 International Whaling Commission (IWC), 'Membership and contracting governments' available at <https://iwc.int/members>; accessed 27 August 2021.

237 IWC, 'Commercial whaling' available at <https://iwc.int/commercial>; accessed 26 August 2021.

238 IWC, 'Catches taken: Under objection or under reservation' available at https://iwc.int/table_objection; accessed 26 August 2021.

239 IWC, 'Catch limits for aboriginal subsistence whaling' available at https://iwc.int/html_76; accessed 26 August 2021.

240 IWC, 'Catches: Special permit' available at https://iwc.int/table_permit; accessed 26 August 2021.

241 IWC Resolution 1990-6: Resolution in support of the United Nations General Assembly initiative regarding large-scale pelagic driftnet fishing and its impact on the living marine resources of the world's oceans and seas.

242 IWC Resolution 1997-4: Resolution on cetacean bycatch reporting and bycatch reduction.

243 IWC Resolution 2001-4: Resolution on incidental capture of cetaceans.

244 IWC Resolution 2018-3: Resolution on ghost gear entanglement among cetaceans.

In 2016, the IWC endorsed the development of the Bycatch Mitigation Initiative (BMI), implemented through a Standing Working Group on Bycatch under the Conservation Committee, a Bycatch Coordinator at the IWC Secretariat and an Expert Advisory Panel.²⁴⁵ Bycatch in small scale coastal fisheries in developing countries was identified as a starting priority for BMI.²⁴⁶ According to the Strategic Plan 2018–2028, once funding is secured, BMI plans to start with a series of pilot projects that are then scaled up and the initiative becomes an active advisory body on cetacean bycatch monitoring, assessment and mitigation using tools such as avoidance, gear development, and changes in fishing practice or management.²⁴⁷ Increasing domestic capacity and international awareness of the issue are also objectives.²⁴⁸

The IWC has established the Global Whale Entanglement Response Network to build capacity around the world and with a long-term objective of preventing entanglements.²⁴⁹ The programme is led by a technical advisor and supported by an expert panel composed of representatives from countries that already have professional national entanglement response teams.²⁵⁰ This group of experts also has developed global Best Practice Guidelines and a training workshop that has been delivered to more than 1,200 professionals from more than 30 countries.²⁵¹

The threat of ship strikes has been addressed in IWC resolutions very briefly. In Resolution 1981-7, the Commission noted ‘the possible effects’ of shipping and encouraged member countries to conduct research into this matter, among others.²⁵² In Resolution 2000-8 dedicated to the North Atlantic right whale, the Commission encouraged Canada and the United States to adopt measures to reduce ship strikes on the species.²⁵³

In 2005, the Conservation Committee established the Ship Strikes Working Group to develop a ship strikes database and cooperate with the IMO.²⁵⁴ The established database contains incident records going back to 1999.²⁵⁵

245 IWC, Bycatch Mitigation Initiative Strategic Plan 2018–2028, IWC/67/CC/01.

246 *Ibid.*

247 *Ibid.*

248 *Ibid.*

249 IWC, ‘Whale entanglement – Building a global response’ available at <https://iwc.int/entanglement>; accessed 27 August 2021.

250 *Ibid.*

251 *Ibid.*

252 IWC Resolution 1981-7: Resolution relating to pollutants in whales.

253 IWC Resolution 2000-8: Resolution on western North Atlantic right whales.

254 Ship Strikes Working Group, Sixth Progress Report to the Conservation Committee, 63rd Annual Meeting of the International Whaling Commission June 2011, IWC/63/CC13.

255 *Ibid.*

The Strategic Plan to Mitigate Ship Strikes 2017–2020 focused on improving the database, developing training and technology, identifying high risk areas and populations, as well as cooperating with the shipping industry and other organisations.²⁵⁶ The Marine Environment Protection Committee (MEPC) of the IMO is the key partner on the issue of ship strikes.²⁵⁷

The IWC is also working with the IMO on the issue of anthropogenic underwater noise.²⁵⁸ The threat of underwater noise has been discussed at the Scientific Committee since 2004, and it has since been included in the strategic plan of the Conservation Committee.²⁵⁹ A small intersessional working group has been established to ‘consider and propose initial steps in articulating and progressing work on noise’ as envisaged by the strategic plan.²⁶⁰ The IWC also has adopted a resolution which recommends that contracting governments develop and share mitigation technologies and strategies; establish national and regional registers and monitoring programmes; incorporate best practice guidelines to assess and mitigate impact such the ones developed by the IMO and the Convention on Migratory Species of Wild Animals (CMS); and support the adoption of national and international noise standards.²⁶¹ The resolution also asks the IWC Secretariat to encourage action by international bodies, including the IMO, on the issue of underwater noise, while directing the Scientific and Conservation Committees to continue their work evaluating the impact of underwater noise and mitigation measures, as well as reviewing the implementation of the recommendations.

Despite recognising climate change as a threat to cetaceans three decades ago, the IWC has had difficulty formulating advice on how to manage this threat.²⁶² It is included as a priority threat in the Conservation Committee’s

256 K Cates *et al.*, ‘IWC Strategic Plan to Mitigate the Impacts of Ship Strikes on Cetacean Populations: 2017–2020’ available at <https://iwc.int/ship-strikes>; accessed 5 November 2021.

257 IWC, ‘Ship strikes: Collisions between whales and vessels’ available at <https://iwc.int/ship-strikes>; accessed 28 August 2021.

258 IWC, ‘Contribution from the Secretariat of the International Whaling Commission to Part 1 of the Report of the United Nations Secretary General on Oceans and Law of the Sea, Anthropogenic Underwater Noise’ available at https://www.un.org/Depts/los/consultative_process/contributions_19cp/IWC.pdf; accessed 28 August 2021.

259 IWC, ‘Conservation Committee: Strategic Plan 2016–2026’ available at https://iwc.int/document_3708; accessed 28 August 2021.

260 IWC, ‘Argentina and Brazil, Progressing the work of the IWC on the impacts of marine noise on cetaceans’, IWC/67/CC/14.

261 IWC Resolution 2018-4: Resolution on anthropogenic underwater noise.

262 IWC, ‘Climate change’ available at <https://iwc.int/climate-change>; accessed 28 August 2021.

strategic plan and recognised as an overarching issue by the Scientific Committee.²⁶³ The Scientific Committee has indicated that it may initiate specific activities related to climate change in the future.²⁶⁴

IMO

The IMO has already played roles in protecting marine mammals, especially from ship collisions, through its various legal tools and thus could provide an avenue for future shipping measures in relation to the blue whale if deemed necessary in particular locations. Those tools include the designation of traffic separation schemes, routeing measures, areas to be avoided, ship reporting requirements, and particularly sensitive sea areas.²⁶⁵

The impacts of noise on marine mammals is a growing concern,²⁶⁶ but the IMO has only developed non-binding Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address the Adverse Impacts on Marine Life.²⁶⁷ The 2014 Guidelines highlight the two main opportunities for reducing noise levels from vessels, through ship design and maintenance and through routeing and operations. The opportunities for noise reduction at the design phase are especially emphasised with large noise reductions possible through designs of propellers, hulls and onboard machinery.²⁶⁸ The need to maintain clean propellers and smooth underwater hull surfaces is noted along with the role of ship speed reduction in reducing noise.²⁶⁹

The voluntary and general nature of the Guidelines have been criticised,²⁷⁰ and recent initiatives have been taken within the IMO to revisit the Guidelines.

263 IWC (n 235); IWC, Report of the Scientific Committee (24 April–6 May 2018), IWC/67/Rep01.

264 Report of the Scientific Committee, *ibid.*

265 See B Ellis and L Brigham (eds), *Arctic Marine Shipping Assessment 2009 Report* (Arctic Council, 2009) 60–61.

266 C Erbe *et al.*, 'The effects of ship noise on marine mammals: A review' (2019) 6 *Frontiers in Marine Science* 1–21, <https://doi.org/10.3389/fmars.2019.00606>; S Vakili, AI Ölçer and F Ballini, 'The development of a policy framework to mitigate underwater noise pollution from commercial vessels' (2020) 118 *Marine Policy* 104004.

267 International Maritime Organization (IMO), Marine Environment Protection Committee (MEPC), Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life, IMO Doc MEPC.1/Circ. 833 (2014).

268 *Ibid.*, at pp. 3–5.

269 *Ibid.*, at pp. 5–6.

270 See FOEI, WWF, IFAW, Pacific Environment and CSC, Comments on IMO document MEPC 75/14 – Proposal for a new output concerning a review of the 2014 Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life (MEPC.1/Circ. 833) and identification of next steps, IMO Doc MEPC 75/14/1 (2020).

In 2019, Australia, Canada and the United States submitted a proposal to the IMO's MEPC for a review of the Guidelines and the identification of next steps.²⁷¹ At the MEPC's 76th Session in June 2021, the Committee agreed to include a review of the 2014 Guidelines in the biennial agenda of the Sub-committee on Ship Design and Construction (SDC) with a target completion date of 2023.²⁷² The SDC is tasked with identifying barriers to the Guidelines' uptake and implementation; identifying measures to further prevent and reduce underwater noise from ships; identifying areas requiring further assessment and research; identifying an acceptable means of measuring existing ship noise profiles; and amending the 2014 Guidelines and identifying/developing next steps, if necessary.²⁷³

CMS

The blue whale was listed under Appendix I of the Convention on the Conservation of Migratory Species of Wild Animals in 1979.²⁷⁴ This means that the parties are required to prohibit taking, hunting, capturing, harassing, deliberately killing or attempting to engage in such conduct, in addition to protecting habitat and attempting to reduce the impact of factors that are endangering the species.²⁷⁵ No concerted actions or action plans have been adopted for the blue whale.

The CMS has addressed some of the key threats to the blue whale through a number of resolutions and decisions. Resolution 12.22 calls upon parties to strengthen their bycatch mitigation measures for all marine species, work through the regional fisheries management organisations, arrangements and bodies to tackle the issue, improve data collection and research, and provide financial and technical support to the Secretariat and developing countries.²⁷⁶ The Secretariat is requested to cooperate with the relevant 'daughter' agreements and programmes, such as the IWC Bycatch Mitigation

271 MEPC, Proposal for a new output concerning a review of the 2014 Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life (MEPC.1/Circ.833) and identification of next steps, IMO Doc MEPC 75/14 (2019).

272 MEPC, Report of the Marine Environment Protection Committee on Its Seventy-Sixth Session, IMO Doc MEPC 76/15 (2021), 60.

273 *Ibid.*

274 Convention on the Conservation of Migratory Species of Wild Animals (CMS), 'Balaenoptera musculus' available at <https://www.cms.int/en/species/balaenoptera-musculus>; accessed 14 September 2021.

275 Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 23 September 1979, in force 1 November 1983) 1651 UNTS 333, Articles 1(i), 3(4)–(5).

276 CMS, Bycatch, UNEP/CMS/Resolution 12.22 (2017).

Initiative, and subject to availability of resources, to assist developing countries. The Scientific Council and the Working Group on Bycatch are requested to consider the available scientific and technical information and recommend mitigation measures. Subsequent Decisions 13.61 and 13.63 urge the parties to implement bycatch mitigation measures for marine mammals, while the Secretariat is asked, subject to funding availability and upon request by the parties, to identify fisheries with the highest level of bycatch for CMS-listed species and to conduct workshops to identify mitigation measures, if warranted.²⁷⁷ Resolution 12.20 targets marine debris, including ALDFG, by encouraging parties to establish monitoring programmes and follow the FAO's Code of Conduct for Responsible Fisheries, among other measures.²⁷⁸

With respect to underwater noise, Resolution 12.14 urges parties to develop a regulatory framework or implement relevant measures to reduce marine noise and consider using the CMS Family Guidelines on Environmental Impact Assessment for Marine Noise-generating Activities that are to be updated and reviewed by the Scientific Council on a regular basis.²⁷⁹ The parties are asked to disseminate this document to their national decision-makers and share their experiences with its implementation with the Scientific Council in Decision 13.58.²⁸⁰ The Secretariat is directed to strengthen coordination with other international bodies to encourage policy coherence on the issue.

The parties, Scientific Council and Secretariat are also requested to make use of and contribute to the Important Marine Mammal Areas (IMMAS) identified by the IUCN Joint Species Survival Commission/World Commission on Protected Areas Marine Mammal Protected Areas Task Force.²⁸¹ To date, no IMMAs have been identified in the North Atlantic.²⁸²

Two CMS daughter agreements cover large cetaceans, the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and

277 CMS, 'Decisions 13.61 to 13.63 – Bycatch' available at <https://www.cms.int/en/page/decisions-1361-1363-bycatch>; accessed 15 September 2021.

278 CMS, 'Management of marine debris' UNEP/CMS/Resolution 12.20 (2017).

279 CMS, 'Adverse impacts of anthropogenic noise on cetaceans and other migratory species' UNEP/CMS/Resolution 12.14 (2017).

280 CMS, 'Decisions 13.58 to 13.60 – Adverse impacts of anthropogenic noise on cetaceans and other migratory species' available at <https://www.cms.int/en/page/decisions-1358-1360-adverse-impacts-anthropogenic-noise-cetaceans-and-other-migratory-species>; accessed 14 September 2021.

281 CMS, 'Decisions 13.54 to 13.57 – Important marine mammal areas (IMMAS)' available at <https://www.cms.int/en/page/decisions-1354-1357-important-marine-mammal-areas-immas>; accessed 15 September 2021.

282 Marine Mammal Protected Areas Task Force, 'IMMA E-Atlas' available at <https://www.marinemammalhabitat.org/imma-eatlas/>; accessed 15 September 2021.

Contiguous Atlantic Area (ACCOBAMS) and the Pacific Island Cetaceans Memorandum of Understanding (MOU). Blue whales are not on the 'indicative list' of cetaceans covered by ACCOBAMS, but the agreement is meant to apply to 'all cetaceans that have a range which lies entirely or partly within the Agreement area or that accidentally or occasionally frequent the Agreement area' and therefore, its obligations should cover the species.²⁸³ The parties have agreed to prohibit deliberate taking, hunting, capturing, harassing, and killing of cetaceans and implement the conservation plan focused on minimising human impacts on the species, habitat protection, research and monitoring as well as capacity-building, including emergency response.²⁸⁴ Multiple resolutions, programmes and activities are supporting the parties in their commitments.²⁸⁵ There are no conservation management plans for the blue whale.²⁸⁶

The non-binding MOU for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region, concluded under the auspices of the CMS and in partnership with the Pacific Regional Environment Programme, is intended to conserve all cetaceans in the region and 'fully protect' species listed on CMS Appendix 1, which includes the blue whale.²⁸⁷ The signatories committed to implementing the nine-point Action Plan and agreed to exchange information to coordinate conservation measures and facilitate the work related to the Plan.²⁸⁸ The Whale and Dolphin Action Plan has since been updated and incorporated into the Pacific Islands Regional Marine Species Programme 2022–2026 which includes a multi-species action plan covering cross-cutting issues such as climate change and ecosystems and habitat protection.²⁸⁹ The

283 Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (Monaco, 24 November 1996, in force 1 June 2001) 2183 *UNTS* 303, Article 1(2) and Annex 1.

284 *Ibid.*, Article 2 and Annex 2.

285 See, for example, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), 'Anthropogenic noise' available at <https://accobams.org/conservations-action/anthropogenic-noise/>; accessed 17 September 2021; ACCOBAMS, 'Bycatch & depredation' available at <https://accobams.org/conservations-action/bycatch-depredation/>; accessed 17 September 2021; ACCOBAMS, 'Ship strikes' available at <https://accobams.org/conservations-action/ship-strikes/>; accessed 17 September 2021.

286 ACCOBAMS, 'Species conservation management plans' available at https://accobams.org/species/_conservation-plans/; accessed 17 September 2021.

287 Memorandum of Understanding for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region, in effect 12 September 2006, section 1 [Pacific Cetaceans MOU].

288 *Ibid.*, sections 4–5.

289 CMS, Draft Pacific Islands Regional Marine Species Programme/Whale and Dolphin Action Plan 2022–2026, CMS/PIC/MOS4/Doc.3.2 (2021).

Whale and Dolphin Action Plan focuses on bycatch reduction and development of sustainable cetacean-watching tourism.²⁹⁰

Future Directions

Scientific Directions

Improved conservation of endangered blue whales in the Northwest Atlantic will require a concerted effort to reduce large existing uncertainties regarding the species' regional abundance, population growth rate, and mortality rate. This will require better use of existing data and the collection of new data on the distribution, abundance, reproduction, and human interference with the species in US, Canadian and international waters. Such efforts have been implemented for North Atlantic right whales following the unusual mortality event in 2017,²⁹¹ but have not yet been extended to other species that have also suffered human-caused mortality.²⁹² For example, regular airborne surveys for right whales also record blue, fin, sei, humpback and minke whales, but this information is not used in the same way to mitigate ship strike and entanglement risk for these other species. Similarly, while stranded right whales are usually necropsied to determine the cause of death, such efforts are much less common in other whales, including blue whales.²⁹³ From a scientific perspective, much is known about the annual blue whale summer feeding aggregation in the St. Lawrence Estuary,²⁹⁴ but information on wintering grounds and migration routes is almost absent. To mitigate human-caused risks throughout the species' life cycle, such information needs to be collected and disseminated. While the wider and more offshore distribution of blue whales makes year-round data collection more challenging than for coastal species, newly developed satellite sensors might help to fill this data gap.²⁹⁵ The objective would be to better identify seasonally important critical habitat where whales are particularly vulnerable to specific human activities and threats, such that those threats can be mitigated in a targeted manner, for example, via

290 *Ibid.*

291 Koubrak, VanderZwaag and Worm (n 4).

292 Wimmer and Maclean (n 30).

293 *Ibid.*

294 C Ramp and R Sears, *Distribution, Densities, and Annual Occurrence of Individual Blue Whales (*Balaenoptera musculus*) in the Gulf of St. Lawrence, Canada from 1980–2008*, Canadian Science Advisory Secretariat Research Document 2012/157 (DFO, Ottawa, 2013).

295 HC Cubaynes *et al.*, 'Whales from space: Four mysticete species described using new VHR satellite imagery' (2019) 35 *Marine Mammal Science* 466–491.

slow-down measures for large vessels, or seasonal closures for entangling fishing gear.

Multilevel Law and Policy Directions

National Directions

Since the waters of Canada and the United States cover a large area of the blue whale's distribution in the Northwest Atlantic, further advancing implementation of existing national commitments relating to the blue whale seems crucial. For Canada, the most important step forward would be updating and amending the 2009 recovery strategy for the blue whale with the inclusion of critical habitat identifications. A further step would be issuing a progress report on implementation of the 2009 recovery strategy for the years 2015–2020. The publication dates of these documents remain uncertain as drafts are being prepared, but various review and approval steps remain to be completed.²⁹⁶

For the United States, implementation of the recovery plan for the blue whale is difficult to assess, but moving beyond the 'more studies' approach is necessary. A step in that direction might be assisted by a detailed progress report on recovery implementation as required in Canada²⁹⁷ and not just a five year status report required under the ESA.²⁹⁸ The latest status report simply reviews whether the status of the blue whale should be retained or changed (downlisted or delisted).²⁹⁹ No details on financial and human resources devoted pursuant to the plan are provided nor are research activities described. Biennial reports on recovery plan implementation, required to be submitted to Congress,³⁰⁰ summarise general implementation of multiple plans and also have not provided detailed implementation information so as to allow an evaluation.³⁰¹

Improvements to existing national species at risk laws and policies might also be considered to benefit the blue whale in the future. For Canada, critical habitat protection might be enhanced through clarifying the meaning of critical habitat destruction and passing proactive regulations to protect specific listed species as authorised by SARA, but this power has not been exercised to

296 Personal communication, Roxanne Gillett, Fisheries and Oceans Canada, 19 August 2021.

297 SARA (n 53), section 46.

298 16 USC §1533(c)(2).

299 NMFS, *Blue Whale (Balaenoptera musculus) 5-Year Review: Summary and Evaluation* (NMFS, Silver Spring, MD, November 2020).

300 16 USC §1533(f)(3).

301 NMFS, *Recovering Threatened and Endangered Species, FY 2017–2018 Report to Congress* (NMFS, Silver Spring, MD, 2019).

date.³⁰² Existing action plan monitoring and reporting requirements, with a single five-year ministerial progress report mandated after a plan comes into effect,³⁰³ might also be bolstered. Subjecting action plans to an independent performance review process has been suggested to critically assess successes and shortcomings.³⁰⁴ Requiring subsequent and more frequent action plan reviews has also been recommended.³⁰⁵ For the United States, key improvements might include provision of a statutory duty to recover species, clarifying the definition of recovery, removing or restricting the cost-benefit weighing in critical habitat designations, and shifting critical habitat designation to the recovery planning phase.³⁰⁶ Advancing the consideration of climate change threats and impacts in Canadian and US recovery planning is also a common scholarly call.³⁰⁷

Other future national governance directions are also possible. Enhancing the roles of marine spatial planning and marine protected areas in the recovery of endangered cetaceans has been suggested.³⁰⁸ Further developing and eventually requiring ropeless fishing gear to reduce cetacean entanglements remains a goal in both Canada and the United States.³⁰⁹

Canada–United States Bilateral Directions

The most obvious and near-term ways to strengthen bilateral cooperation in relation to the blue whale is through the two main cooperative mechanisms already in place. The Canada and United States Bilateral Working Group might expand its present focus from the North Atlantic right whale towards a broader ecosystem approach considering other cetaceans in the Northwest Atlantic including the blue whale. The Species at Risk Working Group also stands as a potential forum for advancing blue whale recovery, but has faced a substantial

302 SARA (n 53), section 59(3); Koubrak, VanderZwaag and Worm (n 4).

303 SARA (n 53), section 55.

304 Koubrak, VanderZwaag and Worm (n 4).

305 *Ibid.*

306 J Berchiolli, 'Stewarding species: How the Endangered Species Act must be improved' (2020) 10(3) *UC Irvine Law Review* 1079–1099.

307 *Ibid.*; Koubrak, VanderZwaag and Worm (n 4); I Kendrick, 'Critical habitat designations under the Endangered Species Act in an era of climate change' (2021) 121(1) *Columbia Law Review* 81–117; M Hou, 'The dark horse of the Endangered Species Act: How section 7(a)(1) can be used to mitigate climate change' (2020) 88 *George Washington Law Review* 753–787; AJND Coffey, 'Feeling the heat: The Endangered Species Act and climate change' (2020) 36 *Georgia State University Law Review* 437–463.

308 Koubrak, VanderZwaag and Worm (n 4).

309 HJ Myers *et al.*, 'Ropeless fishing to prevent large whale entanglements: Ropeless Consortium report' (2019) 107 *Marine Policy* 10358.

limitation of not including all Fisheries and Oceans and National Marine Fisheries Service regions. The co-leads and membership have been drawn from Fisheries and Oceans' Maritimes Region and NMFS's Greater Atlantic Region.³¹⁰ The Working Group is considering ways to bring in other regions to discuss cross-cutting issues, including transboundary species at risk that range beyond the Gulf of Maine region.³¹¹

A further avenue for facilitating greater bilateral cooperation might be to strengthen species at risk legislation in both countries to specifically encourage or require to the extent possible joint recovery implementation for listed transboundary species. The ESA only provides general directions for fostering international cooperation through the Secretary of State by encouraging foreign countries to provide for the conservation of endangered and threatened species listed under the ESA and by entering into bilateral or multilateral agreements with foreign countries to provide such conservation.³¹² SARA is silent on implementation cooperation, while section 39(3) only requires transborder consultation at the recovery strategy preparation stage. The extent of Canada and United States collaborations in recovery planning for shared species has been documented as being very low due to several factors including time, budgets, and a focus on recovering species within national borders.³¹³

A key question looming on the horizon for bilateral cooperation is whether cooperation should continue to be largely informal or be supplemented with one or more formal agreements. While various benefits surround a 'soft law' approach, such as maintaining maximum flexibility and avoiding lengthy negotiation processes,³¹⁴ a legally-binding approach also carries attractions including establishment of firmer institutional and financial commitments, encouragement of greater political and bureaucratic commitments, giving 'legal teeth' to environmental principles and standards, elevation of the profile of regional challenges and cooperation needs, and possible provision of dispute resolution.³¹⁵

³¹⁰ Government of Canada (n 173).

³¹¹ Personal communication, Katherine Hastings, Fisheries and Oceans Canada, 27 August 2021.

³¹² 16 USC §1537(b).

³¹³ See A Olive, 'The road to recovery: Comparing Canada and U.S. recovery strategies for shared endangered species' (2014) 20 *Canadian Geographer* 1–13.

³¹⁴ DL VanderZwaag, 'Overview of regional cooperation in coastal and ocean governance' in C Thia-Eng, G Kullenberg and D Bonga (eds), *Securing the Oceans: Essays on Ocean Governance—Global and Regional Perspectives* (Partnerships in Environmental Management for the Seas of East Asia, Quezon City, 2008) 197–228, at p. 208.

³¹⁵ *Ibid.*

Various options for further formalising Canada–United States bilateral cooperation might be considered to benefit blue whale recovery. A legally-binding agreement for East Coast fisheries has been suggested³¹⁶ and could benefit the blue whale through addressing gear entanglement issues and promoting ecosystem-based management, for example, through the conservation of cetacean prey species. Other options include a Canada–United States cetacean conservation agreement for the Atlantic or a regional sea type agreement³¹⁷ with an annex or protocol addressing marine biodiversity conservation and species at risk with possible models including the Mediterranean³¹⁸ and Northeast Atlantic.³¹⁹

Regional Directions

Various options should be considered for expanding regional cooperation in the North Atlantic to conserve cetaceans and their habitats, although uncertainties in species distribution and threats make broad regional cooperation unlikely, at least in the near term. Range States could work through the CMS and adopt a legally-binding agreement on cetaceans or a memorandum of understanding and/or action plan, as has been followed for the Pacific Islands Region.³²⁰ Range States could also negotiate a cetacean agreement or arrangement outside the auspices of CMS. NAMMCO provides an avenue of cooperation with four countries in the Northeast Atlantic, but deepening the ties with the agreement is probably politically unfeasible given the organisation's pro-whaling stance.³²¹

Key questions surround possible steps in these regional directions. Would working through the CMS framework be politically acceptable to Range States not party to the CMS, which include Canada and the United States?³²² What States should be included in a new agreement or arrangement, for example, just Canada, the United States, Denmark/Greenland, France/St. Pierre and Miquelon in the Northwest Atlantic or extending to States in the Northeast

³¹⁶ VanderZwaag, Bailey and Shackell (n 172), at pp. 23–24.

³¹⁷ D VanderZwaag, 'Transboundary challenges and cooperation in the Gulf of Maine Region: Riding a restless sea toward misty shores' in HN Scheiber (ed), *Law of the Sea: The Common Heritage and Emerging Challenges* (Martinus Nijhoff, The Hague, 2000) 265–285, at p. 282.

³¹⁸ Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, 10 June 1995, in force 12 December 1999) 2102 UNTS 203.

³¹⁹ OSPAR (n 189).

³²⁰ Pacific Cetaceans MOU (n 287).

³²¹ Hoel (n 219).

³²² CMS, 'Parties and Range States' available at <http://www.cms.int/en/parties-range-states>; accessed 5 November 2021.

Atlantic? Should particular whale species like the blue whale be given special priority? What scientific and conservation measures should be included?

Global Directions

Three global advances in marine environmental protection appear especially relevant to the blue whale. First, and most important, is the maintenance of the moratorium on commercial whaling under the IWC. Second is the strengthening of the IMO Guidelines for Noise Reduction from Vessels, which ideally would result in legally-binding noise reduction standards for both existing and newly constructed vessels. Third is the finalisation and implementation of new post-2020 biodiversity targets under the CBD with the proposed 30 per cent marine protected area target being particularly relevant.

Conclusion

One can certainly feel 'blue' over the lagging scientific understandings and lack of specific management measures to recover blue whales in the North Atlantic. Population size, structure and distribution remain very uncertain and the extent of current threats is not well quantified. While both Canada and the United States have listed the blue whale as endangered, no critical habitats have been designated, nor have specific measures been taken to protect blue whales from fishing gear entanglements or ship strikes with the exception of measures, such as an area to be avoided and vessel speed restrictions in the Saguenay-St. Lawrence Marine Park in Canada.

However, there are reasons for hope in light of the many future enhancement opportunities at national, bilateral, regional and global levels. For example, new satellite sensors hold promise to help identify blue whale wintering grounds, migration routes, and other critical habitat. Ways to improve blue whale recovery planning and species at risk laws and policies have been suggested for Canada and the United States. Both countries are committed to developing and eventually requiring ropeless fishing gear to prevent cetacean entanglements. Bilateral mechanisms for increasing transboundary cooperation exist, such as the Canada and United States Bilateral Working Group. Broader regional cooperation options are also available, such as a new cetacean agreement or arrangement for the North Atlantic, although following these options will certainly depend on further clarifications of the blue whale distributions and threats. The IMO is working at strengthening its guidelines on noise reduction from vessels while new marine biodiversity targets are expected to be finalised under the CBD in 2022.

One major lesson can be drawn from this blue whale case study. Without a major mortality event or threat, garnering adequate political will and human and financial resources to address species at risk recovery is difficult. The blue whale still remains largely off the political radar screen and has yet to receive the political, legal, scientific and social attentions deserved. As a result of this circumstance, the survival of the world's largest animal is still in jeopardy.