

# Chapter 13 The Regulation of Ship Emissions in Canadian Northwest Atlantic and Arctic Waters: Is There a Need for Consistency and Equity?

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**Abstract** Since the adoption of Annex VI of the International Convention on the Prevention of Pollution from Ships, 1973/78, the International Maritime Organization has gradually expanded the scope of ship emission regulation to include VOCs, SOx, NOx, particulate matter and, more recently, greenhouse gas emissions. This regulatory effort has not been integrated and displays some inconsistency and even fragmentation, resulting in different levels of environment protection for different regions and even potential conflicts between standards. The regulation of use and carriage of heavy sulphur fuel oil may lead to increase of clean fuel use and thereby produce more  $CO_2$  emissions. Designation of emission control areas under Annex VI has benefitted public health in the Baltic, North Sea and North American waters, but not Arctic waters and coastal communities adjacent to international trade routes elsewhere. This chapter discusses the prospects and pitfalls of ship emissions regulation and argues for the development of an integrated approach consistent with the IMO's own principles of regulation and enhancement of air emission standards in Arctic waters.

**Keywords** Air pollution  $\cdot$  Emission control area  $\cdot$  MARPOL  $\cdot$  Public health  $\cdot$ Indigenous peoples  $\cdot$  International Maritime Organization (IMO)  $\cdot$  North American Emission Control Area (NAECA)  $\cdot$  Ship emissions  $\cdot$  Truth and Reconciliation Commission (TRC)  $\cdot$  United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)

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## 13.1 Introduction

Shipping has long carried the bulk of global trade efficiently and with the lowest emissions per tonne mile of any transportation mode. Nevertheless, shipping still produces substantial atmospheric emissions harmful to public health and the environment and contributes to climate change (ICCT 2007). The regulated ship emissions consist of a range of harmful substances such as nitrogen oxides (NOx), sulphur oxides (SOx), volatile organic compounds (VOCs), ozone-depleting substances and particulate matter (PM) (MARPOL 1973/78, Annex VI). Ship emissions include substantial carbon dioxide (CO<sub>2</sub>) releases, among other greenhouse gases (GHGs), and are also the subject of a long-term regulatory plan (IMO 2014, 2018). Air pollution from ships received initial international policy attention in the International Maritime Organization (IMO) in 1991, and since 1997 ship emissions constitute a topic for systematic and ongoing regulation (IMO 1991; Protocol 1997; Chircop et al. 2018a). While efforts to curb the emission of various harmful substances have grown incrementally, the increase of international trade has meant consequential increases in emissions (IMO 2014).

Although the IMO adopted standards for ship emissions applicable at the global level, the highest levels of protection are contingent on the designation of an emission control area (ECA) for particular substances (MARPOL 1973/78, Annex VI). Generally, the Canadian waters of the Northwest Atlantic (including the St Lawrence Seaway) and Pacific regions, as well as their ports and their coastal communities, enjoy some of the highest levels of protection from ship emissions of any marine area. This is the case because the North American Emission Control Area (NAECA) was designated by the IMO in 2010 to control the emission of SOx, NOx and PM in North American waters up to a northernmost limit of 60 degrees north in Canadian waters (IMO 2011). The effect of the ECA is to prescribe the highest emission standards for these harmful substances for the Northwest Atlantic and Pacific marine areas of Canada, as well as the United States and its Caribbean area. However, because the northernmost limit of the NAECA in Canadian waters is 60 degrees north, the sensitive Arctic environment and Indigenous communities do not enjoy the same clean air standards for ship emissions as other Canadian marine regions. The differentiated treatment should be of concern to Canada as shipping in the Arctic is increasing with enhanced seasonal accessibility due to loss of sea ice cover and as a matter of environmental justice towards Indigenous peoples.

This chapter argues for scaling up standards for ship emissions in Arctic waters with respect to NOx, SOx and PM, similarly to other Canadian waters. The purpose is to challenge differences in regulatory approach and consequences for the Northwest Atlantic and Arctic through which there are continuous transportation corridors. The focus is on these substances because of their harmful nature and the NAECA, which was designated to scale up their regulation. The discussion starts with an explanation of the nature of the harmful substances in ship emissions and why they need regulation. Next, the regulation of ship emissions through MARPOL Annex VI and the designation of ECAs is explained. The discussion then moves to

the regulation of ship emissions in the Northwest Atlantic, with a focus on the NAECA, and in Arctic waters, followed by consideration of policy concerns and possible options for Canada. The chapter concludes with an overall assessment and argues for an integrated approach to ensure that human health and environmental concerns are appropriately, uniformly and equitably addressed throughout waters under Canadian sovereignty and jurisdiction.

#### **13.2** Rationale for Ship Emissions Regulation

Ship emissions are regulated because they contribute to the ambient concentration of air pollution, resulting in adverse impacts on human health and the environment (ICCT 2007; IMO 2009a). The vast majority of shipping relies on fossil fuels for motive power and onboard operations while at sea, in the navigation of inland waterways and even when in port. The combustion of such fuels produces the range of substances of concern in this chapter. Moreover, incineration activities on board a ship may also produce harmful substances to human health and the environment and hence are largely banned (MARPOL 1973/78, Annex VI, reg III/16).

From a human health perspective, the elevated ambient concentrations of PM, ground-level ozone, NOx and SOx are known to contribute to air pollution and to have adverse public health impacts, including premature mortality, cardiopulmonary disease, lung cancer and chronic respiratory ailments (Barregard et al. 2019; IMO 2009a; MARPOL 1973/78, Annex VI, Appendix III). PM2.5 and ozone due to ship emissions have the largest concentrations near the coasts, thus affecting human settlements. The fine particles of PM25 tend to reduce visibility, linger longer in the atmosphere and are carried over great distances (IMO 2009a). The particles can go deep into the respiratory tract and reach the lungs, worsening medical conditions such as asthma and heart disease. Long-term exposure can lead to premature mortality, including from lung cancer (NY Department of Public Health, 2018). A study submitted to the IMO in 2009 by the United States and Canada in support of the NAECA forecasted the impact of regulating  $PM_{2.5}$  from ship emissions on reduced premature mortality, a range of illnesses and hospital visits (Table 13.1) (IMO 2009a, Annex I). The study concerned densely populated areas in the vicinity of major shipping lanes on the Atlantic and Pacific coasts and clearly identified the public health imperative.

SOx is known to be harmful to marine and terrestrial ecosystems by affecting biogeochemical cycles through the deposit on land, soils, vegetation and surface waters (IMO 2009a). Ecosystem impairment from SOx and NOx includes nutrient overloading and eutrophication and acidification. NOx and precursor gases create smog and reduce visibility (IMO 2009a). Some areas display greater sensitivity than others, and this is a factor to be borne in mind with respect to emissions in Arctic waters where black carbon from PM may help accelerate sea ice loss (Comer 2019). For coastal and marine areas that have multiple stressors, the ship emissions may exacerbate the problem, such as through increased acidification from sulphuric and

	2020 Annual ship-related	2020 Annual reduction in ship-related
Mortality/illness	incidence without NAECA	incidence with NAECA
Premature mortality	5100-12,000	3700-8300
Hospital admissions	8400	3300
Emergency room visits	4100	2300
Chronic bronchitis	4600	3500
Acute bronchitis	13,000	9300
Acute respiratory symptoms	6,500,000	3,400,000

**Table 13.1** Estimated  $PM_{2.5}$  and ozone-related human health impacts associated with ship emissions in the United States and Canada (adapted from IMO 2009a)

nitric acids. Moreover, ship emissions using hydrocarbon-based fuel contain harmful GHGs which are a major contributor to climate change and associated human and environmental impacts (IMO 2014). Carbon dioxide ( $CO_2$ ) from the burning of fossil fuel alone accounts for the bulk of GHG emissions from ships, and as noted earlier, black carbon accelerates loss of sea ice (IMO 2014; Comer 2019).

The rationale for regulating ship emissions by the IMO includes the need for a multilateral approach to regulating standards for international shipping. In their NAECA proposal, Canada and the United States argued that a global approach to regulating ship emissions reduces the pressure for unilateral regulation of substances harming public health and the environment (IMO 2009a). In exercising sovereignty over the terrestrial, inland and internal waters, states have the right to regulate emissions at the national and subnational levels. If they do so, a fragmented approach to this aspect of ship regulation could arise, which in turn could affect the pursuit of vital uniform standards for shipping to support international trade. This is an option for Canada because it claims that the waters of the Arctic archipelago are internal waters subject to a historic title, and therefore those waters are subject to its sovereignty and entail consequential exclusive jurisdiction and control (House of Commons 1985; AWPPA 1970).

#### **13.3** The Regulatory Framework

#### 13.3.1 The Global Approach to Ship Emissions Regulation

The regulation of international shipping occurs, first and foremost, at the global level. The imperative of international regulation through the IMO, a UN specialized agency expressly established for the governance of international shipping, reflects the global and transnational nature of the industry. The general belief has always been that this is the optimal regulatory level which produces necessary controls while ensuring the continuing flow of maritime trade (IMO Convention 1948). The regulation of pollution from ships is primarily governed by the International

Convention for the Prevention of Pollution from Ships, 1973/78 (MARPOL), a comprehensive IMO instrument addressing a broad range of wastes generated during the operation of ships (MARPOL 1973/78). Other IMO conventions concerning pollution prevention from ships, such as from antifouling systems and ballast waters, are not a concern of this chapter. Through six annexes, MARPOL addresses pollution from oil (Annex I), noxious liquid substances carried in bulk (Annex II), noxious liquid substances carried in packaged form (Annex III), sewage (Annex IV), garbage (Annex V) and air pollution (Annex VI), the concern of this chapter.

Annex VI was adopted in 1997 to regulate a growing list of harmful substances in ship emissions, including NOx, SOx, VOCs, ozone-depleting substances and PM, and to regulate onboard incineration (Protocol 1997). Its provisions apply to all ships, except where stated otherwise in particular regulations (MARPOL, Annex VI, reg 1.1). The targets for NOx emissions rules are marine diesel engines with a power output of more than 130 kW built after specified dates for Tier I, II and III, each of which has more stringent standards (MARPOL, Annex VI, reg 13). The SOx rules apply to all fuel oil, combustion equipment (main and auxiliary engines) and equipment on board (e.g., boilers, inert gas generators) (MARPOL, Annex VI, reg 14).

Of particular interest to this chapter is that Annex VI makes provision for the designation of ECAs for specific substances in identified marine regions on the basis of requests from the region's coastal states. An ECA is defined as "an area where the adoption of special mandatory measures for emissions from ships is required to prevent, reduce and control air pollution from NOx or SOx and particulate matter or all three types of emissions and their attendant adverse impacts on human health and the environment" (MARPOL, Annex VI, reg 1.1.8). An ECA helps "reduce the stresses on a large number of sensitive ecosystems, including numerous forests, grasslands, alpine areas, wetlands, rivers, lakes, estuaries, and coastal waters" (IMO 2009a; MARPOL, Annex VI, Appendix III). The emission standards in an ECA are substantially higher: NOx emissions are subject to Tier III and SOx with a sulphur limit of 0.10% (since 1 January 2015) compared to the current 3.5% and 0.50% by mass (as of 1 January 2020) for all other areas. Proponent states must demonstrate the need to prevent, reduce and control the emission of any or all three harmful substances in a clearly designated area (MARPOL, Annex VI, Appendix). The need must be evidenced. In particular, because of the public health concern, there should be a description of the human populations at risk. There must be assessment of the emissions contributing to ambient pollution and environmental impacts in the areas concerned, including "a description of the impacts of the relevant emissions on human health and the environment, such as adverse impacts to terrestrial and aquatic ecosystems, areas of natural productivity, critical habitats, water quality, human health, and areas of cultural and scientific significance, if applicable" (MARPOL, Annex VI, Appendix). Scientific information on relevant meteorological conditions, such as prevailing wind patterns, topographical, geological, oceanographic, morphological and other conditions that contribute to pollution concentration or environmental impact, has to be submitted. This information

has to be accompanied by data on ship traffic and density, measures already undertaken at the national level to curb ambient pollution from NOx, SOx and PM in the areas concerned, as well as the estimated relative costs of reducing ship emissions through the ECA, compared with national measures for land-based sources of those substances, and the economic impact on trade (MARPOL, Annex VI, Appendix). The ECA criteria underscore the need for a demonstrable probable cause-effect nexus, disclosure of sources of data and methodologies used for the assessment and the anticipated burden for shipping and trade to enable a generalized cost-benefit assessment by the Marine Environment Protection Committee (MEPC), the key structure within the IMO responsible for overseeing MARPOL.

The designation of an ECA entails an amendment to Annex VI, resulting in an express mention in Regulations 13 and 14 of Annex VI. To date, ECAs have been designated by the IMO for the Baltic (NOx and SOx), the North Sea (NOx and SOx), the Atlantic and Pacific waters off Canada and the United States (NOx, SOx and PM) and the US Caribbean Sea area off Puerto Rico and the US Virgin Islands (NOx, SOx and PM) (MARPOL, Annex VI, regs 13.6 and 14). The consequence is that ships on voyages that include ECAs as well as other marine areas will need to take into account the different fuels they have to carry (to be evidenced by the bunker delivery notes), to keep them separate, to know when and where to use them and to maintain detailed log book records that will be subject to inspection in port.

It is interesting to observe that while there is a substantial case to be made by the proponent states, the ECA criteria do not require those states to evaluate and report back to the IMO on the functioning of the ECA. Concern has been expressed within the IMO about the absence of mandatory review or reporting requirements for areabased management tools designated and adopted by the IMO to determine lessons learned and ensure ongoing relevance (IMO 2016).

In addition to the general rules concerning emissions and ECAs, Annex VI also regulates ships' energy efficiency through an Energy Efficiency Design Index (EEDI), mandatory for new commercial vessels of 400 gross tonnage or more,<sup>1</sup> and the Ship Energy Efficiency Management Plan (SEEMP), applicable to all ships, for the purpose of enhancing efficiency in engine and ship design as well as the overall energy use on board ships to curb GHG emissions (MARPOL 1973/78, Annex VI, chap IV).

#### 13.3.2 NAECA Emission Standards in the Northwest Atlantic

The NAECA was adopted on 26 March 2010, entered into force on 1 August 2011 and came into effect on 1 August 2012 (IMO 2010a). It entailed amendments to Annex VI Regulations 13.6 and 14.3 and introduced a new appendix containing the full

<sup>&</sup>lt;sup>1</sup>Bulkers, gas carriers, tankers, container ships, general cargo ships, refrigerated cargo carrier, combination carrier, ro-ro cargo ships (vehicle carriers), ro-ro cargo ship, ro-ro passenger ships, liquefied natural gas carriers and cruise passenger ships without conventional propulsion.



Fig. 13.1 North American Emission Control Area (IMO 2009a)

coordinates of the navigational area regulated (MARPOL 1973/78, Annex VI, regs 13, 14 and Appendix VII). Figure 13.1 describes the area covered, which includes, up to the limits of the exclusive economic zone (EEZ), the sea areas located off the Pacific coasts of the United States and Canada; the Atlantic coasts of the United States, Canada and France (Saint Pierre and Miquelon) and the Gulf of Mexico coast of the United States; and the coasts of the Hawaiian Islands, but not the waters off the Aleutian Islands chain (MARPOL 1973/78, Annex VI, Appendix VII). In 2011 there was further definition of the NAECA boundaries to include the waters off the coast of the Commonwealth of Puerto Rico and the US Virgin Islands (IMO 2011). The northernmost limit of NAECA in Canadian waters is 60 degrees north. At the time of adoption of the NAECA, Canada had not yet become a party to Annex VI, which is a voluntary annex of MARPOL. The Canadian Minister of Transport at the time provided the IMO Secretary-General with the "highest assurances" that it would become a party, which it did on 26 March 2010 with effect as of 26 June 2010 (IMO 2010b, 44; IMO 2019).

The NAECA was designated for the purpose of preventing, reducing and controlling air pollution from the designated substances in incremental stages. It entered into force specifically for NOx in 2011 and for SOx and PM in 2012. Temporary exemptions were adopted for certain ships in 2011 (IMO 2011). As of 2015, the fuel of all vessels cannot exceed 0.10% fuel sulphur (1000 ppm), which is aimed at reducing PM and SOx emissions by more than 85% (IMO 2010a). Ships can comply with the SOx and PM standard by using low sulphur fuel or alternative fuels or by installing a scrubber or adopting procedures to ensure compliance. Prior to 2016, marine diesel engines constructed on or after 1 January 2011 were required to comply with the Tier II standard for NOx. As of January 2016, new engines are required to employ emission controls that achieve a Tier III outcome, namely, an 80% reduction of NOx.

#### 13.3.3 Ship Emission Standards in Canadian Arctic Waters

The international standards for ship emissions while navigating Arctic waters are lower than those in the NAECA. Atmospheric emissions did not feature in the pollution prevention provisions of the International Code for Ships Operating in Polar Waters, 2014/2015 (Polar Code), and amendments to MARPOL Annexes I, II, IV and V adopted by the MEPC in 2015 (Polar Code 2014/2015). The Polar Code geographical area of application is described in Fig. 13.2. Annex VI was not part of the negotiation agenda, and while there were proposals to regulate the use of heavy fuel oils (HFOs), there was no agreement on the introduction of a mandatory rule. The voyage planning requirements in the mandatory safety section, while referring to environmental considerations, make no reference whatsoever to the fuel to use to minimize emission impacts (Polar Code 2014/2015, Part I-A, chap 12). Instead, the only provision relevant for ship emissions while navigating polar waters is in the form of additional guidance, not a mandatory standard, in Part II-B of the Polar Code: "Ships are encouraged to apply Regulation 43 of MARPOL Annex I when operating in Arctic waters" (Polar Code 2014/2015, Part II-B, para 1.1). With the exception of vessels used in search and rescue, Regulation 43 establishes a ban in



Fig. 13.2 Geographical area of the Polar Code (Polar Code 2014/2015)

the Antarctic area on the carriage of HFOs in bulk as cargo, for use as ballast, or carriage and use as fuel (MARPOL, Annex I, reg 43).<sup>2</sup>

Accordingly, the currently applicable international ship emission standards for Arctic waters generally consist of the basic rules of Annex VI concerning SOx at 3.5% until 31 December 2019 (and 0.5% as of 1 January 2020) and consequential PM reduction from the lower sulphur (rather than the 0.10% for ECAs), NOx at the Tier I level and other generally applicable standards for other harmful substances such as ozone-depleting substances and VOCs.

Canada implemented the Polar Code in 2017 through a new set of regulations, the Arctic Shipping Safety and Pollution Regulations, under the authority of the Arctic Waters Pollution Prevention Act, 1970 (AWPPA) and the Canada Shipping Act, 2001 (ASSPPR 2017; AWPPA 1970; CSA, 2001). The new regulations make no mention of ship emissions. All emissions in Canadian waters are regulated by the Vessel Pollution and Dangerous Chemicals Regulations (VPDCR) under the Canada Shipping Act, 2001 (CSA 2001). Thus NAECA standards are implemented under these regulations (VPDCR 2012, ss 110, 111). The NOx Tier III standard for marine diesel engines does not apply to a Canadian or foreign vessel pleasure craft operating in Arctic waters, including Hudson Bay, James Bay or Ungava Bay (ibid, s 110.3(3)). The maximum sulphur content standard for Arctic waters (including Hudson Bay, James Bay and Ungava Bay) for Canadian and foreign vessels and pleasure craft remained in step with the general Annex VI standard, rather than the NAECA. Accordingly, the 3.50% limit before 1 January 2020 and thereafter the 0.50% limit apply (ibid, s 111(1)). The NAECA 0.10% limit applicable after 31 December 2014 does not apply to Canadian Arctic waters (ibid). In addition to the sulphur content standard, PM is also addressed in the rules on smoke. Arctic waters appear to be covered by the rule concerning density of smoke applicable to all other waters under Canadian jurisdiction, namely, that a vessel must not operate fuelburning installations that do not utilize hand-fired boilers and that emit smoke of a density greater than density number 1 (20% of box space on Transport Canada's Smoke Chart) (ibid, ss 117(1), 119 (1)).

Short of scaled-up emission standards for Canadian Arctic waters, the Transport Canada Guidelines for Passenger Vessels Operating in the Canadian Arctic contain recommendations with respect to cruise ships (Transport Canada 2017). The Guidelines state, in discretionary language, that "where possible, operators should use distillate fuel oil during all operations in the Arctic. Lower emission outboard engines are also encouraged" (ibid, 60). With respect to the use of HFOs, the Guidelines simply remind operators of the recommendatory Part II-B provision in the Polar Code encouraging ships to apply Regulation 43 of MARPOL Annex I (ibid, 22). Accordingly, apart from the discretionary nature of the recommendations, the hope is that cruise ships will attempt to minimize harmful emissions when in Canadian Arctic waters.

<sup>&</sup>lt;sup>2</sup>These include crude oils having a density at 15 °C higher than 900 kg/m<sup>3</sup>; oils, other than crude oils, having a density at 15 °C higher than 900 kg/m<sup>3</sup> or a kinematic viscosity at 50 °C higher than 180 mm<sup>2</sup>/s; and bitumen, tar and their emulsions.

# **13.4** The Argument for Scaling Up Emission Standards in Polar Waters

It might come across as ironic that Arctic waters, which are among the most fragile ocean spaces, are receiving only the basic minimum protection from ship emissions, rather than the heightened protection equivalent to an ECA. This observation is particularly pertinent considering that the pollution prevention provisions for oil, noxious liquid substances, sewage and garbage adopted with the Polar Code and related amendments to MARPOL Annexes I, II, IV and V, while not designating the Arctic as a special area, actually provide equivalent protection. A major reason for eschewing special area designation in the Polar Code was the paucity of ports to provide reception facilities for the regulated ship wastes in the region's states, a condition of that status (Chircop et al. 2018b).

The Canadian Northwest Atlantic is an integral part of potential new navigation routes through the Northwest Passage, which arguably ought to be subject to equivalent safety and environmental standards because the navigation occurs continuously through waters under Canadian sovereignty or jurisdiction. A counter argument is that, for the sake of consistency, polar shipping standards should then extend to navigation in the Northwest Atlantic. For this to occur, Canada would need to propose to the IMO the designation of its Northwest Atlantic waters as a special area under MARPOL Annexes I, II, IV and V. To do so, Canada would need to meet another set of criteria for special designation, which will also entail amendment of the parent instrument and would likely be a lengthy process (IMO 2013). The case for such an initiative has as yet to be made and scientifically supported to meet the MARPOL Annex VI Appendix III criteria. Hence, it would be more fruitful at this stage for Canada to focus on equivalency of emissions to ensure that Canada's Indigenous peoples in the Arctic receive the same level of protection as their counterparts in the other Canadian coastal regions.

Canada can be expected to face challenging policy choices in the regulation of ship emissions in the Arctic. Canada played a critical role in the development of the Polar Code, and its initial proposal set out what could be described as a comprehensive first draft of the code (IMO 2009b; Chircop et al. 2018b). Canada argued for the strongest possible environmental standards, but was unsuccessful in securing the inclusion of mandatory rules for ballast water management and antifouling systems in polar waters (Chircop et al. 2018b). Despite the strong environmental mission, the Canadian "comprehensive" proposal was silent on ship emissions. Much has transpired since that initial submission, most especially with respect to the report of the Truth and Reconciliation Commission (TRC), whose recommendations were endorsed by the federal government (TRC 2015). In the light and spirit of the TRC findings, it is arguable that the federal regulator ought to be concerned about the harmful emissions from the growing shipping traffic in the Arctic and the impacts on Indigenous coastal communities. While some might argue that the population densities in the Arctic are nowhere comparable with the Northwest Atlantic, the fact is that the thinly populated areas of the coastal regions of the Atlantic provinces

received the NAECA protection. It is further arguable that the navigational chokepoints in Canadian Arctic waters, such as straits and low-impact navigational corridors proposed by the Canadian Coast Guard to facilitate the delivery of its services (see Chap. 7 in this volume), can be expected to concentrate the smaller shipping tonnage in localized geographical areas and surrounding coastal communities, thus raising concerns (Carter et al. 2018). The notion of low-impact corridors should include potential impacts from emissions as shipping increases.

Canada has policy choices in terms of whether it should proceed with scaling up ship emission standards in Arctic waters to elevate them to the same level as those applicable in the NAECA. One route is to proceed unilaterally by invoking the power granted by Article 234 of the United Nations Convention on the Law of the Sea, 1982 (UNCLOS 1982). Article 234 provides:

Coastal States have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence.

According to this provision, Canada has international legal authority to legislate and enforce pollution prevention standards for shipping in the 200-nautical mile EEZ in the Arctic as an ice-covered area for most of the year. This unique provision was specially negotiated at the behest of Canada and is widely regarded as providing unilateral power to regulate vessel-source pollution prevention to a higher standard than the international norm and without a requirement to proceed through the IMO first. Such a move would apply only to Canadian Arctic waters as defined in the AWPPA (AWPPA 1970, s 2).<sup>3</sup> Canada could exercise this power to raise emission standards in the Arctic in a speedy manner.

There are policy and legal issues that arise with this approach. Article 234 applies to the EEZ, defined as having a breadth of 200 nautical miles from the baselines of the territorial sea in a seaward direction (UNCLOS 1982, art 57). Article 234 has drafting ambiguities, such as whether the territorial sea is included "within" the EEZ (Bartenstein 2011). Since the territorial sea is technically not part of the EEZ, Canada could be constrained in its ability to regulate construction and design standards required to control ship emissions in relation to vessels exercising the right of innocent passage without applying generally accepted international standards or proposing to the IMO to scale up the international standards applicable to ship

<sup>&</sup>lt;sup>3</sup>Section 2 of the AWPPA defines Canadian Arctic waters as "the internal waters of Canada and the waters of the territorial sea of Canada and the exclusive economic zone of Canada, within the area enclosed by the 60th parallel of north latitude, the 141st meridian of west longitude and the outer limit of the exclusive economic zone; however, where the international boundary between Canada and Greenland is less than 200 nautical miles from the baselines of the territorial sea of Canada, the international boundary shall be substituted for that outer limit".

emissions in the Arctic (UNCLOS 1982, art 21). Further, and with respect to the internal waters in the Arctic claimed on the basis of historic title, while Canada can exercise its sovereign right to regulate emissions without applying generally accepted international standards or resorting to the IMO, it would mostly likely attract protest or criticism from states that do not recognize the historic title, such as the United States. It could be further argued that a Canadian unilateral approach would be geographically limited when ship emissions concern the entire region and probably also inconsistent with and even counterproductive to the Polar Code which, after all, was a largely successful attempt at raising polar shipping standards in a multilateral manner and to facilitate their uniformity. Another criticism could be policy hypocrisy, because Canada is perceived to be dragging its feet on regulating the use and carriage of use of HFOs in the Arctic ostensibly to protect Indigenous interests (Clean Arctic Alliance 2018), another matter under consideration at the IMO (Sun 2019) and discussed in a separate chapter in this book (see Chap. 14 in this volume).

The alternative is for Canada to proceed through the IMO with a coordinated submission involving other Arctic states assuming they, and most especially the Russian Federation as the largest regional state with the longest coastline, are all supportive. The proposal would build on the Polar Code and entail amendments to MARPOL Annex VI through the designation of the Arctic area defined in the Code as an ECA. This is not unprecedented, and in fact since the adoption of the Arctic Council to consult on shipping matters and support initiatives at the IMO (Arctic Council 2009; Chircop et al. 2018b). Most recently, the Arctic Council member states made a joint submission concerning the adoption of a regional approach for the provision of port reception facilities, entailing amendment of MARPOL, and which is currently under consideration by the MEPC (IMO 2017).

It is possible some IMO members and organizations having consultative status might argue that not only are population densities low in the Arctic (especially along the Northwest Passage), but at this time there is relatively little international shipping whose emissions could pose public health and environmental impacts. The counter argument is that the Polar Code may be seen as a proactive and precautionary form of regulation as the region is expected to become more accessible to international shipping. And, as argued earlier, the NAECA benefits also sparsely populated areas of the Canadian Atlantic region.

Scaling up pollution prevention from all sources in the Arctic is more likely to contribute to the sustainability of polar shipping. Major shipping companies appear to be increasingly ready to act on their corporate social responsibilities. It is instructive to note the recent decision of CMA CGM, one of the world's largest container operators based in France, to avoid using the Northern Sea Route for its trade between Asia and Europe, citing environmental concerns, including the threat of pollution (gCaptain 2019a). Similarly, President Emmanuel Macron of France called upon container shipping companies to avoid using the Arctic route for the same reason (gCaptain 2019b).

## 13.5 Conclusion

This chapter has advanced the argument that Canadian Arctic waters, if not even the entirety of Arctic waters as defined for the purposes of the Polar Code, should receive protection from ship emissions at least equivalent to those applicable in the NAECA and possibly be designated as an ECA. The argument is based on the need to protect the especially sensitive Arctic environment that is subject to multiple stressors and the imperative of protecting the health of Indigenous peoples. It draws on, by analogy and rationale, with the scaled-up standards for pollution prevention in the Polar Code, in which Arctic waters (as well as Antarctic waters) receive a level of protection comparable to that provided for MARPOL special areas in Annexes I, II, IV and V. Since the Arctic is deemed worthy of special protection from oil, noxious liquid substances, sewage and garbage, why not also from ship emissions, given the public health concerns and the multiple stressors the region is experiencing? This author acknowledges current IMO efforts at regulating the use and carriage of use of HFOs, a significant concern for SOx and NOx, but further observes that such an initiative would not equally address harmful NOx.

Canada has fundamental obligations towards its Indigenous peoples in redressing historic injustices in the process of reconciliation (TRC 2015). Canada has embraced the UN Declaration on the Rights of Indigenous Peoples which, among other, obliges it to obtain the free, prior, and informed consent of Indigenous peoples with respect to decisions that affect their rights, interests and well-being (UNDRIP 2007, art 19; see Chap. 8 in this volume). The federal government is to be commended in taking steps in engaging Indigenous communities on shipping matters, but the extent to which these efforts concern the impacts of atmospheric emissions from shipping is not clear (OPM 2016). Considering the multiple public health concerns experienced by Indigenous peoples, especially in remote areas where access to health services is especially challenging, Canada should endeavour to prevent, control and mitigate an additional stressor from ship emissions. Pollution prevention from all sources is not only a matter of good maritime administration but also a matter of environmental justice. An integrated approach to the regulation of ship emissions ensures that human health and environmental concerns are uniformly and equitably addressed throughout waters under Canadian sovereignty and jurisdiction.

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