A LEGAL PERSPECTIVE ON EXHAUST GAS CLEANING SYSTEMS IN CANADIAN ARCTIC WATERS

A REPORT TO THE
WORLD WILDLIFE FUND OF CANADA (WWF CANADA)

Aldo Chircop
7 September 2021

Contents

Abstract

This report reviews the application of the International Maritime Organization (IMO)'s new rule on sulphur emissions from ships known as 'IMO 2020' in the context of Canadian Arctic waters. The rule aims to reduce sulphur emissions by requiring either the use of compliant low sulphur fuels or the operation of Exhaust Gas Cleaning Systems known as scrubbers when high sulphur fuel oil is used. An unintended consequence of the rule is the introduction of a new source of pollution from ships, namely highly acidic washwater from open loop scrubber systems and containing harmful substances. Discharges of washwater in Arctic waters is a significant concern because of the sensitivity of this environment and the potential impact on Indigenous peoples. Moreover, the general use of scrubbers produces a range of adverse environmental impacts and is counterproductive to efforts to reduce greenhouse gas emissions and reduce oil spill risks in Arctic waters.

The report sets out the environmental and public health context before discussing the international regulation of air pollution from ships in the law of the sea, international maritime law and international environmental law. A potential role for human rights law is explored, in particular with respect to Indigenous peoples' rights in general international law and as set out in the *United Nations Declaration on the Rights of Indigenous Peoples*.

The report assesses Canada's regulation of air pollution from ships with a focus on the discharge of scrubber washwater at sea. The backdrop is Canada's maritime jurisdictions under the *United Nations Convention on the Law of the Sea* and general international law with respect to Arctic waters and the various international conventions that potentially apply to the scrubber washwater as a pollutant. The discussion observes inconsistencies between the environmental duties of states in the law of the sea and international environmental law on the one hand, and the permissive discharge of washwater under international maritime law on the other hand.

In reviewing Canada's regulation of air pollution and scrubber systems to meet the IMO 2020 standard, the report deconstructs a complex picture of interacting international and domestic legal regimes. The report observes fragmentation in the international and Canadian regulation of vessel-source pollution, especially as it applies to Arctic waters. This is reflected in the multiplicity of pertinent Canadian statutes and regulations. In particular, there is inconsistency in how the rules on the discharge of waste apply to scrubber washwater under the *Arctic Waters Pollution Prevention Act* and regulations under the *Canada Shipping Act, 2001*. In certain circumstances, other environmental statutes potentially apply to such discharges. The report observes regulatory gaps and outdated references to IMO guidelines, but also

opportunities and ways for Canada to navigate the complex law of the sea considerations in regulating scrubbers and the discharge of scrubber washwater.

The report concludes with a call for action at the international and domestic levels. Canada is encouraged to work in unison with other states, and through the Arctic Council and the IMO, in developing a regulatory response to the environmental threat posed by scrubbers and scrubber washwater as a new form of vessel-source pollution. At the same time, Canada is encouraged to review its domestic law to address regulatory gaps and inconsistencies in responding to the risks posed by the use of scrubbers in Arctic waters.

List of abbreviations

ASSPPR	*Arctic Shipping Safety and Pollution Prevention Regulations*
AWPPA	*Arctic Waters Pollution Prevention Act*
CBD	*Convention on Biological Diversity*
CEPA	*Canadian Environment Protection Act*
CITES	*Convention on the International Trade in Endangered Species*
CNMCA	*Canada National Marine Conservation Areas Act*
CO_2	Carbon dioxide
CSA, 2001	*Canada Shipping Act, 2001*
ECA	Emission control area
EEZ	Exclusive economic zone
EGCS	Exhaust Gas Cleaning System (scrubber)
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GHG	Greenhous gas emissions
HFO	Heavy fuel oil
IMO	International Maritime Organization
2009 IMO Guidelines	2009 Guidelines for Exhaust Gas Cleaning Systems adopted by Resolution MEPC.259(68)
2015 IMO Guidelines	2015 Guidelines for Exhaust Gas Cleaning Systems adopted by Resolution MEPC.259(68)
IAPPC	International Air Pollution Prevention Certificate
MARPOL	*International Convention for the Prevention of Pollution from Ships*
MBCA	*Migratory Birds Convention Act*
MEPC	Marine Environment Protection Committee
MPA	Marine protected area
m/m	mass on mass
NAECA	North American Emission Control Area
NMCA	National marine conservation areas
NOx	Nitrogen oxides
PAH	Polycyclic aromatic hydrocarbons
PM	Particulate matter
Polar Code	*International Code for Ships Operating in Polar Waters*
PPO	Pollution Prevention Officer
SECA	Sulphur Emission Control Area
SOLAS	*International Convention for the Safety of Life at Sea*
SOx	Sulphur oxides

UNCLOS	*United Nations Convention on the Law of the Sea*
UNCLOS III	Third United Nations Conference on the Law of the Sea
UNDRIP	*United Nations Declaration on the Rights of Indigenous Peoples*
UNDRIP Act	*United Nations Declaration on the Rights of Indigenous Peoples Act*
UNFCCC	*United Nations Framework Convention on Climate Change*
VOCs	Volatile organic compounds
VPDCR	*Vessel Pollution and Dangerous Chemicals Regulations*
WWF	World Wildlife Fund

1. Introduction

In 2018 the International Maritime Organization (IMO), the global regulator of international shipping, amended the *International Convention for the Prevention of Pollution from Ships*, 1973/78 (*MARPOL*) to introduce new rules on sulphur oxide (SOx) emissions from ships known as 'IMO 2020'.[1] As of 1 January 2020, ships of 400 gross tonnage or more must not use or carry for use fuel with sulphur content exceeding 0.50 percent m/m.[2] A parallel rule banning the carriage for use of non-compliant fuel, unless a ship has an exhaust gas cleaning system installed, came into effect on 1 March 2020.[3] The new emission standard requires ship operators to use compliant fuel, such as very low sulphur fuel oil and marine gasoil, or to continue to use high sulphur fuel oil, such as heavy fuel oil (HFO), by installing exhaust gas cleaning systems, known as scrubbers, to remove sulphur oxides from the ship's emissions. To conform to the new rules many ships are using more expensive compliant fuel, but thousands of other vessels use scrubber systems to enable them continue to use cheap bunker, such as HFO.[4]

The two options enable ship operators to comply with the sulphur emission rule, but the use of scrubbers, and especially open loop systems, involves consequential discharge into the marine environment of acidified washwater containing harmful substances, such as heavy metals, polycyclic aromatic hydrocarbons (PAHs) and their alkylated derivatives, and nitrogen compounds.[5] These substances could produce "acute effects on marine biota and may have further impacts, through bioaccumulation, acidification, and eutrophication, on the structure and functioning of marine ecosystems".[6] Although intended to reduce SOx pollution, the operation of scrubbers is producing a new source of pollution and harm to the marine environment. The threat posed by scrubber washwater is of concern in all marine environments, but the fragile and unique Arctic waters are particularly vulnerable to acidification.[7]

---

[1] Amendments to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (Amendments to MARPOL Annex VI), Resolution MEPC.305(73) adopted on 26 October 2018; *International Convention for the Prevention of Pollution from Ships*, 2 November 1973, 1340 *UNTS* 184, as amended by the *Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships*, 17 February 1978 (in force 2 October 1983) , 1340 *UNTS* 61 [*MARPOL*].

[2] The new rule is in *MARPOL*, *ibid*, Annex VI, reg 14.1.

[3] Adopted under the authority of *MARPOL*, *ibid*, Annex VI, reg 4.1.

[4] "Number of Ships to be Equipped with Scrubbers Hits 4000: DNV GL 2020", Ship and Bunker News (30 March 2020), online: <https://shipandbunker.com/news/world/814936-number-of-ships-to-be-equipped-with-scrubbers-hits-4000-dnv-gl>.

[5] References to Inform about Risks to the Marine Environment Posed by Scrubber Water Discharge and Recommendations to Reduce Impacts, Submitted by ICES, IMO Doc MEPC 76/INF.5 (1 March 2021), annex 1.

[6] *Ibid*.

[7] AMAP Assessment 2018: Arctic Ocean Acidification (Arctic Monitoring and Assessment Programme, 2018), at 1, online: <https://www.amap.no/documents/doc/amap-assessment-2018-arctic-ocean-acidification/1659>.

The discharge of scrubber washwater is subject to IMO guidance rather than mandatory rules.[8] States and their ports around the world have responded to the problem created by open loop discharge systems in three ways. Some states permit overboard discharges if they comply with IMO guidelines. Others permit the use of scrubbers but have additional regional, national or local rules. Yet others prohibit overboard discharges from open loop scrubbers in their waters.

HFOs, such as residual oil bunker C, contain aromatic, nitrogen, sulphur compounds and other contaminants.[9] The burning of these fuels produces black carbon, a climate forcer that accelerates loss of sea ice cover. At this time, it is permissible for a ship to use HFO bunker in Arctic waters, unlike in the case for Antarctic waters governed as they are by an IMO-adopted ban. In 2021, the IMO adopted a rule that would phase out the use and carriage for use of HFO in Arctic waters over a ten-year period, rather than prescribing an outright ban.[10] The rule allows for exemptions from the application of the rule, which by one estimate enables as much as "74% of the HFO-fueled fleet to continue to use HFO in the Arctic".[11] Hence, the continued operation of exempted ships will leave open the option for those ships to use scrubbers to meet the 0.5 percent m/m sulphur content standard and thereby discharge scrubber washwater into the Arctic marine environment.

In 2014-15, the IMO adopted the *International Code for Ships Operating in Arctic Waters* (*Polar Code*), introducing high standards for the prevention of pollution from ships, notably oil, noxious liquid substances carried in bulk, sewage and garbage.[12] Although a polar standard for air emissions was originally proposed, the *Polar Code* is silent on this source of pollution with the consequence that ships operating in Arctic waters will be subject to the general global standard, rather than a more stringent rule of 0.10 percent m/m designated by the IMO for Sulphur

[8] The most recent version is 2015 Guidelines for Exhaust Gas Cleaning Systems, Resolution MEPC.259(68) adopted 15 May 2015 [2015 IMO Guidelines].

[9] A D Uhler et al, "Chemical Character of Marine Heavy Fuel Oils and Lubricants", in Scott A. Stout and Zhendi Wang (eds), *Standard Handbook Oil Spill Environmental Forensics: Fingerprinting and Source Identification* (2d) (Elsevier, 2016), 641-683.

[10] Amendments to the MARPOL Annex I, Prohibition on the Use and Carriage for Use as Fuel of Heavy Fuel Oil by Ships in Arctic Waters, Resolution MEPC.329(76) adopted on 17 June 2021.

[11] B Comer, L Osipova, E Georgeff, and X Mao, "The International Maritime Organization's Proposed Arctic Heavy Fuel Oil Ban: Likely Impacts and Opportunities for Improvement", White Paper (ICCT, September 2020), at iv, online: <https://theicct.org/sites/default/files/publications/Arctic-HFO-ban-sept2020.pdf>.

[12] *International Code for Ships Operating in Polar Waters (Polar Code)*, IMO Resolution MSC.385(94) (21 November 2014, effective 1 January 2017); Amendments to the International Convention for the Safety of Life at Sea 1974, IMO Resolution MSC.386(94) (21 November 2014, effective 1 January 2017); Amendments to MARPOL Annexes I, II, IV and V, IMO Resolution MEPC.265(68) (15 May 2015, effective 1 January 2017). Online: <http://www.imo.org/en/MediaCentre/HotTopics/polar/Documents/POLAR%20CODE%20TEXT%20 AS%20ADOPTED.pdf> [*Polar Code*].

Emission Control Areas (SECAs). Antarctic waters fare better than Arctic waters because of the HFO ban.

Already, growing Arctic shipping is producing a range of impacts, including among other, regulated discharges permissible by international standards, unregulated surface and underwater noise, and icebreaking.[13] The environmental impacts of shipping produce adverse consequences for Inuit communities. In international and Canadian law, Inuit and other Indigenous peoples enjoy a range of rights, including the right to a healthy environment. Canada has international and domestic legal obligations towards its Indigenous peoples that should guide the regulation of Arctic shipping in a manner to prevent or minimize adverse impacts on Indigenous rights. The discharge of scrubber washwater will be an additional impact and stressor on the Arctic marine environment of concern to Inuit in Canadian Arctic waters.

Canada has an elaborate domestic policy and legislative framework for the regulation of Arctic shipping informed by constitutional and international law. In recent years, Canada has modernized the regulation of Arctic shipping and funded a range of activities under the Oceans Protection Plan to ensure Indigenous engagement in the governance of shipping.[14]

Against this backdrop, it is useful to enquire how Canada is regulating pollution resulting from scrubber use, given the extensive policy and legal framework for shipping, and the considerations underscoring the enforcement of pertinent regulations in Canadian Arctic waters.

WWF Canada commissioned this report as a study of the jurisdictional and legal framework for the operation of scrubbers and discharge of scrubber washwater in Canadian Arctic waters. The jurisdictional scope of the study includes all Canadian Arctic waters, namely internal waters as claimed by Canada, territorial sea and exclusive economic zone (EEZ), as well as waters therein under special protection, such as national marine conservation areas (NMCAs) and marine protected areas (MPAs). The report undertakes textual legal and policy analysis. The opinions submitted in this report are those of the author alone and do not purport to represent the views of WWF Canada.

The report starts by setting out the environmental and public health context of air pollution from ships, with a focus on sulphur emissions. It then proceeds to set out the international legal framework for air pollution from ships and sulphur emissions in particular.

[13] *Arctic Marine Shipping Assessment 2009 Report* (Arctic Council, 2009) [AMSA], 134 *et seq*, online: <file:///C:/Users/aechirco/Downloads/AMSA_2009_Report_2nd_print.pdf>.

[14] Oceans Protection Plan, Transport Canada (8 July 2020), online: <https://tc.canada.ca/en/initiatives/oceans-protection-plan>.

This is followed by detailed analysis of Canada's domestic legal framework for air pollution from ships, with a focus on sulphur emissions and scrubber washwater discharge, and taking into consideration the complex jurisdictional context, international treaty obligations and Indigenous peoples' rights. A further analysis of enforcement considerations follows. General discussion and assessment of issues, gaps and opportunities for the regulation and enforcement of sulphur emissions and washwater discharge follow next, before concluding observations and recommendations are advanced.

2. Environmental and public health context

Shipping in Arctic waters as defined by the *Polar Code* increased by 25% over the 2015-2019 period.[15] Arctic shipping consists of destinational shipping, intra-Arctic, trans-Arctic, and cabotage.[16] The largest single ship type on the increase is fishing vessels, but a range of commercial vessels saw discernible growth.[17] Over that same period, the use of HFOs in Arctic waters generally grew 75 percent and black carbon emissions from ships using HFO grew 72 percent and 85 percent from the entire fleet.[18] A Canadian study on Nunavut shipping over the 1990-2015 observed "an increase in the average number of kilometers that ships have traveled in the territory as well as an increase in the number, and type vessels."[19]

Ships emit a wide range of substances from the use of hydrocarbon-based fuels known to produce adverse impacts on the environment and public health. The harmful substances emitted include particulate matter especially in fine particles ($PM_{2.5}$), volatile organic compounds VOCs), ground level ozone, nitrogen oxides (NOx) and sulphur oxides (SOx). $PM_{2.5}$ and ozone from ship emissions have the largest concentrations near the coasts, reduce visibility, and linger longer in

[15] PAME, The Increase in Arctic Shipping 2013-2019: Arctic Shipping Status Report (ASSR) #1 (31 March 2020), online: <https://pame.is/arctic-shipping>.

[16] Destinational transport: "where a ship sails to the Arctic, performs some activity in the Arctic, and sails south". Intra-Arctic transport: "a voyage or marine activity that stays within the general Arctic region and links two or more Arctic States". Trans-Arctic transport or navigation: "voyages which are taken across the Arctic Ocean from Pacific to Atlantic Oceans or vice versa". Cabotage shipping: "to conduct trade or engage in marine transport in coastal waters between ports within an Arctic State". *Ibid*.

[17] *Ibid*. These include general cargo ships, bulk carriers, refrigerated cargo ships, cruise ships, chemical tankers, oil product tankers, offshore supply vessels, crude oil tankers, passenger ships, gas tankers, service offshore vessels, container ships and ro-ro ships.

[18] Comer et al, *supra* note 11, at iv.

[19] Most traffic consisted of general cargo vessels and icebreakers. However, pleasure craft and fishing vessels were the fastest growing categories of ships. Tanker, barge activity and general cargo vessels also increased. There was a slight decline of passenger vessels. J Dawson, L Copland, O Mussells, and N Carter, *Shipping Trends in Nunavut 1990-2015: A report prepared for the Nunavut General Monitoring Program* (Ottawa and Iqaluit, 2017), at 37.

the atmosphere and travel far.[20] Particulate matter is also a climate forcer, known to accelerate sea ice loss. NOx and precursor gases create smog and reduce visibility. SOx harms marine and terrestrial ecosystems by affecting biogeochemical cycles through deposits on land, soils, vegetation and surface waters.[21] Both SOx and NOx contribute to eutrophication and acidification. These harmful substances are also linked to premature human mortality, cardiopulmonary disease, lung cancer, chronic respiratory ailments.[22] The extent and impacts of the emissions depend on a range of factors, including the type of fuel used, traffic density, routes, vessel speed, distance from coasts, and meteorological conditions. The impacts can be particularly acute in inland waterways subject to dense commercial traffic, ports, and inshore waters of navigation routes.

In addition to the above substances emitted by ships, shipping is responsible for greenhouse gas emissions (GHGs). The Fourth IMO GHG Study reported that international shipping accounted for 2% of global carbon dioxide (CO_2) emissions in the 2012-2018 reporting period,[23] with the expectation they will increase "from about 90% of 2008 emissions in 2018 to 90-130% of 2008 emissions by 2050 for a range of plausible long-term economic and energy scenarios". [24]

Until 31 December 2019, the general SOx emission rule was that ships were permitted to use fuel or carry fuel for use with up to 3.50 percent m/m sulphur content, except in SECAs. The IMO had earlier designated SECAs in the Baltic Sea, North Sea, North American waters (including Hawaii) and parts of the Caribbean, with a sulphur content of no more than 0.10 percent m/m.[25] The SOx emissions in North American waters were expected to drop by 90 percent.[26] On 1 January 2020, the general SOx rule was lowered to 0.50 percent m/m, providing ship operators with a choice to either use low sulphur content fuels, such as marine gas oil, or to continue to use fuel that exceeds the sulphur content by installing a scrubber system. In the years leading to date of effectivity, many ship owners opted to retrofit their vessels by installing scrubber systems and over 4,000 vessels may now be operating with this technology.

---

[20] US Environment Protection Agency, *Proposal to Designate an Emission Control Area for Nitrogen Oxides, Sulfur Oxides and Particulate Matter* (Technical Support Document Assessment and Standards Division Office of Transportation and Air Quality, US Environmental Protection Agency, April 2009), 3-89 *et seq*, online: <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/420r09007.pdf>.
[21] *Ibid* 3-40 *et seq*.
[22] *Ibid* 3-4 *et seq*.
[23] Fourth IMO GHG Study 2020 – Final Report, Note by the Secretariat, IMO Doc MEPC 75/7/15 (29 July 2020), Annex 1, executive summary.
[24] *Ibid.*
[25] *MARPOL*, *supra* note 1, Annex VI, regs 13.6 and 14
[26] Ship Safety Bulletin 08/2016 (18 August 2016).

The technology of scrubbers involves open loop, closed loop and hybrid systems. Open loop systems, which account for the vast majority of installations, use seawater to remove sulphur oxides before the stack emission and discharge the washwater back to the sea.[27] The natural alkalinity of seawater helps buffer the strong acids formed by the interaction of SOx with water, but the ensuing large volumes of washwater are usually discharged back into the sea without further pH adjustment or treatment to separate residues.[28] The washwater tends to include sludge.[29]

Closed loop systems use freshwater treated with chemical additives (i.e., sodium hydroxide) to enhance the alkalinity of the washwater and a portion of the washwater is occasionally unloaded at a port reception facility or discharged to sea.[30] Although less washwater is discharged by closed-loop scrubbers than by open-loop scrubbers, the concentration of contaminants can be greater and may include components in the lubricants of the ships.[31] Hybrid systems combine open and closed loop systems, enabling the switch from one to the other.[32]

The volume of washwater produced by scrubbers is substantial[33] and produces two problems: it introduces harmful substances into the marine environment directly and affects the chemistry of the receiving waters. The harmful substances include metals and PAHs.[34] The washwater contributes to ocean acidification.[35] Acidification is known to produce adverse

[27] "Scrubbers at a glance" (DNV, 18 October 2018), online: **<**https://www.dnv.com/expert-story/maritime-impact/Scrubbers-at-a-glance.html**>.**

[28] "Available estimates of scrubber discharge volumes range from 210 to 4500 million tonnes per year in the Baltic Sea and North Sea combined, and 47 million tonnes for 2020 along Canada's Pacific coastline." "ICES VIEWPOINT: Scrubber Discharge Water from Ships – Risks to the Marine Environment and Recommendations to Reduce Impacts", in References to Inform about Risks to the Marine Environment, *supra* note 5.

[29] "Open-loop scrubbers typically do not have water treatment systems to remove solids before discharge, contrary to many schematics of scrubbers in the literature. The water flow rate of open-loop systems is often too high to allow for onboard treatment (European Sustainable Shipping Forum, 2017). Instead, whatever sludge could be captured from open-loop systems remains suspended in the washwater and is discharged overboard." B Comer, E Georgeff and L Osipova, *Air Emissions and Water Pollution Discharges from Ships with Scrubbers* (Washington DC: International Council on Clean Transportation, 2020), at 4, online: <https://theicct.org/sites/default/files/publications/Air-water-pollution-scrubbers-nov2020.pdf>.

[30] References to Inform about Risks to the Marine Environment, *supra* note 5.

[31] Report of the GESAMP Task Team on Exhaust Gas Cleaning Systems, Note by the Secretariat, IMO Doc PPR 7/INF.23 (13 December 2019), 11.

[32] References to Inform about Risks to the Marine Environment, *supra* note 5.

[33] "Scrubbers said to Account for 10bn Tonnes of 'Polluting' Washwater Annually", *Lloyd's List* (29 April 2021).

[34] "Scrubbers discharge large amounts of metals and polycyclic aromatic hydrocarbons in dissolved, readily bioavailable form. These contaminants may concentrate at ultra-trace levels in the water column and bioaccumulate in plankton, fish, and marine mammals, to levels that may impair vital functions and population productivity. Concentrations of contaminants may be hundreds to million times higher in plankton than in the surrounding seawater." ICES VIEWPOINT, *supra* note 28, at 3.

[35] "Ocean acidification is already impacting oceanic species, especially shellfish and corals. In areas of intense maritime traffic where scrubber water discharge is permitted, scrubber-related ocean acidification could be similar

impacts on ecosystems and species.[36] Acidification results in change in ocean pH and carbonate chemistry, leading to reduced calcification and growth in species, affecting food web changes and human food supply.[37] This problem is of particular concern in Arctic waters, whose waters have naturally low alkalinity, especially when large volumes of untreated washwater from open loop systems are discharged to sea directly. Ocean acidification also alters the bioavailability and of pH-sensitive metals and can increase their toxicity, which presents a concern both in terms of ecosystem impacts as well as possible human health risks.[38] Scrubber washwater has the potential to compromise the ocean's ability to buffer the rate of climate change by inhibiting the CO_2 uptake.[39]

Moreover, the continued use of HFO prolongs the potential risks of spills from minor accidents and major casualties where the ship loses its bunker and cargo. Although under *MARPOL* ships are required to have a Shipboard Oil Pollution Emergency Plan, the ability to implement it effectively may be impaired in the Arctic's frequently extreme navigational conditions.[40] There is little to no coastal and community infrastructure to respond to spills in a timely manner. The region's remoteness would require transporting response personnel, assets and equipment from outside the Arctic region in responding to a major spill.[41] The effects of a spill on the sensitive marine environment, its wildlife and Inuit communities could be catastrophic.

Finally, by way of context, the utility of scrubbers in reducing air pollution may be over-estimated. Scrubbers are designed to remove SOx, and indeed they are effective in doing so. However, they are not as effective in reducing total air pollution (e.g., PM and PAHs) as low

---

to that induced by carbon dioxide over several years to decades. This particularly relevant in semi-enclosed and enclosed seas." *Ibid* at 3.

[36] S Hennige, J M Roberts and P Williamson (eds), *An Updated Synthesis of the Impacts of Ocean Acidification on Marine Biodiversity*, Technical Series No. 75 (Montreal: Secretariat of the Convention on Biological Diversity, 2014).

[37] *Ibid* at 17.

[38] C Lewis et al, "Ocean acidification increases copper toxicity differentially in two key marine invertebrates with distinct acid-base responses", *Scientific Reports* 6:21554, DOI: 10.1038/srep21554 (22 February 2016), 1, 7, online: <https://www.nature.com/articles/srep21554.pdf>. D Roberts et al, "Ocean acidification increases the toxicity of contaminated sediments",(2013) *Wiley Online Library* 19(2): 340-351, online: <https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.12048>. D A John and J Leventhal, "Bioavailability of Metals" (2004), online: <https://pubs.usgs.gov/of/1995/ofr-95-0831/CHAP2.pdf>.

[39] "It has been estimated that for each tonne of sulphur dioxide discharged by scrubber water, the ocean uptake of atmospheric carbon dioxide is reduced by half a tonne, thereby reducing the ability of the ocean to contribute to offsetting global climate change." References to Inform about Risks to the Marine Environment, *supra* note 5, at 3.

[40] *MARPOL*, *supra* note 1, Annex I reg 37.

[41] AMSA, *supra* note 13, 155.

sulphur fuel oil and marine gas oil, and in any case the continued use of HFO still produces GHGs.[42]

3. International regulation of air pollution from ships

3.2 International law of the sea

At the outset, it is useful to set out the environmental jurisdiction that states may exercise over shipping and the applicable substantive obligations to protect the marine environment from scrubber washwater. The principal international legal instrument setting out the rights and obligations of states in the marine environment is the *United Nations Convention on the Law of the Sea*, 1982 (*UNCLOS*),[43] which has 168 state parties, entered into force on 16 November 1994, and is generally regarded as the constitution of the world's oceans. Canada ratified *UNCLOS* on 7 November 2003 and implemented it primarily through the enactment of the *Oceans Act* in 1996.[44]

Most rules set out therein, such as those concerning international navigation and marine environment protection, have attained the status of customary international law. Customary rules bind all states, including states not parties to *UNCLOS*. The pertinent jurisdictional provisions concern states when they act in their capacities as flag, coastal and port states.

3.2.1 Flag states

The flag state is the state under whose laws a ship is registered. Registration gives a ship nationality and enables it to fly the flag of the registering state. Once registered, the ship enjoys

[42] "The International Maritime Organization (IMO) allows the use of scrubbers as an equivalent compliance option because they are expected to reduce sulfur dioxide emissions by the same, or more, as using compliant fuels. However, when considering the total air pollution consequences of scrubbers, they may not be equivalent to using lower-sulfur fuels, such as marine gas oil (MGO)." Comer et al, *supra* note 11, at 1. "The scrubber removes between 32% and 43% of the particle mass from the exhaust at the HFO tests upstream and downstream of the scrubber, but levels equivalent to those in LSFO exhaust are not reached. Decreases in the emissions of polycyclic aromatic hydrocarbons (PAH-16) and particulate matter as black carbon, organic carbon and elemental carbon, over the scrubber were observed for a majority of the trials, although emissions at LSFO use were consistently lower at comparable engine power." H Winnes, E Fridell and J Moldanová, "Effects of Marine Exhaust Gas Scrubbers on Gas and Particle Emissions", (2020) *Journal of Marine Science and Engineering* 8(4): 299, online: <https://www.mdpi.com/2077-1312/8/4/299/htm>.

[43] *United Nations Convention on the Law of the Sea* (adopted 10 December 1982, in force 16 November 1994) 1833 *UNTS* 396 [*UNCLOS*].

[44] *Oceans Act*, SC 1996 c 31.

a range of international navigation rights in the maritime zones of coastal states and on the high seas.

The flag state has an obligation to exercise effective jurisdiction and control over its ships in administrative, technical and social matters in conformity with generally accepted international regulations, procedures and practices.[45] That jurisdiction includes the regulation of pollution from ships flying their flag with the same effect as generally accepted international rules and standards adopted by the IMO.[46] This regulation includes atmospheric pollution from ships.[47] Such regulations, procedures and practices constitute the minimum standard and the flag state may exceed them with respect to its ships. The flag state's duty includes ensuring that the master, officers and crew are conversant with and observe the international vessel-source pollution regulations, and to take steps to ensure compliance.[48] It must ensure that its ships are regularly inspected, properly certificated, and prevented from sailing when substandard.[49] The flag state is responsible for investigating violations, ensuring compliance with international standards, taking enforcement action against its ships wherever violations occur, and applying real and substantive penalties.[50] It is also required to ensure its ships comply with requests from foreign authorities concerning violations in EEZs.[51]

Accordingly, the flag state is the principal jurisdiction responsible for implementing and enforcing the sulphur rule over its ships. As a flag state, Canada may regulate the discharge of scrubber washwater and may exceed the minimum international standard with respect to ships registered under its flag.

3.2.2 Coastal states

The coastal state is the state in whose waters under national jurisdiction international shipping operates. As a coastal state, Canada enjoys maritime zones over which it exercises varying degrees of power ranging from sovereignty, to sovereign rights over resources, to jurisdiction for specific functional purposes. The maritime zones concerned are internal waters, territorial sea, contiguous zone, EEZ and continental shelf. The authority to regulate international shipping, and thus the discharge of scrubber washwater, varies by maritime zone. *UNCLOS* protects international navigation rights in zones of national jurisdiction to different extents, through

[45] *UNCLOS*, *supra* note 43, art 94(1) and (5).
[46] *Ibid* art 211(2).
[47] *Ibid* art 212.
[48] *Ibid* art 94(c).
[49] *Ibid* art 217(2) and (3).
[50] *Ibid* art 217(1) and (4)-(8).
[51] *Ibid* art 220(4).

regimes of innocent passage, archipelagic sea lanes passage, transit passage and freedom of navigation. The extent to which a coastal state may regulate international navigation rights depends on the maritime zone concerned.

Internal waters – which consist of port waters, bays as defined by *UNCLOS*, and marine areas enclosed within the straight baselines of the territorial sea – are subject to the coastal state's sovereignty.[52] There is no international navigation right through internal waters, unless the straight baseline delineated to determine the outer limits of the territorial sea encloses waters that were previously not internal waters.[53] On entering a port voluntarily, ships submit themselves to local law and jurisdiction. The coastal state becomes the port state, as per below. The coastal state enjoys full power to regulate the discharge of scrubber washwater in internal waters.

In exceptional cases, marine waters may be subject to a title to historic waters that places them within the sovereignty of the coastal state.[54] General international law, rather than *UNCLOS*, governs the legal status of such waters.[55] Canada has employed the straight baseline system in the Arctic with the effect of enclosing the waters on the landward side of the baselines. Canada claims the enclosed waters as internal waters subject to its sovereignty, acquired through historic title based on Inuit use since time immemorial.[56] The legal status of these waters is uncertain because some states, including the Arctic neighbour United States, do not recognize the Canadian claim and consider the waters of the Northwest Passage subject to an international navigation right.[57] Nonetheless, Canada continues to exercise sovereignty and jurisdiction to regulate international shipping in the Northwest Passage. At times, other states questioned Canada's exercise of jurisdiction over international shipping, most especially in the case of regulatory initiatives deemed unilateral and not conforming to international standards, or imposed additional requirements such as mandatory reporting. In regulating scrubber washwater, Canada would need to consider the unsettled legal status of Arctic waters and the consequences of measures that might be inconsistent with international standards.

[52] *Ibid* art 2(1), 8(1), and 10(4).
[53] *Ibid* art 8(2).
[54] C R Symmons, *Historic Waters and Historic Rights in the Law of the Sea: A Modern Reappraisal* 2d (Leiden: Brill/Nijhoff, 2019), 14-15.
[55] The only reference to historic waters in *UNCLOS* concerns "historic bays" and to which the convention's provisions do not apply. *UNCLOS*, *supra* note 43, art 10(6). General international law continues to regulate matters not addressed by *UNCLOS. Ibid* preamble.
[56] House of Commons Debates, 33rd Parl, 1st Sess, [Vol 5] (10 September 1985) at 6462–464 (Secretary of State for External Affairs, the Right Honourable Joe Clark).
[57] J A Roach and R W Smith, *Excessive Maritime Claims* 3d (Leiden: Martinus Nijhoff, 2012), 111–12.

Canada enjoys sovereignty over a 12-nautical mile territorial sea. It has the right to regulate the international right of innocent passage enjoyed by international shipping. Innocent passage means passage that is continuous and expeditious, without calling into a Canadian port or internal waters, and which does not prejudice the peace, good order or security of the coastal state.[58] Passage is prejudicial to the coastal state, among other, when a ship commits an act of wilful and serious pollution contrary to *UNCLOS*.[59] The coastal state may regulate innocent passage for, among other, "the preservation of the environment of the coastal State and the prevention, reduction and control of pollution thereof".[60] There are limits to which the coastal state may regulate innocent passage. For example, the regulations "shall not apply to the design, construction, manning or equipment of foreign ships unless they are giving effect to generally accepted international rules or standards", and the coastal state must publicize such regulations,[61] and in turn, foreign ships are required to comply with such regulations.[62] The coastal state must regulate vessel-source pollution in conformity with *UNCLOS* and in a manner that does not hamper passage, except as permitted by the convention.[63] For example, it cannot "impose requirements on foreign ships which have the practical effect of denying or impairing the right of innocent passage"[64] or charge fees except for specific services rendered to a ship.[65] However, the coastal state may suspend temporarily innocent passage in specific areas of the territorial sea, but only for security purposes.[66] These rules constrain the ability of the coastal state to regulate scrubbers in a manner other than in accordance with *MARPOL* Annex VI, for example to ban the discharge of scrubber washwater from open loop systems.

UNCLOS sets out a special navigation regime for straits used for international navigation, which may have relevance for Canadian Arctic waters depending on views on the legal status of those waters and the Northwest Passage through them. If the Canadian view holds, the regime for straits does not apply to its Arctic waters, because of Canada's legal title to historic waters under general international law and the consequential exclusive sovereignty it enjoys over those waters. In the alternative, the *UNCLOS* regime establishes an international right of transit passage applicable to straits used for international navigation and limits the exercise of coastal state sovereignty subject to these rules.[67] Ships must conduct continuous and expeditious transits[68]

[58] *UNCLOS*, *supra* note 43, arts 18 and 19(1).
[59] *Ibid* art 19(2)(h).
[60] *Ibid* art 21(1)(f).
[61] *Ibid* art 21(2) and (3).
[62] *Ibid* art 21(4).
[63] *Ibid* arts 24(1) and 211(4).
[64] *Ibid* art 24(1)(a).
[65] *Ibid* art 26.
[66] *Ibid* art 25(3).
[67] *Ibid* art 34(2).
[68] *Ibid* art 38(2).

and, among other, "comply with generally accepted international regulations, procedures and practices for the prevention, reduction and control of pollution from ships".[69] The coastal state may regulate transit passage, among other for "the prevention, reduction and control of pollution, by giving effect to applicable international regulations regarding the discharge of oil, oily wastes and other noxious substances in the strait"[70] and designate sea lanes and traffic separation schemes following submission to and adoption by the IMO.[71] Unlike in the case of innocent passage, the coastal state is not empowered to suspend transit passage and must not hamper international navigation.[72] As is evident, the extent to which Canada has freedom to regulate the discharge of scrubber washwater in the Northwest Passage depends on the view on the legal status of Canadian Arctic waters. If the Canadian view applies, Canada has the freedom to regulate the discharge of scrubber washwater, whereas if the alternative view prevails, Canada can only apply *MARPOL* Annex VI procedures in regulating the discharge.

UNCLOS enables coastal states to claim archipelagic waters, but this does not apply to Canada's Arctic archipelago because the entitlement is based on the entire territory of the state being composed of an archipelago.[73] *UNCLOS* also provides for a contiguous zone of up to 24 nautical miles from the baselines of the territorial sea to prevent the infringement of and enforce its customs, fiscal, immigration, and sanitation laws and regulations in its territory or territorial sea.[74] Canada has claimed this zone.[75] This zone and the related jurisdictions are not directly relevant to the discharge of scrubber washwater and do not need to be considered further.

Canada has claimed 200-nautical mile EEZs in the Arctic, Atlantic and Pacific oceans consistently with *UNCLOS*.[76] The EEZ enables Canada to exercise sovereign rights for resource and energy generation purposes, as well as jurisdiction, among other, for the purposes of protection and preservation of the marine environment.[77] In exercising enforcement jurisdiction, the coastal state may adopt vessel-source pollution regulations "giving effect to generally accepted international rules and standards established through the" the IMO.[78] Canada's ability to regulate international shipping in the EEZ is limited to applying international rules and standards, and because in the EEZ international shipping enjoys the freedom of navigation

[69] *Ibid* art 39(2)(b).
[70] *Ibid* art 42(1)(b).
[71] *Ibid* art 41.
[72] *Ibid* arts 42(2) and 44.
[73] *Ibid* art 46.
[74] *Ibid* art 33.
[75] *Oceans Act*, *supra* note 44, s 10.
[76] *Ibid* s 13.
[77] *UNCLOS*, *supra* note 43, art 56.
[78] *Ibid* art 211(5).

otherwise applicable on the high seas.[79] The coastal state must exercise its rights with due regard to the rights of other states, including freedom of navigation.[80] In turn, flag states have a counterpart due regard duty towards the rights of the coastal state.[81]

The jurisdiction exercised by coastal states includes enforcement. Regulations adopted in accordance with international standards, and with respect to violations in the territorial sea and EEZ, may be enforced on foreign ships voluntarily in port.[82] The coastal state enjoys a power of inspection and institution of proceedings when the violation occurs during passage in the territorial sea. When the suspected violation occurs in the EEZ, the coastal state is in a position to take various steps, including requesting information from the vessel concerned, physical inspection where a violation concerns a substantial discharge or threatening pollution, and ultimately detention if the discharge caused harm to coastal state interests.[83]

UNCLOS contains a unique provision enabling Arctic states to exercise additional prescriptive and enforcement jurisdiction over international shipping in ice-covered areas. 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.

This provision was uniquely negotiated by Canada, the former Soviet Union and the United States during the Third United Nations Conference on the Law of the Sea, 1973-82 (UNCLOS III) and inserted into the package deal that became *UNCLOS*. The genesis of the provision was the jurisdiction claimed by Canada over shipping in its Arctic waters under the *Arctic Waters Pollution Prevention Act*, 1970 (*AWPPA*),[84] which was adopted in the wake of the test voyage of the American tanker *S.S. Manhattan*, accompanied by the Canadian Coast Guard icebreaker *John. A. Macdonald*, through the Northwest Passage in 1969.[85] The *AWPPA* was a controversial assertion

[79] *Ibid* art 58.
[80] *Ibid* art 56(2).
[81] *Ibid* art 58(3).
[82] *Ibid* art 220(1).
[83] *Ibid* art 220(2), (5) and (6).
[84] *Arctic Waters Pollution Prevention Act*, RSC 1985 c A-12 [*AWPPA*].
[85] "S.S. Manhattan Breaks Through", CBC News (8 September 1969), online: <https://www.cbc.ca/archives/entry/ss-manhattan-breaks-through>.

of unilateral jurisdiction in Arctic waters north of 60 degrees latitude and up to 100 nautical miles (eventually extended to 200 nautical miles) seawards from the baselines of the territorial sea. Canada developed and applied the earliest standards for Arctic shipping with a strong emphasis on protection of Indigenous peoples, maritime safety and pollution prevention. The unilateral exercise of jurisdiction was criticized by some states, most especially the United States, but a compromise was reached at UNCLOS III to frame this jurisdiction in the form of Article 234. Most significantly, while the expectation is that the shipping standards may be raised unilaterally by the coastal state beyond the generally accepted international rules and standards adopted through the IMO, the higher standards adopted do not require IMO consultations.[86]

On depositing its instrument of accession to *MARPOL* and Annexes I and II, Canada communicated to the IMO a declaration stating that based on *UNCLOS* Article 234:

> (a) The Government of Canada considers that it has the right in accordance with international law to adopt and enforce special non-discrimination laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered waters where particularly severe climatic conditions and the presence of ice covering such waters 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.
>
> (b) Consequently, Canada considers that its accession to the Protocol of 1978, as amended, relating to the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL 73/78) is without prejudice to such Canadian laws and regulations as are now or may in the future be established in respect of arctic waters within or adjacent to Canada.[87]

In response, the United States communicated to the IMO that Canada

> … may enact and enforce only those laws and regulations, in respect of foreign shipping in Arctic waters, that are within 200 nautical miles from the baselines used to measure the breadth of the territorial sea determined in accordance with international law: - that have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence in Arctic waters, and - that are otherwise consistent with international law, including Articles 234 and 236 [and other UNCLOS provisions].[88]

---

[86] S Rosenne and A Yankov (vol eds), *United Nations Convention on the Law of the Sea 1982: A Commentary* vol IV (Dordrecht: Nijhoff, 1991)[Virginia Commentary], 396.

[87] Canada communicated its instrument of accession on 16 November 1992, with effect on 16 February 1993. *Status of IMO Treaties: Comprehensive Information on the Status of Multilateral Conventions and Instruments in respect of which the International Maritime Organization or its Secretary-General Performs Depositary or Other Functions* (IMO, 15 July 2021), at 133, online: <https://wwwcdn.imo.org/localresources/en/About/Conventions/StatusOfConventions/Status%20-%202021.pdf>.

[88] *Ibid*.

Subsequently, a number of European states submitted a further communication, holding that Canada's declaration:

> … should be read in conformity with Articles 57, 234 and 236 of the United Nations Convention on the Law of the Sea. In particular, the ... Government recalls that Article 234 of that Convention applies within the limits of the exclusive economic zone or of a similar zone delimited in conformity with Article 57 of the Convention and that the laws and regulations contemplated in Article 234 shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence.[89]

The exchange of views serves to underscore the extent to which other states, whether parties to *UNCLOS* or not, expect other state parties to comply with the provisions of *UNCLOS*. Canada's declaration appeared to put forward a view of Article 234 suggesting that it operated autonomously and insulating that power from other provisions in the convention. Although providing an exceptional jurisdiction, Article 234 is an integral part of the *UNCLOS* package deal and requiring interpretation with reference to other provisions and the context of the convention as whole.

Under *UNCLOS* Canada is entitled to extensive continental shelves, defined to include the entire continental margin, in the Atlantic and Arctic oceans. The continental shelf overlaps with the EEZ up to the 200 nautical mile limit, but has a different legal regime. Canada is currently following procedures set out in *UNCLOS* to enable it to determine the outer limits of the continental shelves beyond 200 nautical miles. After Canada receives recommendations from the Commission on the Limits of the Continental Shelf established for this purposes in the convention, it will be able to define the outer limits of its continental shelves in the Atlantic and Arctic. Continental shelf rights include sovereign resource rights over the non-living resources and sedentary species, but do not include rights in the superjacent waters. Thus, the freedom of navigation applies to the waters of the continental shelf overlapping with the EEZ and beyond 200 nautical miles to the future outer limit.

Ships of all states enjoy the freedom of navigation on the high seas, defined as marine areas beyond national jurisdiction, and as seen earlier, only the flag state may exercise jurisdiction over its ships. Thus, on the high seas Canada enjoys jurisdiction only over ships flying its flag.

[89] *Ibid*. The states concerned were Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Portugal, Spain and the United Kingdom.

Finally, in order to understand the full geographical scope of the sovereignty, sovereign rights and jurisdictions that Canada is entitled to exercise under *UNCLOS* in Arctic waters, it is important to keep in mind settled and unsettled maritime boundaries with neighbouring states. Canada has a longstanding dispute with the United States concerning the maritime boundary in the Beaufort Sea for all of the maritime zones described above. Canada delimited the continental shelf boundary with Denmark in respect of Greenland in 1973,[90] but this is not finalized in the Lincoln Sea and in the central Arctic Ocean.[91] Canada's extended continental shelf claim in the central Arctic Ocean overlaps with the respective claims of Denmark, Russian Federation and the United States. The negotiation of shelf boundaries will likely occur well into the future after Canada and its neighbours receive recommendations from the Commission on the Limits of the Continental Shelf.

3.2.3 Port states

Canada enjoys the highest level of jurisdiction over international shipping when ships enter its ports voluntarily. This is so because port entry is a privilege and not a right, although it may be regulated by agreement.[92] The port state enjoys full sovereignty over its internal waters.[93] Foreign ships entering Canadian ports are subject to Canadian law and jurisdiction, and any conditions for entry established by Canada.[94] Accordingly, Canada may "establish particular requirements for the prevention, reduction and control of pollution of the marine environment as a condition for the entry of foreign vessels into their ports or internal waters", giving "due publicity to such requirements" and communicating them to the IMO.[95] Finally, the port state also enjoys enforcement jurisdiction when foreign ships are voluntarily in its port with respect to violations made by them outside that state's waters. The port state may investigate and institute proceedings in respect to discharges in violation of international standards.[96] Hence, Canada may enforce scrubber discharge violations made by foreign ships in waters outside its jurisdiction.

---

[90] *Agreement between the Government of the Kingdom of Denmark and the Government of Canada relating to the Delimitation of the Continental Shelf between Greenland and Canada*, 17 December 1973 (in force 13 March 1974), 950 *UNTS* 152, as amended by *Exchange of Notes Constituting an Agreement to Amend the Agreement Between the Government of Canada and the Government of the Kingdom of Denmark Relating to the Delimitation of the Continental Shelf Between Greenland and Canada Done at Ottawa on 17 December 1973*, Treaty E104991 (5 April 2004 and 20 April 2004), online: <https://www.treaty-accord.gc.ca/text-texte.aspx?id=104991>

[91] A tentative agreement was reported in 2003, but the boundary remains undelimited. J. Hartmann, "Canada and Denmark reach agreement on the Lincoln Sea Boundary", European Journal of Environmental Law Blog (10 January 2013).

[92] R R Churchill and A V Lowe, *The Law of the Sea* 3d (Manchester: Juris Publishing, Manchester University Press, 1999), 61-62.

[93] *UNCLOS*, *supra* note 43, art 2(1).

[94] *Ibid* arts 25(2) and 38(2).

[95] *Ibid* art 211(4).

[96] *Ibid* art 218(1).

3.2.4 UNCLOS environmental obligations

Beyond the jurisdictional provisions discussed above, *UNCLOS* also sets out substantive rules establishing general and specific obligations of states on the marine environment. In the seminal Article 192, states have a general obligation to protect and preserve the marine environment.[97] This entails a positive obligation to take measures, and a negative obligation not to degrade the marine environment.[98] Their obligations apply with respect to the marine environment in all maritime areas.[99]

More specifically, states have a duty to take individual or joint measures to prevent, reduce and control pollution of the marine environment from any source.[100] The measures must be designed in a manner "*to minimize to the fullest possible extent … the release of toxic, harmful or noxious substances*, especially those which are persistent, from land-based sources, from or through the atmosphere or by dumping" (*emphasis added*).[101] This provision states a general duty, thus including the release of substances from ships, as well as from other sources. Measures to be taken by states include "*pollution from vessels*, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, *preventing intentional and unintentional discharges*, and regulating the design, construction, equipment, operation and manning of vessels" (*emphasis added*).[102] This provision is even more specific in its application to ships and is arguably applicable to the intentional discharge of scrubber washwater. Moreover, the measures taken by states "shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life".[103] This is particularly relevant, given the risks posed by scrubber washwater to fragile Arctic ecosystems.

Further, Canada, as well as other *UNCLOS* state parties, have a duty to take measures in a manner that does not "transfer, directly or indirectly, damage or hazards from one area to another *or transform one type of pollution into another*".[104] The interpretation of the word 'transform' refers to "the quality or nature of the pollution".[105] This appears to be precisely what

[97] *Ibid* art 192.
[98] *In the Matter of the South China Sea Arbitration, The Philippines v People's Republic of China*, Award, 12 July 2016, PCA Case No 2013-19 (*Philippines v China*), para 941.
[99] *Ibid* para 940.
[100] *UNCLOS*, *supra* note 43, art 194(1).
[101] *Ibid* art 194(3)(a).
[102] *Ibid* art 194(3)(b).
[103] *Ibid* art 194(5).
[104] *Ibid* art 195.
[105] Virginia Commentary, *supra* note 86, at 72.

the IMO scrubber rule has led to: the atmospheric emission of SOx has been qualitatively converted to discharge of the harmful sulphur compounds, among other substances, directly into the marine environment. In providing a framework for the discharge of scrubber washwater into the marine environment, it would appear that the IMO guidelines discussed below are inconsistent with this UNCLOS provision.

Moreover, states have a duty to take measures to prevent, reduce and control marine pollution from technologies under their jurisdiction or control that may cause significant and harmful change.[106]

Specifically with respect to atmospheric pollution, state parties have a duty to cooperate through the IMO to establish global and regional rules and to regulate with respect to areas under their national sovereignty and their ships, "taking into account internationally agreed rules, standards and recommended practices and procedures".[107] They "shall take other measures as may be necessary to prevent, reduce and control such pollution".[108] This prescriptive jurisdiction is accompanied by a duty to exercise enforcement jurisdiction.[109]

Accordingly, Canada has a range of responsibilities under *UNCLOS* to protect the marine environment from harmful SOx emissions from ships and the discharge of scrubber washwater. At the same time, it would appear that when particular *UNCLOS* duties to protect the marine environment are applied to scrubber washwater as a pollutant, inconsistency between provisions is apparent.

3.2.5 Obligations under international environmental law

Instruments of international environmental law interface with *UNCLOS* Article 192 and other provisions to ensure activities within domestic jurisdiction and control respect the marine environment. These instruments lend further support to combat marine pollution from the discharge of scrubber washwater.

While commenting on the *Convention on the International Trade in Endangered Species, 1975* (*CITES*)[110] as an instrument of international environmental law commanding "nearly universal adherence", the arbitration tribunal in *Philippines v. China* held that *CITES* "forms part

[106] *UNCLOS*, *supra* 43, art 196(1).
[107] *Ibid* art 212(3).
[108] *Ibid* art 212(2).
[109] *Ibid* art 222.
[110] *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, 3 March 1973 (in force 1 July 1975), 993 *UNTS* 243 [*CITES*].

of the general corpus of international law that informs the content of Article 192 and 194(5)" of *UNCLOS*. The tribunal further held that the general obligation in Article 192 "includes a due diligence obligation to prevent the harvesting of species that are recognised internationally as being at risk of extinction and requiring international protection".[111] By analogy, the *United Nations Framework Convention on Climate Change*, 1992 (*UNFCCC*)[112] and the *Paris Agreement*, 2015[113] in climate law, and the *Convention on Biological Diversity*, 1992 (*CBD*)[114] in conservation law, all of which have comparable subscription rates to *CITES*,[115] also form part of the international law that informs the content of *UNCLOS* Article 192. Canada is a party to all these instruments.

The contribution of scrubber washwater to ocean acidification is inconsistent with climate law goals by compromising the oceans' capacity to function as sinks and thereby their ability to offset climate change.[116] In the *UNFCCC*, states have fundamental duties to protect the climate system and to take "precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects", including carbon sinks.[117] States committed to "[P]romote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems".[118] Similarly, the *Paris Agreement* urges states to take action to conserve and enhance sinks and reservoirs of greenhouse gases.[119]

The discharge of scrubber washwater appears inconsistent with the goals and commitments of the *CBD* providing for the conservation of biological diversity and sustainable use of its components.[120] The convention sets out several duties concerning *in situ* conservation

[111] *Philippines v China*, *supra* note 98, at para 956.
[112] *United Nations Framework Convention on Climate Change* (adopted 9 May 1992, in force 21 March 1994) 1771 *UNTS* 107 [*UNFCCC*].
[113] *Paris Agreement* (adopted 12 December 2015, in force 4 November 2016) UN Doc FCCC/ CP/2015/L.9/Rev.1 (12 December 2015).
[114] *Convention on Biological Diversity* (adopted 5 June 1992, in force 29 December 1993), 1760 *UNTS* 79 [*CBD*].
[115] At the time of writing *CITES* has 183 states parties, compared to *UNFCCC* (197), *Paris Agreement* (174), and *CBD* (196).
[116] "Secondly, on a longer time scale (few months to a year) the acidification by strong acids (H2SO4 and HNO3) will increase the partial pressure of CO2 in the water (shifting Equation 1 to the left), resulting in a CO2 flux from the ocean to the atmosphere. For each ton of SO2 discharged by scrubbers, the ocean uptake of atmospheric CO2 is reduced by half a ton (Stips et al. 2016), reducing the ability of the ocean to absorb CO2 (sink role of the ocean) and further contributing to global climate change (Hunter et al. 2011)." References to Inform about Risks to the Marine Environment, *supra* note 5, at 15.
[117] *UNFCCC*, *supra* note 112, art 3(3).
[118] *Ibid* art 4(1)(d).
[119] *Paris Agreement*, *supra* note 113, art 5(1).
[120] *CBD*, *supra* note 114, art 1.

that call for measures that should inform the regulation of scrubber washwater management. States have several consequential obligations, including:

- "Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques";[121]
- "Promote the protection of ecosystems, natural habitats …";[122]
- "Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas";[123]
- "Endeavour to provide the conditions needed for compatibility between present uses and the conservation of biological diversity and the sustainable use of its components";[124]
- "Where a significant adverse effect on biological diversity has been determined pursuant to Article 7, regulate or manage the relevant processes and categories of activities".[125]

Accordingly, it is reasonably arguable that instruments of international environmental law further reinforce the duties of states to prevent the degradation of the marine environment from pollution, such as scrubber washwater, to enable the achievement of climate change and biological diversity goals.

3.2.6 Obligations under international human rights law

States also have obligations under international human rights law that interface with their environmental responsibilities, in particular with respect to rights now enshrined in the *United Nations Declaration on the Rights of Indigenous Peoples*, 2007 (*UNDRIP*).[126] Canada embraced *UNDRIP* and legislated a framework for its implementation through the *United Nations Declaration on the Rights of Indigenous Peoples Act* (*UNDRIP Act*), which received the Royal Assent on 21 June 2021.[127] *UNDRIP* sets out individual and collective rights of Indigenous peoples, such as the right to self-determination, cultural rights, and rights to lands, territories and resources. In the context of the Indigenous rights to lands, territories and resources in the Arctic, Dalee Sambo Dorough, International Chair of the Inuit Circumpolar Council, wrote:

> For the Inuit, a critical element is the need to recognise the profound relationship that they have with the Arctic Ocean coastal areas and their respective lands, territories and resources. In this context, the term 'territories' should be regarded as comprehensive and inclusive of the coastal land areas, shore-fast sea ice, offshore areas of the ocean itself,

[121] *Ibid* art 7(c).
[122] *Ibid* art 8(d).
[123] *Ibid* art 8(e).
[124] *Ibid* art 8(i).
[125] *Ibid* art 8(l).
[126] *United Nations Declaration on the Rights of Indigenous Peoples*, GA Res A/RES/61/295 adopted 13 September 2007 [*UNDRIP*].
[127] *United Nations Declaration on the Rights of Indigenous Peoples Act*, SC 2021 c 14 [*UNDRIP Act*].

> including the seabed, which have been traditionally used for millennia as the source of sustenance in the way of whales, seals, walrus, migratory birds and other marine life.[128]

While the legal status of *UNDRIP* as a UN General Assembly resolution is not the same as an international convention or treaty, the resolution itself may constitute evidence of existing general international law.[129] In Resolution 5/2012, the International Law Association concluded that the rights to Indigenous ancestral lands, territories and resources constitute customary international law and therefore bind states. The consequence is that:

> States must comply – pursuant to customary and applicable conventional international law – with the obligation to recognise, respect, safeguard, promote and fulfil the rights of indigenous peoples to their traditional lands, territories and resources, which include the right to restitution of the ancestral lands, territories and resources of which they have been deprived in the past. Indigenous peoples' land rights must be secured in order to preserve the spiritual relationship of the community concerned with its ancestral lands, which is an essential prerequisite to allow such a community to retain its cultural identity, practices, customs and institutions.[130]

A further consequence of the legal status of the rights to lands, territories and resources as customary law is that states have substantive and procedural environmental obligations towards Indigenous peoples. These are set out in *UNDRIP* Article 29 as follows:

> 1. Indigenous peoples have *the right to the conservation and protection of the environment and the productive capacity of their lands or territories and resources*. States shall establish and implement assistance programmes for indigenous peoples for such conservation and protection, without discrimination.
> 2. States shall take effective measures to ensure that *no storage or disposal of hazardous materials shall take place* in the lands or territories of indigenous peoples without their free, prior and informed consent.
> 3. States shall also take effective measures to ensure, as needed, that programmes for monitoring, maintaining and restoring the health of indigenous peoples, as developed and implemented by the peoples affected by such materials, are duly implemented.[131] (*emphasis added*)

Accordingly, it is arguable that under *UNCLOS* Canada's obligation to protect and preserve the Arctic marine environment entails responsibilities to protect Arctic waters in a manner to

---

[128] D Sambo Dorough, "The Rights, Interests and Role of the Arctic Council Permanent Participants", in R C Beckman *et al* (eds), *Governance of Arctic Shipping: Balancing Rights and Interests of Arctic States and User States* (Leiden: Brill, 2017), at 80.

[129] *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, *ICJ Reports 1996* (I), 254-255, para 70.

[130] International Law Association, Resolution No. 5/2012: Rights of Indigenous Peoples, adopted at the 75th Conference of the International Law Association, Sofia, Bulgaria, 26-30 August 2012, at para 7, online: <Committees (ila-hq.org)>.

[131] *UNDRIP*, *supra* note 125, art 29.

enable Inuit to exercise their rights at international and domestic law. Canada's obligations extend to not permitting the disposal of hazardous materials, including scrubber washwater, in Arctic waters that are ancestral to Inuit.

3.2 International maritime law

3.2.1 The MARPOL framework

Differently from the international law of the sea, but interfacing with it, international maritime law concerns rules and standards for the operation of ships and related services. The IMO is the competent international organization with respect to international shipping. *UNCLOS* sets out an obligation for states to establish international rules and standards for vessel-source pollution through the IMO or general diplomatic conference.[132] States have done this with the adoption of *MARPOL* and its Protocol of 1978. *MARPOL* applies to flag states with respect to standards for their ships in all navigable waters, to port states regarding port reception facilities, and to coastal states concerning special areas and emission control areas in their maritime zones. The domestic authority responsible for the implementation of *MARPOL* is the national maritime administration, understood as the government under whose authority a ship operates.[133]

MARPOL is the most important instrument for the prevention of pollution from ships and covers pollution through six dedicated annexes, namely oil (I), noxious liquid substances carried in bulk (II), noxious liquid substances carried in packaged form (III), sewage (IV), garbage (V), and air pollution (VI). Comprehensive as *MARPOL* is, it does not cover all forms of vessel-source pollution. For example, *MARPOL* standards do not address grey water and underwater noise, and instead the IMO adopted non-mandatory guidelines for these. *MARPOL* addresses the discharge of scrubber washwater only in part, as will be seen below.

MARPOL establishes general pollution prevention standards applicable to all areas, and particular standards applicable to designated marine areas. In addressing air pollution from ships, Annex VI sets out general standards for ozone depleting substances,[134] NOx, SOx, PM, VOCs, incineration on board and energy efficiency to reduce GHGs with respect to all ships, except as provided otherwise. Emissions are understood as referring both to releases into the atmosphere or at sea.[135] Ships of 400 gross tonnage or above are subject to certification requirements and

[132] *UNCLOS*, *supra* note 43, art 211(1).
[133] *MARPOL*, *supra* note 1, Convention, art 2(5).
[134] These refer to substances such as halons and chlorofluorocarbons (CFCs) controlled under the *Montreal Protocol on Substances that Deplete the Ozone Layer* (adopted 16 September 1987, in force 1 January 1989) 1522 *UNTS* 3, art 1(4) and substances listed in Annexes A, B, C or E.
[135] *MARPOL*, *supra* note 1, Annex VI, reg 2.7.

periodic surveys to ensure compliance, whereas smaller vessels may be subject to measures established by the national maritime administration.[136] Maritime administrations, or recognized organizations delegated by them, issue the International Air Pollution Prevention Certificate (IAPPC) to their ships after the initial or renewal survey.[137] The main form of the certificate attests to the surveys of the ship and extensions of validity,[138] and a supplementary form provides the record of construction and equipment for the control of emissions.[139]

The particular standards include rules for special areas under Annexes I, II, IV and V, and emission control areas (ECAs) under Annex VI. Special areas are not relevant to this report, while ECAs are. ECA "means 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." [140] The designation of an ECA requires formal amendment of regulations 13 and 14 of Annex VI through the tacit acceptance procedure in the *MARPOL* convention.[141] To date, ECAs have been established for SOx, NOx and PM in the marine regions listed in Table 1. The absence of polar waters from the list of ECAs designated by the IMO to date is immediately noticeable.

In comparison, polar waters are protected from other vessel-sources of pollution other than air pollution under the *Polar Code* and Antarctic waters are also designated as a special area under Annexes I, II and V. Although Arctic waters are not designated as a special area, the higher discharge standards introduced by the *Polar Code* under the amended Annexes I, II, IV and V provide equivalent protection. Hence, air pollution remains a gap in the *Polar Code*. Arctic waters are missing ECA designation or protection from an equivalent special standard. In this respect, Antarctic waters fare better than Arctic waters because the former are subject to an HFO ban that is in effect, thus significantly reducing certain emissions, such as PM and SOx.

Table 1: Emission Control Areas

Area	**Emissions regulated**	**Date of adoption**	**Date of entry into force**	**Date of effectivity**
Baltic Sea	SO_x	26 September 1997	19 May 2005	19 May 2006

[136] *Ibid* Annex VI, regs 2.5-2.9.
[137] *Ibid* Annex VI, reg 6.
[138] *Ibid* Annex VI, Appendix IA and IB.
[139] *Ibid* Annex VI, Appendix IC.
[140] *Ibid* Annex VI, reg 2.8.
[141] *Ibid* Convention, art 16(2).

	NO_x	7 July 2017	1 January 2019	1 January 2021 (ships constructed after this date to comply with NOx Tier III standards)
North Sea	SO_x	22 July 2005	22 November 2006	22 November 200
	NO_x	7 July 2017	1 January 2019	1 January 2021 (ships constructed after this date to comply with NOx Tier III standards)
North American area (including Hawaii)	SO_x and PM	26 March 2010	1 August 2011	1 August 2012
	NO_x			1 January 2016 (ships constructed after this date to comply with NOx Tier III standards)
United States Caribbean Sea	SO_x and PM	26 July 2011	1 January 2013	1 January 2014
	NOx			1 January 2016 (ships constructed after this date to comply with NOx Tier III standards)

Source: adapted from IMO, "Special Areas under MARPOL" (undated), online: <https://www.imo.org/en/OurWork/Environment/Pages/Special-Areas-Marpol.aspx>

As seen earlier, in November 2020 MEPC 75 approved a new rule for HFOs used or carried for use as fuel in Arctic waters to protect the region from the risk of oil spills.[142] Clearly, the reduction of HFO use as fuel should reduce harmful emissions, in particular PM (including black carbon) and SOx. Although called a ban, in reality the new rule does not immediately eliminate the use of HFO. The rule becomes effective on 1 July 2024. Vessels engaged in search and rescue and pollution response are exempted. The rule takes effect on 1 July 2029 for ships with a construction standard that maintains a designated distance between the fuel tank and the hull. Moreover, Arctic states may waive the application of the rule to ships registered under their flags and while operating in their Arctic waters, including the EEZs, until 1 July 2029. There is no limit to the number of ships that may be granted waivers. The number of ships enjoying such exemption could be significant because of the increasing commercial tonnage. Perhaps an unforeseen consequence is that Arctic states are now attractive flags of convenience for the reflagging of ships that otherwise operate in Arctic waters under non-Arctic flags.[143]

[142] *Ibid* Annex I, reg 43A. The rule applies to oils having a density at 15°C higher than 900 kg/m3 or a kinematic viscosity at 50°C higher than 180 mm2/s.

[143] B Comer, "IMO's draft HFO 'ban' is nothing of the sort", ICCT blog (27 February 2020), online: <https://theicct.org/blog/staff/imo-draft-hfo-ban-2020>.

3.2.2 Sulphur emissions

Annex VI regulates SOx and PM emissions from ships through goal-based regulation, namely by setting standards to be achieved and letting regulatees decide on how to comply with those standards. Regulation 14 sets the general standard for the sulphur content of fuel oil at 0.50 percent m/m, and the higher ECA standard at 0.10 percent m/m.[144] The rule applies to ships of 400 gross tonnage and over, and for smaller vessels at the discretion of the national maritime administration. As mentioned at the outset of this report, a ship operator has the option of using low sulphur content fuels to meet the prescribed general and ECA emission standards, or to install a scrubber system to lower the SOx content to meet the standards. The discussion now turns to the rules applying to these options in complying with the SOx rule.

The IAPPC reflects the choice made by the ship operator. The IAPPC supplementary form includes information on the ship's SOx and PM emissions outside and within ECAs.[145] It includes particulars on the fuel used, its sulphur content as documented by bunker delivery notes to meet general and ECA standards, an approved arrangement (scrubber) to maintain SOx emissions to the prescribed standards, and that the ship is fitted with designated fuel sampling points.

The bunker delivery note documents the sulphur content of the fuel purchased by the ship operator and it must be kept on board and ready for inspection by competent authorities.[146] The supplier is responsible to provide bunker that complies with the precise fuel specifications specified by the purchaser, and the IMO has adopted guidelines to assist purchasers for this purpose.[147] Sulphur content is measured according to a standard set by the International Organization for Standardization.[148]

In order to meet quality requirements, fuel oil must consist of refined blends of hydrocarbons and may include low amounts of additives for performance, and free of inorganic acid or substance harmful to performance, human health or that increases air pollution.[149] Fuels produced by methods other than petroleum refining must have similar safeguards and not

[144] *MARPOL*, *supra* note 1, Annex VI, regs 14(1) and (4).
[145] *Ibid* Annex VI, Appendix IC.
[146] *Ibid* Annex VI, regs 14(5), 18.5-18.7 and Appendix V. The rule also applies to LNG. *Ibid* reg 18(4).
[147] IMO has adopted Guidance on Best Practice for Fuel Oil Purchasers/Users for Assuring Quality of Fuel Oil Used on Board Ships, IMO Doc MEPC.1/Circ.875 (26 April 2018).
[148] "Sulphur content of fuel oil means the concentration of sulphur in any fuel oil, measured in % m/m as tested in accordance with a standard acceptable to the Organization". *MARPOL*, *supra* note 1, Annex VI, reg 2.52, as amended with effect on 1 April 2022. The standard referred to is ISO 8754:2003 Petroleum products – Determination of sulphur content – Energy-dispersive X-ray fluorescence spectrometry. MEPC 75 (November 2020) introduced technical amendments on sulphur content definition and sampling, the International Air Pollution Prevention (IAPP) certificate, and fuel verification procedure for Annex VI on fuel oil samples.
[149] *Ibid* Annex VI, reg 18.1.

exceed the sulphur standard, or cause higher NOx emissions than the set standard.[150] The supplier has to provide a sample of the fuel provided against the bunker note in accordance with IMO guidelines.[151] MEPC has provided guidance on best practices for fuel oil suppliers.[152]

Ships trading between ports in ECAs and elsewhere will likely change fuels as they approach or depart from an ECA. Fuels with different sulphur content have to be stored in separate tanks. They are required to document in the logbook or electronic record book the procedure for the change of fuel use and ensure older fuel is fully flushed out so that the sulphur content limit is not exceeded as they approach the ECA.[153] A state authority may require analysis of oil in use or an onboard sample without undue delay and in accordance with IMO guidelines to determine compliance.[154] Annex VI establishes a procedure for the national maritime administration to apply for the verification of the sulphur content of the fuel oil supplied to a ship.[155]

While the IMO monitors the worldwide average of sulphur content of residual fuel oil,[156] states are duty-bound to facilitate the functioning of the sulphur rule. Ships need access to fuels that comply with the sulphur and other emission rules and states are expected to take reasonable steps to ensure compliant fuels are available in their ports, and to so inform the IMO.[157] States undertake to maintain a register of local fuel suppliers and requiring suppliers to maintain records of bunkers delivered and to inform the administration on non-compliant fuels.[158] The IMO is to be informed when fuel suppliers fail to meet regulatory requirements.

Cost and ship design and equipment circumstances may encourage an operator to install a scrubber system. Annex VI allows national maritime administrations to permit the use of "any fitting, material, appliance or apparatus to be fitted in a ship or other procedures, alternative fuel oils, or compliance methods used as an alternative to that required by this Annex" if they are at

[150] *Ibid* reg 18.2.
[151] *Ibid* reg 18.8. See also 2009 Guidelines for the Sampling of Fuel Oil for Determination of Compliance with the Revised MARPOL Annex VI, Resolution MEPC.182(59) adopted on 17 July 2009.
[152] Guidance on Best Practice for Fuel Oil Suppliers for Assuring the Quality of Fuel Oil Delivered to Ships, IMO Doc MEPC.1/Circ.875/Add.1 (9 November 2018).
[153] *MARPOL*, *supra* note 1, Annex VI, reg 14(6).
[154] *Ibid* reg 14(8). See the 2019 Guidelines for On Board Sampling for the Verification of the Sulphur Content of the Fuel Oil Used on Board Ships, IMO Doc MEPC.1/Circ.864/Rev.1 (21 May 2019); 2020 Guidelines for On Board Sampling of Fuel Oil Intended to Be Used or Carried for Use on Board a Ship, IMO Doc MEPC.1/Circ.889 (7 December 2020).
[155] *MARPOL*, *supra* note 1, Annex VI, reg 18.8.2 and Appendix VI.
[156] *Ibid* Annex VI, reg 14(2). The IMO does this in accordance with the 2010 Guidelines for Monitoring the Worldwide Average Sulphur Content of Fuel Oils Supplied for Use on Board Ships, Resolution MEPC.192(61) adopted on1 October 2010, as amended by Resolution MEPC.273(69) adopted on 22 April 2016.
[157] *MARPOL*, *supra* note 1, Annex VI, reg 18(1).
[158] *Ibid* reg 18(9).

least as effective in reducing emissions regulated by the annex, and must inform IMO.[159] In doing so, the national maritime administration "shall endeavour not to impair or damage its environment, human health, property, or resources or those of other States".[160] They inspect scrubber systems and on approval issue the SOx Emission Compliance Certificate.[161]

Annex VI requires national maritime administrations to take into account IMO guidelines on equivalents.[162] Equivalents to using compliant fuels include installing and operating certified scrubber systems, alternative fuels, other technologies, and regional fuel averaging regimes. With respect to scrubbers, in 2008 the IMO adopted non-mandatory Guidelines for Exhaust Cleaning Systems[163] and amended them in 2009 by MEPC Resolution 184(59) (IMO 2009 Guidelines).[164] MEPC Resolution 259(68) amended them again in 2015.[165] They provide the detailed technical requirements for testing, survey certification and verification of scrubber systems through two schemes, both of which should have technical manuals. Scheme A consists of unit certification with parameter and emission checks, and Scheme B consists of continuous emission monitoring with parameter checks. Ships should have an SOx Emissions Compliance Plan approved by the national maritime administration.[166] The plan should list all fuel oil combustion equipment on board, although it is possible there may be equipment that may not be possible to connect to the scrubber system and in which case emission compliance will have to be achieved through another means.[167] The plan involves continuous monitoring and onboard procedures for demonstrating compliance with the emission standards.

The IMO 2009 Guidelines also address washwater discharge criteria. At the time the guidelines were revised in 2015, it was anticipated that scientific research would enhance knowledge of the contents of washwater and its effects, and that Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) would provide advice to enable the revision of the criteria. In 2019, GESAMP established a Task Team on Exhaust Gas Cleaning Systems at the request of MEPC and its Sub-Committee on Pollution Prevention and Response to undertake a review of the scientific literature and oversee a modelling study of washwater discharge, and submitted a report in 2019.[168] Among other, the report recognized that "current

[159] *Ibid* reg 4(1)-(2).
[160] *Ibid* reg 4.4.
[161] 2015 IMO Guidelines, *supra* note 8.
[162] *MARPOL*, *supra* note 1, Annex VI, reg 4(3).
[163] Guidelines for Exhaust Cleaning Systems, Resolution MEPC.170(57) adopted on 4 April 2008.
[164] 2009 Guidelines for Exhaust Cleaning Systems, Resolution MEPC.184(59) adopted on 17 July 2009 [2009 IMO Guidelines].
[165] 2015 IMO Guidelines, *supra* note 8, para 1.4.
[166] *Ibid* paras 2.1.3 and 9.1.1.
[167] *Ibid* para 9.1.5.
[168] Report of the GESAMP Task Team, *supra* note 31.

available evidence on chemicals in EGCS washwater effluents and its importance for the environment, should call for an increased and broad focus on this topic from both the science community and from policymakers".[169]

Washwater monitoring and recording, which is to include pH, PAH, turbidity and temperature, should be continuous when the scrubber system is in operation in ports, whereas in other areas, monitoring and recording should be undertaken when the scrubber system is in operation.[170] The IMO 2009 and 2015 Guidelines provide criteria for pH, PAH, turbidity and suspended matter, nitrates, and washwater additives and other substances in discharged washwater. The pH should not less than 6.5 measured at 4 metres from the overboard discharge point when the ship is stationary and should be recorded in the technical manual. The stated maximum concentrations of PAH should be measured downstream of the water treatment equipment of the scrubber and upstream of any washwater dilution or other reactant dosing unit prior to discharge.[171] The Guidelines include flow rate, PAH concentration limit and measuring technology used. As for turbidity and suspended particle matter, the washwater treatment system should be designed to minimize their discharge, including heavy metals and ash.[172] Again, turbidity should be measured downstream of the water treatment equipment and upstream of washwater dilution before discharge. The discharge of nitrates beyond the percentage for NOx removal, should be minimized.[173] Scrubbers which utilize chemicals, additives or that create chemicals are required to be assessed.[174] Finally, washwater residue from closed-loop scrubbers may not be discharged at sea and should be offloaded to adequate port reception facilities.[175] Storage and disposal of residues has to be logged.[176]

States also undertake to provide reception facilities in their ports to enable ships using their ports or undertaking repairs in those ports to offload "exhaust gas cleaning residues from an exhaust gas cleaning system, without causing undue delay to ships".[177] As observed earlier, the operation of closed-loop scrubbers produces sludge residue to be discharged at a port reception facility.

---

[169] *Ibid* at 13.
[170] 2009 IMO Guidelines, *supra* note 164, paras 10.1.1 and 10.2; 2015 IMO Guidelines, *supra* note 8, paras 10.1.1 and 10.2.
[171] *Ibid* para 10.1.3.
[172] *Ibid* para 10.1.4.
[173] *Ibid* para 10.1.5.
[174] *Ibid* para 10.1.6.
[175] *Ibid* para 10.4.
[176] *Ibid*.
[177] *MARPOL*, *supra* note 1, reg 17(2).

The discharge of scrubber washwater permissible under *MARPOL* raises several concerns of compatibility with the IMO's own and other international legal regimes. In particular, the IMO is in the process of finalizing its strategy to reduced GHG emissions from shipping by adopting short-term measures and laying the ground for medium and long-term measures. Ironically, at the same time as the IMO is adopting measures to enhance the energy efficiency of ships, the rule for the scrubber system on board ships appears to increase fuel consumption by 1.5 to 3.5 percent.[178]

[178] E den Boer Maarten and M Hoen, *Scrubbers – An Economic and Ecological Assessment* (Delft: CE Delft, March 2015), at 39.

4. Canada's legal framework for air pollution from ships

Having considered the international law of the sea and international maritime law framework for the regulation of air pollution from ships, and with particular reference to SOx emissions and scrubber washwater discharge, we now turn our attention to the counterpart domestic legal framework in Canada. We start this discussion by first setting out the jurisdictional context underscoring the regulation of shipping. This is important because it sets out the limits of regulatory initiatives and enforcement. Canada's approach to the implementation of international legal obligations flowing from the pertinent instruments to which it is party follows. The bulk of the discussion will consist of analysis of federal maritime regulation of air pollution from ships with a focus on SOx and other pertinent environmental laws and regulations. This part will conclude with reflections on the need to weigh in the rights of Indigenous peoples in the regulation of air emissions in Canadian Arctic waters.

4.1 Jurisdictional considerations

As a coastal state, Canada has claimed all the maritime zones and related rights and jurisdictions available to it under *UNCLOS* and general international law. In Arctic waters, Canada claims maritime zones and jurisdictions under *UNCLOS* and asserts a historic legal title to the waters of the archipelago based on general international law. The internal waters and the territorial sea are part of the territory of Canada and vest in Canada.[179] The sovereign rights and jurisdictions over the EEZ and continental shelf, although not territorial, similarly vest in Canada. Thus, for the purposes of Canada's international relations, Canada enjoys the rights in the territorial sea, contiguous zone, EEZ and continental shelf.

The *AWPPA* definition of Canadian Arctic waters is for the purposes of regulating shipping in those waters within the boundaries of the Act. The Act 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.[180]

The limits of Canadian Arctic waters to the east and west coincide with the claimed or delimited maritime boundaries at this time, to the south by the 60th parallel, and to the north by the 200-

[179] *Oceans Act*, *supra* note 44, s 7; *Interpretation Act*, RSC 1985 c I-21, s 35(1).
[180] *AWPPA*, *supra* note 84, s 2.

nautical mile seaward limit of the EEZ. This definition includes the waters of the archipelago and therefore the portion of the Northwest Passage in Canadian waters, but not the entirety of Hudson Bay. The definition substantially overlaps with the counterpart definition of Arctic waters in the *Polar Code*.[181] However, the geographical scope of the mandatory reporting system under the *Northern Canada Vessel Traffic Services Zone Regulations* (*NORDREG*), while including Arctic waters, is significantly wider and includes all of the Hudson Bay and other designated bays and waters.[182]

The *Constitution Act, 1982* allocates the power to conduct external relations and various powers concerning the marine areas to the federal level.[183] In particular, section 91(1) allocates the legislative authority over navigation and shipping to the federal level. The Supreme Court of Canada has also clarified that "marine pollution, because of its predominantly extraprovincial as well as international character and implications, is clearly a matter of concern to Canada as a whole" and therefore subject to federal jurisdiction.[184] Provincial powers extend to matters concerning property and civil rights and local undertakings (which include an environmental jurisdiction), and in some sectors this may extend to marine activities.[185] Provincial and territorial governments, as well as Indigenous peoples and their governments, enjoy rights over marine spaces and related rights. The situation varies from province to province, territory to territory, and Indigenous people to Indigenous people. When some provinces joined confederation, they brought with them rights to marine areas, and a few of these have been judicially considered, although not always affirmed.[186] While the maritime zones and jurisdictions under *UNCLOS* vest

[181] The definition of Arctic waters and Antarctic area for the purposes of the Polar Code is set out in two instruments. *International Convention for the Safety of Life at Sea,* adopted 1 November 1974 (in force 25 May 1980), 1184 *UNTS* 2 [*SOLAS*], arts XIV/1.2 and XIV/1.3 and *MARPOL*, *supra* note 1, Annex I regs 1.11.7 and 46.2, Annex II regs 13.8.1 and 1.2, Annex IV regs 17.2 and 17.3, and Annex V regs 1.14.7 and 13.2. The *Polar Code* definition uses 60 degrees as the southernmost baseline in Canadian Arctic waters.

[182] *Northern Canada Vessel Traffic Services Zone Regulations*, SOR/2010-127 [*NORDREG*], s 2. These other areas include: the waters of Ungava Bay, all of the waters in Hudson Bay and Kugmallit Bay (Arctic waters include only portions of these), James Bay, the Koksoak River from Ungava Bay to Kuujjuaq, Feuilles Bay from Ungava Bay to Tasiujaq, Chesterfield Inlet and Baker Lake, and Moose River from James Bay to Moosonee.

[183] *The Constitution Act, 1982*, Schedule B to the Canada Act 1982 (UK), 1982, c 11, , s 91: "(9) Beacons, Buoys, Lighthouses, and Sable Island; (10) Navigation and Shipping; (11) Quarantine and the Establishment and Maintenance of Marine Hospitals; (12) Sea Coast and Inland Fisheries; (13) Ferries between a Province and any British or Foreign Country or between Two Provinces."

[184] *R v Crown Zellerbach Canada Ltd*, [1988] 1 SCR 401.

[185] For example in relation to occupational health and safety in fishing. *Mersey* and *Pattison* cases. *R v Mersey Seafoods Ltd*, 2008 NSCA 67 (CanLII); *Jim Pattison Enterprises v British Columbia (Workers' Compensation Board)*, 2011 BCCA 35.

[186] *Reference Re Ownership of Off Shore Mineral Rights*, [1967] SCR 792; *Reference Re Ownership of the Bed of the Strait of Georgia and Related Areas*, [1984] 1 SCR 388; *Reference Re Mineral and Other Natural Resources of the Continental Shelf* (1983), 145 DLR (3d) 9 (Nfld CA); *Reference Re the Seabed and Subsoil of the Continental Shelf Offshore Newfoundland*, [1984] 1 SCR 86.

in Canada, the *Oceans Act* enables the application of both federal law and provincial law in the marine environment, and implictly within the constitutional allocation of powers.[187]

Aboriginal and treaty rights, including the right of self-determination and aboriginal government and jurisdiction, are protected by section 35 of the constitution.[188] Parliament has enacted the *UNDRIP Act* to affirm *UNDRIP* "as a universal international human rights instrument with application in Canadian law" and to "provide a framework for the Government of Canada's implementation of the Declaration".[189]

When considering the regulation of SOx emissions and scrubber washwater discharge in Canadian waters, it is important to consider the direct and indirect impacts on Indigenous rights. Indigenous nations assert rights to ancestral lands, territories and resources in marine areas. There have been numerous cases where courts applied the government's duty to consult with respect to marine resource rights of Indigenous nations across Canada. Canadian courts have yet to affirm marine title,[190] but Indigenous rights to certain marine resource uses, such as fishing, are now settled.[191] In the case of Arctic waters, modern treaties between Canada and Indigenous peoples consist of land claims settlements that include a range of marine spatial and resource rights and responsibilities. These include the *James Bay and Northern Québec Agreement*,[192] *Inuvialuit Final Agreement*,[193] *Nunavut Land Claims Agreement*,[194] *Labrador Inuit Land Claims*

[187] *Oceans Act*, *supra* note 44, s 9 (provincial law in the territorial sea), ss 11 and 12 (federal in the contiguous zone), s 20 (federal law on installations on the continental shelf, and s 21 (federal and provincial law in the EEZ and continental shelf). The jurisdiction of provincial courts is similarly extended to the maritime zones. *Ibid* s 22.

[188] *Constitution Act*, *supra* note 183, s 35.

[189] *UNDRIP Act*, *supra* note 127, s 4

[190] The claim of the Haida Nation on the west coast includes waters encompassed by the territorial sea and EEZ. The claim is currently in the British Columbia judicial system. *Constitution of the Haida Nation*, preamble, online: <https://www.haidanation.ca/wp-content/uploads/2018/10/Constitution-2018-10-signed.pdf>. *Haida Nation v British Columbia (Minister of Forests)*, 2004 SCC 73.

[191] N Bankes, "Modern Land Claims Agreements in Canada and Indigenous Rights with Respect to Marine Areas and Resources", in S Allen, N Bankes and Ø Ravna (eds), *The Rights of Indigenous Peoples in Marine Areas (*Oxford: Hart, 2019), 49.

[192] This agreement reserved hunting, fishing and trapping for the exclusive use of Crees, Inuit and Naskapis. James Bay and Northern Québec Agreement (11 November 1975), online: <https://www.rcaanc-cirnac.gc.ca/eng/1407867973532/1542984538197>. *James Bay and Northern Québec Native Claims Settlement Act*, SC 1976-77 c 32; *Act approving the Agreement concerning James Bay and Northern Québec*, SQ 1976 c 46, art 24.7.1. Fishing included the right to conduct commercial fisheries.

[193] This agreement covers large areas of the Mackenzie Delta, Beaufort Sea and Amundsen Gulf area, thereby including internal waters, the territorial sea and EEZ, and provides for resource rights. *Inuvialuit Final Agreement* (as amended) (25 July 1984), Annex A and Annex A-1, online <https://irc.inuvialuit.com/sites/default/files/Inuvialuit%20Final%20Agreement%202005.pdf>.

[194] This agreement includes internal waters and the territorial sea of the east coast of Nunavut, and, among other, protects Inuit resource rights and rights "to participate in decision-making concerning the use, management and conservation of land, water and resources, including the offshore". It also recognizes that "Canada's sovereignty over the waters of the arctic archipelago is supported by Inuit use and occupancy". *Agreement between the Inuit of*

Agreement,[195] *Eeyou Marine Region Land Claims Agr*eement,[196] and *Nunavik Inuit Land Claims Settlement*.[197] In addition, a number of MPAs and NMCAs have been established in Arctic waters in consultation with Indigenous peoples. Further, the Beaufort Sea has an Integrated Management Plan adopted under the *Oceans Act* through the efforts of the Beaufort Sea Partnership. [198] The plan's framework includes the *Inuvialuit Final Agreement*.

4.2 Canada's implementation of international legal obligations

In exercising prescriptive and enforcement jurisdiction, Canada has to be mindful of its international obligations. Canada has an international legal obligation to perform its treaty responsibilities in good faith[199] and failure to do so may attract protests from other states. Domestic law is not acceptable justification for failure to perform treaty obligations.[200] A state may become a party to a treaty while expressing reservations or making declarations. Reservations, or exceptions, have the effect of modifying the application of a treaty in relation to that state and vis-à-vis other state parties to the extent of the reservation.[201] Declarations, or statements, have a lesser effect, but other states may still object to or seek clarification of such statements, as was Canada's experience on accession to *MARPOL* discussed earlier. *UNCLOS* does not permit reservations, but accommodates declarations aimed at facilitating the harmonization of its national law with provisions of the Convention, and without excluding or modifying the

the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada (25 May 1993), online: <http://www.tunngavik.com/documents/publications/1993-00-00-Nunavut-Land-Claims-Agreement-English.pdf>. *Nunavut Land Claims Agreement Act*, SC 1993, c 29.

[195] Among other, this agreement addresses fishing rights and requires the Minister to consult on ocean management and marine protected area initiatives. *Land Claims Agreement between the Inuit of Labrador and Her Majesty the Queen in Right of Newfoundland and Labrador and Her Majesty the Queen in Right of Canada* (22 January 2005), chaps 6 and 13. online: <https://www.canlii.org/en/ca/laws/stat/schedule-b-to-the-canada-act-1982-uk-1982-c-11/latest/schedule-b-to-the-canada-act-1982-uk-1982-c-11.html>.

[196] This agreement addresses the aboriginal title of the Crees of Eeyou Istchee to the use and ownership of lands and resources, including fisheries, in Nunavut and in Hudson Bay and James Bay. *Agreement between the Crees of Eeyou Istchee and Her Majesty the Queen in Right of Canada concerning the Eeyou Marine Region* (7 July 2010), art 2.23, online: <https://www.rcaanc-cirnac.gc.ca/eng/1320437343375/1542989331999>.

[197] This agreement addresses, among other, fishing and wildlife harvesting rights in marine areas in Hudson Bay, Hudson Strait, Ungava Bay and Labrador Sea. *Nunavik Inuit Land Claims Settlement* (1 December 2006), preamble and art 3, Online: <https://www.rcaanc-cirnac.gc.ca/eng/1320425236476/1551119558759#pre>.

[198] Beaufort Sea Partnership, "Integrated Ocean Management", online: <https://www.beaufortseapartnership.ca/integrated-ocean-management/integrated-oceans-management-plan/>. *Integrated Ocean Management Plan (IOMP) for the Beaufort Sea: 2009 and Beyond* (Beaufort Sea Planning Office, 2009), online: <http://www.beaufortseapartnership.ca/wp-content/uploads/2015/04/integrated-ocean-management-plan-for-the-beaufort-sea-2009-and-beyond.pdf>. The plan in includes actions on shipping.

[199] *Vienna Convention on the Law of Treaties* (adopted 23 May 1969, in force 27 January 1980) 1155 *UNTS* 331, art 26.

[200] *Ibid* art 27.

[201] *Ibid* art 21.

effect of the Convention's provisions.[202] Canadian courts have been careful in ensuring their decisions comply with Canada's international legal obligations,[203] and indeed courts have held Canada to its international obligations.[204]

The rights and obligations set out in law of the sea and maritime law conventions frequently require legislative implementation. Canada subscribes to the dualist doctrine entailing the domestication of international treaties through national legislation. The *Oceans Act* performs this function by articulating Canada's zonal and jurisdictional entitlements in *UNCLOS* into domestic law. International maritime law instruments, such as the *International Convention for the Safety of Life at Sea*, 1974[205] and *MARPOL*, are similarly domesticated. Statutory provisions and annexes incorporate IMO instruments and sometimes include Canadian modifications.[206] Some IMO conventions contain technical content that requires periodic updating. In these instances, domestic implementation has included referential incorporation through an enabling provision in a statute or regulation. At times referential incorporation, as in the case of implementation of EGCS guidelines through the *Vessel Pollution and Dangerous Chemicals Regulations* (*VPDCR*), has included IMO guidelines.[207] In Arctic waters, and operating under the authority of the *AWPPA* and the *Canada Shipping Act, 2001* (*CSA, 2001*),[208] the *Arctic Shipping Safety and Pollution Prevention Regulations* (*ASSPPR*) implemented the *Polar Code* through a mixture of direct and referential incorporation, while including modifications to facilitate the transition from the old to the new regulations for some ships.[209]

4.3 Maritime regulation of air pollution and scrubber washwater

The regulation of vessel-source pollution in Canada occurs through maritime law and environmental law statutes. The *AWPPA* and *CSA, 2001* are the principal maritime statutes addressing pollution prevention, but the CSA, 2001 regulates air pollution from ships.

[202] *UNCLOS*, *supra* note 43, art 310.
[203] *Ordon Estate v Grail* (1996), 30 OR (3d) 643 (CA), aff'd [1998] 3 SCR 437.
[204] For example *Baker v. Canada (Minister of Citizenship and Immigration)*, [1999] 2 SCR 817 with respect to the *Convention on the Rights of the Child*, CTS 1992 No 3.
[205] *SOLAS*, *supra* note 181.
[206] For example the *Convention on the International Regulations for Preventing Collisions at Sea,* adopted 20 October 1972 (in force 15 July 1977), 1050 *UNTS* 16, implemented through the *Collision Regulations* CRC c 1416.
[207] *Vessel Pollution and Dangerous Chemicals Regulations*, SOR/2012-69 [*VPDCR*], ss 1(1), 111(4)(a).
[208] *Canada Shipping Act, 2001*, SC 2001 c 26 [*CSA, 2001*].
[209] *Arctic Shipping Safety and Pollution Prevention Regulations*, SOR/2017-286. See the commentary on Canada's *Polar Code* implementation in A Chircop, P Pamel and M, "Canada's implementation of the Polar Code", (2018) *Journal of International Maritime Law* 24(6): 428-450.

4.3.1 AWPPA and regulations

The *AWPPA* defines waste for the purposes of the Act to include:

> (a) any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water to an extent that is detrimental to their use by man or by any animal, fish or plant that is useful to man, and
> (b) any water that contains a substance in such a quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water to the extent described in paragraph (a).
>
> and without limiting the generality of the foregoing, includes anything that, for the purposes of the *Canada Water Act*, is deemed to be waste.[210]

While the definition of waste does not include air emissions, the discharge of scrubber washwater appears to qualify as a waste. As seen earlier, when discharged into the marine environment, scrubber washwater deposits harmful substances and contributes to acidification, thus degrading Arctic marine water in a manner that is directly and indirectly detrimental to marine life. Inuit, who are a maritime people, depend on a healthy ecosystem for the pursuit of their subsistence, cultural identity and enjoyment of their rights to lands, territories and resources, as well as all other Indigenous rights.

Section 4(1) of the *AWPPA* establishes a general prohibition on the deposit of waste by any person or ship in Arctic waters or on the mainland or islands where the waste may enter Arctic waters, except as authorized by regulations under this section.[211] Regulations under this section may prescribe the type and quantity of the waste and the conditions under which it may be discharged.[212] Persons or the master of the ship discharging waste in contravention of this provision must report the discharge to a pollution prevention officer (PPO).[213]

As noted earlier, in implementing the *Polar Code* amendments to *MARPOL*, the *ASSPPR* did not amend Annex VI on air pollution, and therefore the SOx rule that is generally applicable to all waters applies to Arctic waters. None of the conditions that enable the discharge of waste in the Arctic marine environment apply to scrubber washwater.[214] It is interesting to observe that

[210] *AWPPA*, *supra* note 84, s 2.
[211] *Ibid* s 4(1). The only exception is the deposit of waste as part of a water quality management area under the *Canada Water Act*. *Ibid* s 4(2).
[212] *Ibid* s 4(3).
[213] *Ibid* s 5.
[214] *ASSPPR*, *supra* note 209, s 14.

when the *Vessel Pollution and Dangerous Chemicals Regulations* (*VPDCR*) implemented the SOx rule, the definition of 'waste' in the *AWPPA* remained unchanged and therefore scrubber washwater is included. It is unclear why the legislator prohibits the discharge of scrubber washwater under the *AWPPA* and permits its discharge under the *VPDCR*. Moreover, Transport Canada guidelines on ship operations in Arctic waters are silent on scrubber washwater discharge.[215]

Disposal of waste in Arctic waters is an absolute liability offence, with no requirement for proof of fault or availability of the due diligence defence,[216] and entailing, on summary conviction, a fine of $5,000 in the case of a person committing the offence and $100,000 in the case of a ship.[217] If the offence lasts longer than a day, a separate offence is deemed to have been committed every day.[218] Failure to report waste disposal to a PPO, or to comply with an order of a PPO, results in an offence and liability on summary conviction to a fine up to $25,000.[219]

The owners of the ship and its cargo are jointly and severally liable for costs, expenses and loss or damage,[220] and liability is absolute, that is it does not depend on proof of fault or negligence.[221] The extent of liability is for costs and expenses for civil enforcement action, all actual loss or damage and the costs of reasonable measures taken by a public authority to repair, remedy, or mitigate the loss or damage.[222] Shipowners operating in Arctic waters are required to carry evidence of financial responsibility in the form of insurance or an indemnity bond.[223]

4.3.2 CSA, 2001 and VPDCR

The regulation of air pollution from ships of 400 gross tonnage or more in Canada, including in Arctic waters, occurs primarily under the *CSA, 2001* and the *VPDCR* under it. Unlike the *AWPPA* use of 'waste' as the key term to regulate vessel-source pollution, the *CSA, 2001* uses 'pollutant', which is defined as

[215] For example *Guidelines for Passenger Vessels Operating in the Canadian Arctic*, TP 13670, online: <https://tc.canada.ca/en/marine-transportation/marine-safety/guidelines-passenger-vessels-operating-canadian-arctic-tp-13670>. Interestingly, the Guidelines provide guidance on management of grey water.
[216] *AWPPA, supra* note 84, s 7(1).
[217] *Ibid* s 18(1).
[218] *Ibid* s 18(2).
[219] *Ibid* ss 19(1)(a) and (2)(d).
[220] *Ibid* s 6(1)(c).
[221] *Ibid* art 7(1).
[222] *Ibid* s 6(2) and (3).
[223] *Ibid* s 8(1)(d).

> (a) a substance that, if added to any waters, would degrade or alter or form part of a process of degradation or alteration of the quality of the waters to an extent that is detrimental to their use by humans or by an animal or a plant that is useful to humans; and
> (b) any water that contains a substance in such a quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state, that it would, if added to any waters, degrade or alter or form part of a process of degradation or alteration of the quality of the waters to an extent that is detrimental to their use by humans or by an animal or a plant that is useful to humans.[224]

Given the chemical content and its acidifying potential, scrubber washwater qualifies as a pollutant because it is a substance that degrades water quality and is detrimental to marine ecosystems. It would appear that scrubber washwater should thus be banned under the Act together with other pollutants, however that is not the case.

As the reader will observe, the above definition does not include air pollution, and hence the *CSA, 2001* does not itself implement *MARPOL* Annex VI rules on SOx emissions. Rather, the act empowers the Minister of Transport to recommend regulations on air pollution,[225] and hence the *VPDCR* implement Annex VI SOx emissions rules.[226] Section 187 of the *CSA, 2001* further provides that "[N]o person or vessel shall discharge a prescribed pollutant, except in accordance with the regulations made under this Part …".[227] The Minister of Transport is empowered to recommend regulations "prescribing pollutants for the purpose of sections 187 and 189 and respecting the circumstances in which such pollutants may be discharged".[228] Regulations may also concern other subject-matter pertinent to the installation and operation of scrubbers, such as reporting of discharges, carriage of pollutants onboard, reception facilities for residues, machinery and equipment on board, requirements to be met and certification of compliance, and inspections.[229]

The *VPDCR* directly incorporate the *MARPOL* Annex VI SOx rules and also referentially incorporate the 2009 Guidelines for Exhaust Gas Cleaning Systems in IMO Resolution MEPC.184(59) (2009 IMO Guidelines).[230] The regulations are not up-to-date because this resolution is not the current version of the EGCS guidelines. The most recent version is the 2015 Guidelines for Exhaust Gas Cleaning Systems appended to Resolution MEPC.259(68).[231] Even so,

[224] *CSA, 2001*, *supra* note 208, s 185.
[225] *Ibid* s 190(1)(d).
[226] *VPDCR*, *supra* note 207, ss 111-111.2.
[227] *CSA, 2001*, *supra* note 208, s 187.
[228] *Ibid* s 190(1)(a).
[229] *Ibid* s 190(1).
[230] 2009 Guidelines for Exhaust Gas Cleaning Systems in IMO Resolution MEPC.184(59) adopted 17 July 2009 [2009 IMO Guidelines].
[231] 2015 IMO Guidelines, *supra* note 8.

however, Resolution MEPC.184(59) sets out the criteria and procedures for the implementation of the SOx rule in sufficient detail.

Regulation 111 of the *VPDCR* sets out the SOx emission ceilings of 0.50 percent m/m after 31 December 2019 for foreign and Canadian vessels operating in Arctic waters, the Hudson Bay, James Bay and Ungava Bay.[232] The NAECA encompasses the other marine areas under Canadian jurisdiction and the emission ceiling of 0.10 percent m/m applies to all ships.[233] The master is responsible for ensuring that the appropriate fuel is used when a vessel enters or leaves the NAECA.

The same regulation provides that a vessel may operate a scrubber system that meets the requirements of the 2009 IMO Guidelines, as long as the ensuing SOx emissions do not exceed the SOx limits of compliant fuel with low sulphur content.[234] The scrubber system must be certified and operated in accordance with the 2009 IMO Guidelines. Residues from the operation of the system must be discharged at an onshore reception facility, while the washwater and its monitoring and recording must meet the requirements of the resolution. [235] The operation of a scrubber system carries documents on board as required by the resolution, including certification that the system meets the requirements, EGC System Technical Manual (Scheme A or Scheme B), SOx Emissions Compliance Plan, and information on and recording of the operation, maintenance, servicing, adjustments and monitoring of the system.[236] Canadian vessels opting to use scrubber systems as an alternative compliance option must seek approval through the Marine Technical Review Board, and foreign vessels operating in Canadian jurisdiction must similarly seek approval from the Board prior to seeking approval from the flag state.[237]

Hence, the discharge of washwater through a certified system and in compliance with the 2009 IMO Guidelines as enabled by the *VPDCR* is permissible.[238] As long as there is compliance with the criteria and procedures involved, it would appear there is no basis for concluding that a pollution offence has been committed. However, pollution offences are conceivable in certain circumstances. With respect to residues, the *VPDCR* and 2009 IMO Guidelines provide for their delivery to onshore reception facilities and should not be discharged to the sea or incinerated

[232] *VPDCR*, *supra* note 207, s 111(1).
[233] *Ibid.*
[234] *Ibid* s 111(4).
[235] *Ibid* s 111(6).
[236] *Ibid* s 111.2.
[237] New Regulations for Vessel Air Emissions: Proposing Alternative Compliance Options, SSB No.: 02/2013, RDIMS No: 8242032 (9 May 2013).
[238] *VPDCR*, *supra* note 207, regs 110(6) and 111(6).

onboard.[239] The discharge of residue into the marine environment would violate *CSA, 2001* section 187 and constitute discharge of a pollutant.

The *VPDCR* require that the vessel's authorized representative 'must ensure' washwater discharge meets the requirements of section 10 of the 2009 IMO Guidelines.[240] While the 2009 IMO Guidelines *per se* are non-mandatory, the *VPDCR* has effectively made compliance with them mandatory. The discharge water should comply with limits for pH, PAH, turbidity and temperature.[241] The pH, oil content (as measured by PAH levels), and turbidity in washwater should be continuously monitored and recorded.[242] If the discharged washwater does not comply with the limits, it is arguable that the washwater should be characterised as a pollutant for the purposes of *CSA, 2001* section 187. Also, if any of the recommended procedures are not followed (e.g., monitoring and data recording), it is further arguable that there is non-compliance with the *VPDCR* duty to ensure compliance.

The discharge of a pollutant carries a heavy penalty and entails liability on summary conviction to a fine of up to $1,000,000, or to a prison term of up to 18 months, or to both, and if committed for more than one day, it constitutes a separate offence for each day.[243] A court may also make orders imposing additional requirements on the offender.[244]

Violations *per se* are not offences that trigger the application of the *Criminal Code*.[245] The Minister of Transport has flexibility in dealing with violations in the enforcement process. The Minister may:

> (a) enter into an assurance of compliance with the person or vessel that
>
> (i) identifies the violation and provides that the person or vessel will comply with the provision to which the violation relates within the period, and be subject to the terms and conditions, specified in the assurance,
>
> (ii) sets out the amount and form of any security that, pending compliance with the assurance, must be deposited with the Minister, and
>
> (iii) sets out the penalty, fixed by or within the range fixed by the regulations made under this Part, for the violation that the person or vessel would have been liable to pay if the assurance had not been entered into.[246]

[239] *Ibid* s 110(6)(a); 2009 IMO Guidelines, *supra* note 164, para 10.4.1.
[240] *VPDCR*, *supra* note 207, s 110(6)(b).
[241] *Ibid* para 10.1.
[242] *Ibid* para 10.2.
[243] *CSA, 2001*, *supra* note 208, s 191(1)-(3).
[244] *Ibid* s 193.
[245] *Ibid* s 236.
[246] *Ibid* s 229(1)(a).

The person who receives the notice of violation has a right to request a review and to appeal.[247] The Minister may determine whether a violation should be enforced as a contravention or as an offence.[248] Contraventions entail, on summary conviction, a fine of up to $1,000,000 or to imprisonment for up to 18 months, or to both.[249]

Finally, under *NORDREG*, the master of a ship that is about to enter or is in the mandatory reporting area must provide a position report as soon as they become aware of a pollutant in the water.[250] Pollutant carries the same definition as in the *CSA, 2001*. The *NORDREG* duty appears broad enough to capture non-compliant discharge of scrubber washwater in the mandatory reporting requirements.

4.4 Other environmental regulations

In addition to maritime legislation, Canada has an array of environmental legislation that protects and conserves the marine environment from harmful discharges from ships. This report now explores the extent to which environmental law statutes apply to the discharge of scrubber washwater in marine waters.

[247] *Ibid* ss 231.2(1) and 232.2(1).
[248] *Ibid* s 233.
[249] *Ibid* s 245(1) and (2).
[250] *NORDREG*, *supra* note 188, s 7(2)(e).

4.4.1 Canadian Environment Protection Act

The *Canadian Environment Protection Act* (CEPA)[251] is a general environmental protection statute. Among other, it implements the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* and its *1996 Protocol*.[252] The definition of dumping in these instruments excludes "the disposal at sea of wastes or other matter incidental to, or derived from the normal operations of vessels".[253] Consistently with the convention, and while it regulates certain discharges from ships and dumping of ships, the *CEPA* does not apply to scrubber washwater. The Act regulates disposal of substances at sea from ships, but excludes, without qualification, discharges that are incidental to or derived from the normal operations of a ship or of any equipment on a ship,[254] such as washwater from scrubber operations.

4.4.2 Fisheries Act

In section 36(1), the *Fisheries Act*, which among other protects fisheries habitats in Canadian waters, prohibits the discharge of "prejudicial or deleterious substances in any river, harbour or roadstead, or in any water where fishing is carried on".[255] Deleterious substance is defined broadly to include any substance or treated water, which affects water quality that is detrimental to fish, or fish habitat.[256] Section 36(3) qualifies this prohibition as follows:

> Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

Section 36(4) proceeds to exclude deposits of "waste or pollutant of a type, in a quantity and under conditions authorized by regulations applicable to that water or place made by the Governor in Council under any Act other than this Act". "Under any Act other than this Act" includes the *VPDCR* made under the *CSA, 2001*. The effect is to exclude the discharge of scrubber washwater in compliance with the *VPDCR* and the 2009 IMO Guidelines from characterization as an offence under the *Fisheries Act*. However, if the discharge does not comply with the criteria

[251] *Canadian Environmental Protection Act, 1999*, SC 1999 c 33 [*CEPA*].
[252] *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* (adopted 29 December 1972, in force 30 August 1975), 1046 UNTS 120 [*London Convention*]; *Protocol to the Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter, 1972* (adopted 7 November 1996, in force 24 March 2006), *Can TS* 2006 No 5 [*London Protocol*].
[253] *Ibid London Convention*, art III(1); *ibid London Protocol*, art 1(4).
[254] *CEPA*, *supra* note 251, s 122(1).
[255] *Fisheries Act*, RSC 1985 c F-14, s 36(1).
[256] *Ibid* s 34(1).

set out in the 2009 IMO Guidelines, it is arguable that the discharge constitutes an offence under the *Fisheries Act* because it would not be authorized by the *VPDCR* as a regulation applicable under any other act.

Contraventions under the Act are subject to summary conviction or indictment. [257] On summary conviction for a first offence, the fine is up to $100,000, and for subsequent offences a fine or a prison term up to a year, or to both. In the case of an indictable offence, the fine may not exceed $500,000 and the imprisonment up to two years. When the contravention continues for more than one day, it constitutes a separate offence for each day.[258] The offence entails a due diligence defence.[259]

Directions given under the *CSA, 2001* appear to trump the directions of an inspector or fishery officer under the *Fisheries Act*.[260] Similarly civil liability provisions in section 42 of the *Fisheries Act* do not apply to the deposit of deleterious substances under Parts 8 and 9 of the *CSA, 2001*.[261]

4.4.3 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (*MBCA*) implements a bilateral convention between Canada and the United States whose purpose is the protection and conservation of migratory birds as populations and individual birds, as well as their nests.[262] Regulations under the Act establish migratory bird sanctuaries.[263] The Act establishes a general prohibition for any person or vessel to deposit, or permit to deposit, substances or combination of substances that are harmful to migratory birds, in waters frequented by migratory birds or in places from where substance may enter such waters.[264] However, the *MBCA* excludes deposits authorized under the *CSA, 2001*.[265] As in the case of the *Fisheries Act*, it is arguable that non-compliant scrubber washwater discharge could constitute an offence under the *MBCA*.

[257] *Ibid* s 78.
[258] *Ibid* s 78.1.
[259] "No person shall be convicted of an offence under this Act if the person establishes that the person (a) exercised all due diligence to prevent the commission of the offence; or (b) reasonably and honestly believed in the existence of facts that, if true, would render the person's conduct innocent." *Ibid* s 78(6).
[260] *Ibid* s 38(7.2). This is specifically for the Minister of Fisheries and Oceans' power to delegate under s 38.
[261] *Ibid* s 42(7).
[262] *Migratory Birds Convention Act*, SC 1994 c 22 [*MBCA*], s 4.
[263] *Migratory Bird Sanctuary Regulation*s, CRC c 1036, s 3 and schedule.
[264] *MBCA*, *supra* note 262, s 5.1(1) and (2).
[265] *Ibid* s 5(3)(a).

The penalties for offences under the Act are some of the harshest in Canadian environmental law. A wide range of persons may be charged in addition to the vessel, including the shipowner, crew (master, chief engineer, etc.), individuals, corporations and their directors and officers. Summary conviction and indictable offences entail heavy fines and imprisonment. For ships of 7,500 tonnes deadweight and more, the fine on indictment is between $500,000 and $6,000,000 for a first offence, and between $1,000,000 and $12,000,000 for a second offence.[266] Other contraventions include a fine of up to $500,000 for a first offence and up to $1,000,000 for a second or subsequent offence. On summary conviction the ceiling for the fine is $250,000 and up to $500,000 for a subsequent offence.[267] Smaller vessels have lower, albeit still significant fines. Moreover, an offence that continues for more than a day may entail offences for each subsequent day.

4.4.4 Canada Water Act

In Canada, navigable waters may include waters other than marine areas. The *Canada Water Act* provides for the management of water resources and the development of federal-provincial water quality management programmes.[268] The Act prohibits the disposal of waste in "water quality management areas" except under prescribed quantities and conditions.[269] Waste is defined as

> (a) any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water to an extent that is detrimental to their use by man or by any animal, fish or plant that is useful to man, and
> (b) any water that contains a substance in such a quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water to the extent described in paragraph (a).[270]

The reader will recall that the definition of waste in the *AWPPA* includes the definition of waste in the *Canada Water Act*. Unlike the environmental statutes discussed above, this act does not appear to exclude discharges under the *CSA, 2001*, and in particular the discharge of scrubber washwater. Fines for contravention of the Act are up to $5,000 for each offence.

[266] *Ibid* s 13.03.
[267] *Ibid* s 13.04.
[268] *Canada Water Act*, RSC 1985 c C-11.
[269] *Ibid* s 9.
[270] *Ibid* s 2(1).

4.4.5 Protected areas

The federal authority to designate protected areas in the marine environment is set out in several statutes, including the *Oceans Act*, *Canada National Marine Conservation Areas Act* (*CNMCA*),[271] *Canada Wildlife Act*,[272] *Canada National Parks Act*[273] and *MBCA*. The range of protected areas include MPAs, NMCAs, reserves, parts of national wildlife areas in marine waters, migratory bird sanctuaries and national parks. Arctic waters are home to several protected areas. On 25 April 2019, the federal government adopted a new approach to marine conservation enabling all MPAs to function similarly to national parks and including a prohibition of oil and gas, mining, dumping and bottom trawling, consistently with International Union for the Conservation of Nature standards for MPAs.[274]

The discussion now explores the extent to which, if at all, the various protected areas in Arctic waters address the discharge of scrubber washwater. Migratory bird sanctuaries designated under the *MBCA* are not discussed as the earlier consideration of this act concluded that operational discharges from ships authorised under the *CSA, 2001* are excluded from the application of the *MBCA*. Although several national parks have been designated in the Arctic, some of which include marine areas,[275] the *Canada National Parks Act* is not discussed further as it does not establish discharge of waste as an offence under the Act.

Oceans Act

Under the *Oceans Act*, MPAs may be designated in internal waters, the territorial sea and EEZ for conservation purposes by regulations adopted on the recommendation of the Minister of Fisheries and Oceans or by order of the Minister. [276] The Minister is also empowered to lead and coordinate the development and implementation of a national MPA network. Three MPAs have been designated in Arctic waters, two of which are actually clusters of multiple MPAs.

---

[271] *Canada National Marine Conservation Areas Act*, SC 2002 c 18 [*CNMCA*].
[272] *Canada Wildlife Act*, RSC 1985 c W-9.
[273] *Canada National Parks Act*, SC 2000 c 32.
[274] "Protection Standards to better conserve our oceans", Government of Canada (25 April 2019), online: <https://www.dfo-mpo.gc.ca/oceans/mpa-zpm/standards-normes-eng.html>. The decision followed the advice of the National Advisory Panel on Marine Protected Area Standards. See Final Report of the National Advisory Panel on Marine Protected Area Standards (Fisheries and Oceans Canada, 26 September 2018), online: <https://waves-vagues.dfo-mpo.gc.ca/Library/40727191.pdf>.
[275] For example: Quttinirpaaq National Park which includes a part of Ellesmere Island and a part of the Arctic Ocean, bays, fjords, Discovery Harbour and inlets; Ukkusiksalik National Park adjacent to Roes Welcome Sound in Hudson Bay and including Wager Bay. *Ibid* sch 1.
[276] *Oceans Act*, *supra* note 44, ss 35 and 35.1(2).

Located in the Mackenzie Bay and Mackenzie River estuary in the Beaufort Sea, and designated by regulation in 2010, Tarium Niryutait consists of three marine protected areas, namely Niaqunnaq, Okeevik and Kittigaryuit.[277] The regulations prohibit, among other, the carrying out of activities in the areas, "including depositing, discharging or dumping any substance, or causing any substance to be deposited, discharged or dumped — that is likely to result in the disturbance, damage, destruction or removal of a living marine organism or any part of its habitat".[278] Although the regulations make exceptions for several activities, commercial shipping is not among them.[279] It would appear that, given the inshore locations of the areas, discharges from commercial shipping may not constitute a major issue at this time. However, according to Arctic Shipping Traffic Data maintained by the Arctic Council's Protection of the Arctic Marine Environment (PAME) Working Group suggests that there is some commercial traffic in Tarium Niryutait.[280] However, there is commercial traffic external to but adjacent to the MPA.

Anguniaqvia niqiqyuam consists of two MPAs in the Beaufort Sea established by regulation in 2016.[281] They include "the seabed, the subsoil to a depth of five metres and the water column, including the sea ice, each of which is below the low-water line".[282] The regulations prohibit the carrying out of "any activity that disturbs, damages, destroys or removes … any living marine organism or any part of its habitat or is likely to do so",[283] but they permit navigation in compliance with the *CSA, 2001* and *AWPPA*.[284] Any person that proposes a designated activity in the MPA (scientific research and monitoring, education, commercial marine tourism) must submit a plan that includes, among other, vessel particulars and entry and exit dates, and geographical coordinates. The plan must also disclose

> … a list of any substances that may be deposited during the proposed activity in the Marine Protected Areas — other than substances that are authorized by the *Canada Shipping Act, 2001* and its regulations to be deposited in the navigation of a vessel — and the quantity and concentration of each substance.[285]

---

[277] *Tarium Niryutait Marine Protected Areas Regulations*, SOR/2010-190, ss 2-5.
[278] *Ibid* s 6(b).
[279] *Ibid* s 7. The excepted activities are: fishing; dredging; scientific research, geophysical operations, oil and gas exploratory drilling and production, construction, maintenance and decommissioning of oil and gas pipelines, and other specified ship, submarine and aircraft operations, and public health and safety activities. Some of these activities are moot as in 2019 the federal government introduced a moratorium on offshore oil and gas activities. Order Prohibiting Certain Activities in Arctic Offshore Waters, SOR/2019-280.
[280] Arctic Ship Traffic Data – ASTD (PAME, 2021), online: <https://www.pame.is/projects/arctic-marine-shipping/astd>.
[281] *Anguniaqvia niqiqyuam Marine Protected Areas Regulations*, SOR/2016-280.
[282] *Ibid* s 2(3).
[283] *Ibid* s 3.
[284] *Ibid* s 5.
[285] *Ibid* s 9.

It is interesting to observe that, while the vessels engaged in the designated activities do not need to report substances that may be discharged under the *CSA, 2001*, such as scrubber washwater, other commercial vessels are not mentioned. In any case, it appears that cruise ships operating in the area, as a category of commercial marine tourism, do not need to report the discharge of scrubber washwater.

Established by Ministerial order, the Tuvaijuittuq MPA is located in the waters off northern Ellesmere Island and includes the seabed, subsoil to a depth of five metres, water column and sea ice.[286] The prohibitions include any activity "that disturbs, damages, destroys or removes from the Marine Protected Area any unique geological or archeological features or any living marine organism or any part of its habitat, or is likely to do so".[287] Unlike in other MPAs, the prohibitions in the order do not include discharges. However, permissible activities include "marine navigation by a foreign national, a foreign ship or a foreign state, or an entity incorporated or formed by or under the laws of a country other than Canada".[288]

CNMCA

The *CNMCA* provides for the designation of NMCAs and reserves, with Parks Canada as the responsible agency. NMCAs are established to protect and conserve representative marine areas. While also established for the same purpose, reserves constitute a portion of an NMCA which is subject to aboriginal rights accepted for negotiation by the federal government.[289]

Tallurutiup Imanga (Lancaster Sound) NMCA is the only such protected area designated in the Arctic to date. It overlaps a number of existing protected areas, such as migratory birds sanctuaries and a national wildlife area, but they are not considered part of the NMCA. Tallurutiup Imanga is of particular significance to shipping as it covers a major artery of the Northwest Passage. The NMCA designation is accompanied by the Tallurutiup Imanga National Marine Conservation Area Inuit Impact and Benefit Agreement.[290] The agreement provides for collaboration on marine navigation matters "while respecting the existing legislative and regulatory authorities of Transport Canada to manage marine navigation and Canada's international obligations under bilateral and multilateral agreements with respect to marine

[286] *Order Designating the Tuvaijuittuq Marine Protected Area*, SOR/2019-282, s 2.
[287] *Ibid* s 4(1).
[288] *Ibid* s 4(2).
[289] *CNMCA*, *supra* note 271, s 4.
[290] *Tallurutiup Imanga National Marine Conservation Area Inuit Impact and Benefit Agreement* (1 August 2019), online: <https://www.pc.gc.ca/en/amnc-nmca/cnamnc-cnnmca/tallurutiup-imanga/entente-agreement#article-10>.

navigation matters".[291] The collaboration includes a Joint Arctic Maritime Management initiative to explore management of marine navigation matters within the Arctic, development of best management practices for the cruise ship industry and strengthening of communication with communities with respect to marine vessel movements and navigation matters.[292]

The *CNMCA* prohibits the disposal of any substance in an NMCA except by permit under the Act or *CEPA*.[293] The Governor in Council may make regulations for the control and management of NMCAs and these must be consistent with international law, including when "restricting or prohibiting activities or regulating the use of facilities in marine conservation areas or in any zones" and authorizing waste disposal.[294] More specifically,

> Regulations under this section that restrict or prohibit marine navigation or activities related to marine safety, to the extent that such regulations can be made on the recommendation of the Minister of Transport under the *Canada Shipping Act, 2001* or the *Arctic Waters Pollution Prevention Act*, may only be made on the recommendation of the Minister and the Minister of Transport.[295]

Canada Wildlife Act

Administered by the Minister of the Environment, the *Canada Wildlife Act* provides for the establishment of wildlife areas (areas of public lands) and includes protected marine areas in internal waters, territorial sea and EEZ.[296] Regulatory power under the Act includes the prescription of measures for the conservation of wildlife in protected marine areas,[297] and the Minister is empowered to take measures.[298] The *Wildlife Area Regulations* establish several wildlife areas in Nunavut that include marine waters.[299] They prohibit dumping or deposit of "any waste material, or any substance that would degrade or alter the quality of the environment".[300] The regulations do not provide exceptions for the discharge of waste from ship operations.

---

[291] *Ibid* chap 10, para 10.1.1.
[292] *Ibid* paras 10.2 and 10.3.
[293] *CNMCA*, *supra* note 271, s 14(1).
[294] *Ibid* s 16(1).
[295] *Ibid* s 16(3).
[296] *Canada Wildlife Act*, *supra* note 272, s 4.1.
[297] *Ibid* s 12(i)(iii).
[298] *Ibid* s 4.2.
[299] Akpait National Wildlife Area on Baffin Island and in the Davis Strait, Ninginganiq National Wildlife Area on Baffin Island and in the Davis Strait, Qaqulluit National Wildlife Area on Qaqaluit Island and in the Davis Strait, Nanuit Itillinga National Wildlife Area on Bathurst Island and adjoining waters, and Nirjutiqarvik National Wildlife Area at Coburg Island and all the land covered by water immediately adjacent to the island and extending 10 kilometers from the ordinary high-water mark thereof. *Wildlife Area Regulations*, CRC c 1609, sch 1.
[300] *Ibid* s 3(1)(s).

5. Enforcement

The exercise of enforcement jurisdiction over international shipping must occur in conformity with *UNCLOS*. Thus, in exercising jurisdiction over air pollution offenses, Canada has to consider the limits of its jurisdiction as a coastal and port state. *MARPOL* and Canadian law provide a framework for the enforcement of violations of SOx standards. *MARPOL* includes a port state inspection regime to facilitate compliance and is also enforced in a coordinated manner through regional agreements to which Canada is party. To the extent applicable, various federal statutes and regulations may be applied to sanction violations. These will be discussed next.

5.1 *MARPOL* port state inspections

The *MARPOL* convention sets out general rules to standardize port inspection of ships and which serve to guide Canada's inspection regime.[301] The principle of no more favourable treatment to any ship, regardless of flag, governs the inspection regime.[302] Port inspectors may inspect ship certificates to verify their validity and ensure that the ship and its equipment correspond to the certificate's particulars.[303] Situations where non-compliance produces risks to the marine environment may result in a ship's detention or requirement to proceed to a repair yard. The inspection procedure must be reasonable and not result in undue detention or delay, because in such cases the detaining authority may be required to compensate the ship for the ensuing loss or damage.[304] Port inspectors forward reports of discharges of harmful substances to the flag state.[305]

Annex VI Regulations 10 and 11 deal with port state inspection of air pollution standards. Regulation 10 provides:

> 1. A ship, when in a port or an offshore terminal under the jurisdiction of another Party, is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of air pollution from ships.
> 2. In the circumstances given in paragraph 1 of this regulation, the Party shall take such steps as to ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of this Annex.

[301] *MARPOL*, *supra* note 1, Convention, arts 5-7. Procedures for Port State Control, Assembly Resolution A.1052(27) adopted 30 November 2011; 2009 Guidelines for Port State Control under the Revised MARPOL Annex VI, Resolution MEPC.181(59) adopted 17 July 2009.
[302] *MARPOL*, *supra* note 1, Convention, art 5(4).
[303] *Ibid* art 5(2).
[304] *Ibid* art 7.
[305] *Ibid* art 6(2)-(4).

> 3. Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.
> 4. Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.
> 5. In relation to chapter 4 [energy efficiency regulations], any port State inspection shall be limited to verifying, when appropriate, that there is a valid Statement of Compliance related to fuel oil consumption reporting and International Energy Efficiency Certificate on board, in accordance with article 5 of the Convention.

Thus, inspectors may inspect the bunker delivery note and onboard records concerning fuel use and waste management, such as when entering a SECA, retention of scrubber residue on board, and washwater discharge throughout a voyage. In case of violations, Regulation 11 sets out the following procedures:

> 1. Parties shall co-operate in the detection of violations and the enforcement of the provisions of this Annex, using all appropriate and practicable measures of detection and environmental monitoring, adequate procedures for reporting and accumulation of evidence.
> 2. A ship to which this Annex applies may, in any port or offshore terminal of a Party, be subject to inspection by officers appointed or authorized by that Party for the purpose of verifying whether the ship has emitted any of the substances covered by this Annex in violation of the provision of this Annex. If an inspection indicates a violation of this Annex, a report shall be forwarded to the Administration for any appropriate action.
> 3. Any Party shall furnish to the Administration evidence, if any, that the ship has emitted any of the substances covered by this Annex in violation of the provisions of this Annex. If it is practicable to do so, the competent authority of the former Party shall notify the master of the ship of the alleged violation.
> 4. Upon receiving such evidence, the Administration so informed shall investigate the matter, and may request the other Party to furnish further or better evidence of the alleged contravention. If the Administration is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken in accordance with its law as soon as possible. The Administration shall promptly inform the Party which has reported the alleged violation, as well as the Organization, of the action taken.
> 5. A Party may also inspect a ship to which this Annex applies when it enters the ports or offshore terminals under its jurisdiction, if a request for an investigation is received from any Party together with sufficient evidence that the ship has emitted any of the substances covered by the Annex in any place in violation of this Annex. The report of such investigation shall be sent to the Party requesting it and to the Administration so that the appropriate action may be taken under the present Convention.
> 6. The international law concerning the prevention, reduction, and control of pollution of the marine environment from ships, including that law relating to enforcement and safeguards, in force at the time of application or interpretation of this Annex, applies, *mutatis mutandis*, to the rules and standards set forth in this Annex.

Hence, emissions violations will trigger a procedure that requires the flag state administration to investigate and initiate proceedings. As we saw earlier under *UNCLOS*, violations that occur in the internal waters and territorial sea of the coastal state will also trigger enforcement by the coastal state.

States are expected to take reasonable measures to promote the availability of compliant fuels.[306] If a ship does not have compliant fuel on board, it may be required to demonstrate what actions were taken to achieve compliance, including providing evidence of attempt to purchase compliant fuel on its voyage plan and to locate alternative sources.[307] However, to achieve compliance a ship should not be required to deviate from the intended voyage or to delay the voyage unduly.[308] Competent authorities are encouraged to consider these factors in taking, or not taking, control measures.

The IMO adopted the 2019 Guidelines for Port State Control under MARPOL Annex VI Chapter 3 on emissions from ships, including SOx pollution, with effect as of 1 January 2020.[309] Among other, and of particular relevance to SOx, the port state inspector will examine the IAPPC, written procedures for fuel oil change operations, the approved documentation relating to exceptions and/or exemptions, the approved documentation for any installed scrubber system, the required scrubber system monitoring records, bunker delivery notes and representative samples or records thereof.[310] For ships equipped with a scrubber system, the inspector will look at evidence of appropriate approval of the installed system, evidence of use of the system or compliant fuel, and bunker delivery note on board and sample of representative fuel, for demonstration of compliance.[311] Where there are concerns, the inspector may examine operational procedures to ensure "the master or crew are familiar with the correct operation of an EGCS or other equivalent means on board together with any applicable monitoring and recording, and record keeping requirements".[312] Certain deficiencies may warrant the detention of the ship. These include absence of valid IAPPC, ships not equipped with an equivalent means

[306] *MARPOL*, *supra* note 1, Annex VI, reg 18.
[307] *Ibid.*
[308] *Ibid.*
[309] 2019 Guidelines for Port State Control under MARPOL Annex VI Chapter 3, Resolution MEPC.321(74) adopted 17 May 2019, annex. These revoked the 2009 guidelines. See also Procedures for Port State Control, 2019, Assembly Resolution A.1138(31) adopted 4 December 2019.
[310] 2019 Guidelines for Port State Control, *supra* note 309, para 2.1.2.
[311] *Ibid* para 2.2.1. "If the ship is equipped with an EGCS as an equivalent means of SOX compliance, the PSCO should verify that the system is properly functioning, is in operation, there are continuous-monitoring systems with tamper-proof data recording and processing devices, if applicable and the records demonstrate the necessary compliance when set against the limits given in the approved documentation and applies to relevant fuel combustion units on board. Checking can include but is not limited to: emissions ratio, pH, PAH, turbidity readings as limit values given in ETM-A or ETM-B and operation parameters as listed in the system documentation. *Ibid* para 266.
[312] *Ibid* para 2.6.12.4.

of SOx compliance, ships equipped with equivalent means of SOx compliance do not have an appropriate approval, non-compliance with SECA standards, and lack of master and crew familiarity with essential procedures for the operation of air pollution prevention equipment.[313]

MARPOL state parties also committed to inform those states in whose jurisdiction bunker delivery notes for non-compliant fuel were issued. The expectation is that "remedial action as appropriate is taken to bring noncompliant fuel oil discovered into compliance".[314]

5.2 *Paris and Tokyo Memorandums on Port State Control*

Canada's national maritime administration is party to the *Paris Memorandum on Port State Control* in North Atlantic and European waters and its sister *Tokyo Memorandum on Port State Control for the Asia-Pacific Region* to coordinate enforcement of designated maritime conventions and related instruments through port inspections.[315] *MARPOL* is a major instrument for which there is coordinated inspection. The memorandums enable the sharing of inspection data among the participating maritime authorities, with the consequence that the history of deficiencies facilitates targeting of substandard ships at the next port of call.

From time-to-time, the memorandum parties conduct concentrated inspections focused on specific instruments. In 2018, there was a campaign on *MARPOL* Annex VI to check levels of compliance with new SECA rules.[316] The reports demonstrated a high level of general compliance with fuel rules, although the least favourable results concerned scrubber systems.[317] This was not surprising as the sulphur rule came into effect on 1 January 2020. The rate of compliance since then remains to be determined. The Covid-19 pandemic adversely affected inspections and concentrated campaigns.

---

[313] *Ibid* para 2.7.2.

[314] *MARPOL*, *supra* note 1, Annex VI, reg 8.10.

[315] *Paris Memorandum on Port State Control*, 26 January 1982 (as amended until the 43rd Amendment, adopted 2 October 2020), online: <file:///C:/Users/aechirco/Downloads/Paris%20MoU%20including%2043rd%20amendment%20final%20(1).pdf>; *Tokyo Memorandum on Port State Control for the Asia-Pacific Region*, 11 April 1994 (as amended), online: <http://www.tokyo-mou.org/doc/Memorandum%20rev18.pdf>.

[316] Report of the 2018 Concentrated Inspection Campaign (CIC) on MARPOL Annex VI, Paris MOU on Port State Control, online: <https://www.parismou.org/system/files/Evaluation%20CIC%20on%20MARPOL%20VI%20in%202018%20-%20adopted%20PSCC52.pdf>; Report of the 2018 Concentrated Inspection Campaign (CIC) on MARPOL Annex VI, Tokyo MOU on Port State Control, online: < http://www.tokyo-mou.org/doc/CIC%20MARPOL%20Annex%20VI%20-%20Report.pdf>.

[317] A questionnaire administered as part of the campaign posed the question whether an alternative arrangement, (e.g., scrubber system) was installed on board in accordance with MARPOL Annex VI reg. 4.1 and as approved by the flag State, and 62.2% of respondents answered in the negative. *Paris MOU on Port State Control*, *supra* note 315, at 5.

5.3 Enforcement of offences in Canadian ports and waters

The range of pollution offences in Canada range from indictable offenses, offenses subject to summary conviction, and hybrid offenses (indictable or summary conviction). In turn, these offenses may be characterized as *mens rea* offenses (involving criminal intent)[318] or public welfare offenses that only require the Crown to prove the *actus reus* (the act itself, rather than the intention to commit it or negligence).[319] Public welfare offenses are known as strict liability offenses, although a defense of due diligence is available.[320] Public welfare offenses concern breaches of regulations intended to protect community interests as a matter of public policy, and hence most marine pollution offenses are such offenses and fall under federal jurisdiction.[321] The ship, master and chief engineer may be convicted for an offence "committed by a person on board the vessel, whether or not the person is identified or prosecuted for the offence".[322] Corporations and their directors, officers and agents may also be convicted for vessel-source pollution offenses.

Inspections are an integral component of a regulatory regime intended to promote compliance. Inspectors have broad powers to access the ship, its certificates and records without the need of a search warrant. Marine safety inspectors are appointed under the *CSA , 2001* have inspection powers related to pollution prevention.[323] The Minister of Transport has power to direct a vessel that is in Canadian waters or is in or about to enter internal waters, the territorial sea or the EEZ, to provide information in situations where there are reasonable grounds to believe a vessel may or has discharged a pollutant.[324] The inspector may direct the master of a vessel to stop the vessel or proceed to the place that the inspector may select, and to moor, anchor or remain there for any reasonable period that the inspector may specify.[325] The inspector's powers include asking questions, request machinery or equipment to be put into operation or ceased, direct the master not to move the ship, direct the production of documents for inspection, take photographs and make video recordings, take samples of substances, have computer systems examine data, reproduce records, and copy documents.[326] The powers include seizure and detention of anything in relation to which that the inspector believes a provision has

[318] *R v Beaver*, [1957] SCR 531.
[319] *R v Sault Ste Marie (City)*, [1978] 2 SCR 1299.
[320] *R v Wholesale Travel Group Inc*, [1991] 3 SCR 154.
[321] *R v Crown Zellerbach Canada Ltd*, *supra* note 184.
[322] *R v Motor Vessel Glenschiel*, 2001 BCCA 417 at para 29.
[323] *CSA, 2001*, *supra* note 2008, ss 11(2)(d) and 211(1).
[324] *Ibid* s 189(1)(a).
[325] *Ibid* s 211(3).
[326] *Ibid* s 211(4).

been contravened and that may serve as evidence.[327] Moreover, an inspector may detain a vessel.[328]

Investigations are different as they relate to the determination of criminal liability and those under investigation enjoy *Charter* protection.[329] The Minister of Transport may appoint investigators.[330] The *Criminal Code* provides for powers of arrest, search and seizure,[331] however, the arrest of a foreign ship in an enforcement procedure requires the prior consent of the Attorney-General of Canada.[332] Judges of any court may authorize arrest, entry, search or seizure in relation to an offence committed in the territorial sea or internal waters.[333]

The PPO appointed under the *AWPPA* has similar powers to the marine safety inspector under the *CSA, 2001*.[334] They include the power to board any ship in a shipping safety control zone in Arctic waters, order a ship to proceed outside a zone or to anchor, and order all ships within a specified area of Arctic waters to report their position when a substantial quantity of waste has been or may be deposited in Arctic waters.[335] The PPO also has power to seize a ship with the consent of the Governor in Council.[336]

[327] *Ibid* s 212(1).
[328] *Ibid* s 222(1).
[329] *Canadian Charter of Rights and Freedoms*, s 7, Part I of the *Constitution Act, 1982*, *supra* note 183.
[330] *CSA, 2001*, *supra* note 2008, s 219(1).
[331] *Criminal Code*, RSC 1985, c C-46, s 477.3. *CSA, 2001*, *supra* note 2008, s 220(1) also permits seizure without a warrant in certain circumstances.
[332] *Oceans Act*, *supra* note 44, s 12(2).
[333] *Criminal Code*, *supra* note 331, s 477.3(2).
[334] *AWPPA*, *supra* note 84, s 15.
[335] *Ibid.*
[336] *Ibid* s 23(1).

6. General observations and discussion

This report's review of Canada's regulation of air pollution and scrubber systems to meet the IMO 2020 standard presents a complex picture of the relationship between international regimes, the continuum between international and domestic regimes, and Canadian domestic regimes. While scrubber washwater might come across as a single and confined 'issue', in reality it is an integral part of the larger efforts of regulating vessel-source pollution, pursuing mitigation in response to climate change, and ensuring the protection of marine biological diversity. It cuts across the international law of the sea, international maritime law, and international environmental law. Moreover, the 'issue' triggers important questions in Canada's exercise of jurisdiction over international shipping and especially in the particular legal context of Arctic waters. The response to the problem triggers legal and policy reflection.

Fragmentation

The international regulation of air pollution from ships is fragmented. The IMO has undertaken the development of international standards for SOx, GHGs and HFO largely through parallel regulatory processes, leading to inconsistencies between approaches and measures in climate change mitigation efforts and the regulation of operational vessel-source pollution, as will be further explained below.

The review reveals an even more fragmented picture of the regulation of vessel-source pollution in Canada. Over time, legislation appears enacted in response to or driven by specific issues or mandates of departments, resulting in multiple regulations that are not always coordinated, and resulting in duplications and inconsistencies in the overall legislative scheme. Vessel-source pollution offences are set out in or under the authority of more than one statute (*AWPPA*, *CSA, 2001*, *MBCA*). The vessel-source disposal of waste in the environment is also captured by other environmental statutes (*Canada Water Act*, *CEPA*, *Fisheries Act*) and by marine conservation statutes and regulations (*NMCA*, regulations under the *Oceans Act*).

Hence, the researcher or practitioner seeking an understanding of the full range of laws applicable to vessel-source air pollution has to navigate a complex array of primary and subsidiary legislation, some of which may further referentially incorporate international standards that require examination in turn. The process of developing new or amending existing marine environmental regulations and assessing regulatory impact does not appear to have always produced coherency, consistency and clarity in drafting. Understanding the discharge of scrubber washwater in Arctic waters has additional challenges due to the unique legal environment of the regulation of shipping in those waters.

Inconsistencies

The review has identified inconsistencies in how international and Canadian law address the issues concerning the discharge of scrubber washwater. Inconsistencies in international law are apparent in large part because of the silo approach that frequently guides the development of international conventions and rules thereunder. For example, while the IMO exerts efforts to build the industry's response to climate change and the Paris Agreement goal, and in particular to develop measures in its GHG reduction strategy, it adopted an SOx rule that enables ships using low sulphur fuel oil that appears to increase fuel consumption, and consequently GHG emissions from those ships. Further, the prolonged phase out period for the use and carriage for use of HFO in Arctic waters will extend the period during which emissions of black carbon, a climate forcer and contributor to sea-ice loss, are permissible. In turn, the prolonged use of HFOs in Arctic waters continues the risk of spills, the prevention of which has been an IMO concern at least since the adoption of *MARPOL*. Moreover, while the IMO successfully piloted the development of the *Polar Code*, including higher standards for pollution prevention to protect particularly sensitive marine environments, the continued use of HFO comes across as an antithesis of those efforts in the Arctic context. The continued use of HFO is accompanied by the use of scrubbers that raise a host of environmental concerns, and, moreover, open loop scrubbers produce harmful discharges in the fragile Arctic marine environment.

UNCLOS establishes several environmental obligations for states to protect and preserve the marine environment, including from vessel-source pollution, and not transforming one type of pollution into another. At the same time, *UNCLOS* assigns to the IMO the competence for the regulation of vessel-source pollution, and as long as IMO standards are generally accepted, they guide all states in regulating vessel-source pollution. Unfortunately, the IMO SOx regulation, and the legitimation of the discharge of harmful scrubber washwater in particular, has created a situation whereby the substitution of one type of pollution for another has become a generally accepted, albeit controversial practice. This situation appears to be placing states parties to *UNCLOS* and other international environmental law conventions in a legal and policy conundrum, because of conflicting duties under different treaties.

Canadian law reflects these inconsistencies to some extent. The discharge of waste as an offence under the various environmental statutes is not always coordinated with discharges that are permissible under the *CSA, 2001*. While the *CEPA*, *Fisheries Act* and *MBCA* exclude operational discharges permitted by or under the *CSA, 2001*, the *Canada Water Act* does not. Further, there appears to be a disconnect between Transport Canada's Policy on Enforcement of

the Canada Shipping Act, 2001 and the Arctic Waters Pollution Prevention Act[337] and the *AWPPA* and *CSA, 2001*. The Policy stipulates that "[S]hip owners, operators, authorized representatives, masters and crew are obliged to operate their vessels in accordance with the provisions of the *CSA 200*1 and the *AWPPA*, as well as regulations made pursuant to those Acts."[338] For enforcement purposes,

> Marine safety inspectors and pollution prevention officers are responsible for recommending and taking enforcement action in accordance with their statutory authorities, delegated powers, and this Policy and its related procedures published by TCMSS in the Enforcement Manual.[339]

However, there is inconsistency between the *AWPPA* and *CSA, 2001* in their application to the discharge of scrubber washwater in the Arctic context. This inconsistency leaves room for ambiguity in enforcement. While the *AWPPA* prohibits discharges other than those permitted by the Act (for example in compliance with the *Polar Code* as amended by the *ASSPPR*), the *VPDCR* under the authority of the *CSA, 200*1 permit the operation of scrubber systems that involve discharge of contaminated washwater that is not a permissible discharge under the *AWPPA*. The consequences for the ship and persons operating a scrubber system can be substantial. Under the *AWPPA* the discharge of waste in Arctic waters is an absolute liability offence, leaving no room for the due diligence defence, whereas that defence is available to *CSA, 2001* section 187 offenders.

Outdated provisions

Perhaps surprisingly, given Canada's active participation in the IMO and subscriptions to most international maritime conventions, a number of provisions in the *CSA, 2001* appear out of date. The definition of pollutants in section 185 of the *CSA, 2001* does not include air emissions, despite Canada's full support for *MARPOL* Annex VI. The definition could potentially also include scrubber washwater that does not comply with the IMO 2009 Guidelines as referentially incorporated and made mandatory under the *VPDCR*. Moreover, the *VPDCR* do not appear to be up to date with respect to their referential incorporation of IMO guidelines on EGCS. The regulations continue to rely on the 2009 version of the guidelines, although the IMO revised those guidelines and produced an updated version in 2015.

---

[337] Policy on Enforcement of the Canada Shipping Act, 2001 and the Arctic Waters Pollution Prevention Act, TP 13585 E, online: <https://tc.canada.ca/en/marine-transportation/marine-safety/enforcement-canada-shipping-act-2001-arctic-waters-pollution-prevention-act>.
[338] *Ibid* para 2.3.
[339] *Ibid* para 5.3.

Gaps

The *AWPPA*'s definition of waste for the purpose of regulating waste management in Arctic waters is lacking in an important respect. It does not include air pollution from ships that ultimately deposits in Arctic waters and on sea ice. This is a concern for both Indigenous peoples and the environment in Arctic waters, most especially as shipping increases. At the time of the adoption of the Act in 1970, the IMO was only beginning to grapple with the magnitude of vessel-source pollution and it would not be before 1997 that it would adopt the first rules on air pollution from ships. Since then much has changed, and yet the *AWPPA* has not kept pace.

Another gap in international and domestic air pollution regulation is the absence of a dedicated standard on air pollution in Arctic waters. The applicable emission standards to waters north and south of 60 degrees North are different, with the lower standards applicable to waters north of 60 degrees. The laudable establishment of NAECA through the IMO and in cooperation with the United States aims at reducing harmful emissions to promote the public health of coastal populations and environment protection south of 60 degrees. The NAECA has significantly tightened the standard for SOx emissions for Canadian waters in the North Atlantic, Pacific and Great Lakes regions. When NAECA was adopted, the SOx emissions in North American waters were expected to drop by 90 percent. The lower standard applicable in Arctic waters potentially exposes Indigenous and other communities in the North to reduced air quality and related health consequences as shipping continues to grow.

There is a growing scientific consensus that scrubber washwater degrades the marine environment because of its contribution to ocean acidification and toxicity. Scrubber washwater is a pollutant and states have a fundamental international legal obligation to prevent pollution of the marine environment. There was uncertainty on the environmental impact of scrubber washwater when the rule on equivalent ways of compliance was adopted at the IMO, and consequently the three editions of the IMO guidelines for EGCS do not consider restrictions on discharge, other than setting out criteria for monitoring and recording. In comparison, the residue in closed loop systems must be discharged to port reception facilities. Given the heightened concern over the environmental impacts of the discharge of washwater, and the special sensitivity of Arctic waters, it would appear that international and Canadian domestic prohibition of its discharge in Arctic waters is called for.

Opportunities

Despite the fragmentation and inconsistencies, Canada is in a position to close the regulatory gaps. Ideally, Canada should work closely with other states at the IMO to address the problem of pollution from scrubber washwater.

Canada could potentially do more than just regulate scrubber washwater. It could further consider scaling up air pollution standards in its Arctic waters. Canada is in a position to address the air pollution regulatory gap by cooperating with the United States as its closest neighbour and acting through the IMO. The two states are in a position to request the IMO to extend the NAECA to include their Arctic waters.

Canada would not be on its own in scaling up standards for the discharge of scrubber washwater. There is growing state practice to support a Canadian initiative. Several other jurisdictions have now banned the discharges in their ports and inland waters, and a few even in the territorial sea. These include: Bahrain (in port or at anchor), Belgium (port, inland waters), Belize (port waters and territorial sea), Bermuda (territorial sea), California, Connecticut, China (port area of the Coastal Control Area, Inland River Control Area and Bohai Area), Egypt (Suez Canal), Finland (Porvo), France (a number of specified ports), Germany (Rhine and inland waterways), Ghana, Gibraltar, Ireland (Dublin, Waterford and Cork), Kenya (all ports), Malaysia (territorial sea), Mauritius (all ports), Mozambique (Nacala), Norway (World Heritage Fjords sea areas of Geirangerfjord and Nærøyfjord), Oman (ports and territorial waters), Pakistan (Karachi and Bin Qasim), Panama (Panama Canal), Portugal (all ports), Qatar (Mesaieed Industrial City), Romania (all ports), Saudi Arabia (port), Singapore, Slovenia (all ports), Spain (Algeciras, Barcelona (at berth), Bilbao, Cadiz, Cartagena, Huelva and Canary Islands), Sweden (Gothenburg, Stockholm, Trelleborg and Petroport, Stenungsund), Turkey (all ports), United Arab Emirates (Fujairah and Dubai), United Kingdom (Forth and Tay), and Washington (Seattle).[340] Other states permit conditional discharges. Norway, Panama and the United Arab Emirates have banned the use of open loop scrubbers altogether.[341] In Canada, the Port Sept-Iles in Quebec has banned the use of open loop scrubbers within port limits.[342]

At a minimum, as a flag state Canada can introduce such a ban on the discharge of scrubber washwater for domestic Arctic shipping, which is subject to cabotage reserved for

[340] ClassNK, regional regulations, online: <https://www.classnk.or.jp/hp/pdf/activities/statutory/soxpm/dl/regionalregulations_e.pdf>; North, No Scrubs: Countries and Ports where Restrictions on EGCS Discharges Apply (19 March 2021), online: <https://www.nepia.com/industry-news/no-scrubs-more-ports-declare-ban-on-egcs-discharges-update/>.

[341] *Ibid.*

[342] Iron Ore Company of Canada, Notice to Ships Bound for Sept-Isles (2021), online: <http://www.ironore.ca/data/65-iocv5/ressources/documents/sys_docs/notice_to_ship_bounds_-_2021_-_ver3.pdf>.

Canadian-flagged vessels.[343] As a coastal and port state, Canada enjoys sovereignty over its internal waters and may impose conditions for ships on entering those waters, which could include zero discharge. Either it could require ships in internal waters to use only compliant fuels or, if equipped with a hybrid system, they would need to switch from open to closed loop operations.[344] As Canada has invested heavily in maritime safety in the region through the Oceans Protection Plan and is currently considering the establishment of low-impact navigation corridors in its Arctic waters in consultation with Indigenous peoples,[345] such a regulatory initiative is appropriate and timely.

A potential constraint for Canada is the uncertain international legal status of the waters of the Arctic archipelago enclosed by straight baselines. One possible course of action is to impose the ban on the discharge of scrubber washwater as an exercise of its sovereignty over those waters, much as it did with the enactment of the *AWPPA* and conversion of *NORDREG* ship reporting to a mandatory system. Diplomatic protest from the United States and some European states, and possibly others is possible, but that is a cost of the exercise of Canadian Arctic sovereignty. Canada could time the move with the formal designation of low-impact corridors that will provide a range of services to international shipping.

The legal situation in the territorial sea is different. While Canada has the right to regulate innocent passage in the territorial sea to prevent, reduce and control marine pollution, the regulations "shall not apply to the design, construction, manning or equipment of foreign ships unless they are giving effect to generally accepted international rules or standards".[346] With respect to straits used for international navigation, the ability to regulate is limited to "the prevention, reduction and control of pollution by giving effect to applicable international regulations regarding the discharge of oil, oily wastes and other noxious substances in the strait."[347] *MARPOL* Annex VI and the IMO guidelines on EGCS set out the international standards that Canada is bound to apply. It is appropriate for Canada to encourage the IMO to review the

[343] *Coastal Trading Act*, SC 1992 c 31.

[344] There are limits to the duration of ship's ability to operate in a closed closed-loop mode without discharging effluent. Hence, if Canada were to introduce a zero-discharge rule for scrubber washwater in Arctic waters, ship operators might well have to use only compliant fuel.

[345] "The Corridors initiative seeks to minimize the potential cumulative impact of marine transportation on northern ecosystems and communities through the identification of priority areas for service enhancement and investment." PAME, Low-Impact Shipping Corridors Project Report, Arctic Council SAO Meeting, 16-18 March 2021, Reykjavik, Iceland (18 February 2021), at 10, online: <https://oaarchive.arctic-council.org/bitstream/handle/11374/2560/SAOIS203_2021_RVK_Virtual1-InfoDoc_PAME-Arctic-Safe-Low-Impact-Marine-Corridor-Initiatives-Final-Report.pdf?sequence=1&isAllowed=y>.

[346] *UNCLOS*, *supra* note 43, arts 21(2) and 211(4).

[347] *Ibid* art 43(1)(b).

regulation of scrubber washwater so that a new generally accepted international rule and standard will emerge.

Similarly, Canada's exercise of environmental prescriptive jurisdiction in the EEZ must give effect to "generally accepted international rules and standards" established through the IMO.[348] As discussed earlier, *UNCLOS* Article 234 provides Canada with the exceptional opportunity to regulate scrubber washwater discharge in its EEZ in Arctic waters without necessarily applying IMO standards. In doing so, it would have to justify the regulatory move on the basis of the best available scientific evidence. However, in this author's view, acting to trigger legal development through the IMO is desirable to ensure a consistent international standard for discharges in all ocean spaces.

7. Conclusion

There is growing recognition among scientists and maritime regulators that the discharge of scrubber washwater from open loop systems and hybrid systems operating in open loop mode into the marine environment is a new form of pollution triggered by IMO 2020 that requires attention. Closed-loop systems are also of concern as their bleed-off has the potential to degrade water quality. Even if there is scientific uncertainty on impact of washwater on the marine environment, the precautionary approach in international environmental law suggests that action to avoid environmental degradation is required.[349] In any case, the use of scrubbers does not reduce total air pollution to the same degree as distillates and perpetuates the risk of catastrophic spills.

The discharge of this pollutant is of special concern in Arctic waters, which hosts sensitive unique ecosystems and species that are currently under great stress because of the impacts of climate change and exponential sea ice loss. Shipping and other industrial uses are increasing because the region is becoming more accessible and for longer periods, thus adding further stressors. Canadian Arctic waters are the homeland of Inuit who enjoy fundamental rights to their ancestral lands, territories and resources. These rights are pre-eminent and therefore not secondary to the region's industrialization. *UNCLOS,* other instruments of international environmental law, and *UNDRIP* as evidence of general international law pose duties for Canada,

[348] *Ibid* art 211(5).

[349] "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." *Rio Declaration on Environment and Development*, UN Doc A/CONF.151/26 (Vol. I) (12 August 1992), principle 15.

its Arctic neighbours and other user states to act to protect the Arctic marine environment. The problem calls for action at the international and domestic levels.

Rather than rely on ambiguity in international law to leave existing practices unchanged, As a major Arctic state, Canada is well-positioned to exercise leadership to help reconcile inconsistencies in international law to better guide state practice. Canada has international legal obligations and a moral duty to act on a threat to the marine environment and to protect the health and well-being of Indigenous peoples. While an initiative to resolve the regulatory problem posed by scrubber washwater clearly should be launched in the IMO, Canada should also coordinate such an initiative with Arctic states through the Arctic Council. The successful cooperation facilitated by PAME during the development of the *Polar Code* should serve as an example for how the initiative could proceed, namely by first consulting Arctic states and then proceeding to act through the IMO.

While Canada should preferably consider addressing the problem through multilateral rather than a unilateral approach, it should still take action at the domestic level. It should consider reviewing the regulation of air pollution from ships and scrubber systems to prevent the risk of environmental degradation from the use of scrubbers, especially in Arctic waters. This report identified statutory and regulatory issues and gaps that ought to be addressed to better guide compliance and enforcement. Such a review should ensure coherency, consistency and clarity in Canadian regulation of air pollution from ships and use of scrubbers.