

NOTES

The Polar Express Lane: Promoting Cleaner Shipping in The Northwest Passage

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* Georgetown Law, J.D. 2016. © 2017, Maryanne Mundy. Special thanks to Professor Jennifer Hillman, whose enthusiasm, encouragement, and guidance helped me develop an idea into a finished note. Additionally, I would have floundered without the expert assistance of Mabel Shaw and the GULC law library staff. I would also like to thank Professors Edith Brown Weiss, Martin Davies, Gunther Handl, David Freestone, and Francois Baillet for the foundational knowledge that sparked this idea. LCDR (Ret.) Ken Smith of the United States Coast Guard was very generous with both his time and information regarding LNG as marine fuel, and Nils Djusberg of M.E.B.A. helped tremendously with insights into the practicalities of shipping and merchant marine operations. Please direct questions or comments to MGM80@georgetown.edu.

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INTRODUCTION

I. PROLOGUE

“Victory awaits him who has everything in order. Defeat is certain for him who has neglected to take the necessary precautions in time.” —Roald Amundsen

In the early 1900s, renowned Norwegian explorer Roald Amundsen, the first man to reach both poles of the earth, bravely navigated the dangerous waters of the Northwest Passage—the passage between the Atlantic and Pacific Oceans through the waters north of the Canadian mainland.¹ In the hundred years since, fewer than 200 vessels successfully completed the same journey.² But that is about to change. One bright spot amidst the horrors of climate change might be the opening of this fabled route. However, the time to consider an appropriate legal regime for the region is now. Scientists predict the Northwest Passage could be open to year-round navigation in the next 15 years, as early as 2030.³ Considering that it took 21 years from the UN Conference on the Law of the Sea in 1973 to when the Convention entered into force in 1994,⁴ and the Polar Code took 24 years from the time an International Maritime Organization

1. STEPHEN R. BROWN, *THE LAST VIKING* 4, 55–90, 212–225 (Da Capo Press 2012); *see generally* ROALD AMUNDSEN, *THE NORTH-WEST PASSAGE: BEING THE RECORD OF A VOYAGE OF EXPLORATION OF THE SHIP “GJOA” 1903–1907*, (Elibron Classics 2006).

2. There were 69 transits between 1903–2005. David L. VanderZwaag, *Canada and the Governance of the Northwest Passage: Rough Waters, Cooperative Currents, Sea of Challenges*, *NAVIGATING STRAITS* 87, 101 (David D. Caron & Nilufer Oral eds., 2014). As of 2014 there have been 220 transits. R.K. Headland, *TRANSITS OF THE NORTHWEST PASSAGE TO END OF THE 2014 NAVIGATION SEASON 2*, <http://www.americanpolar.org/wp-content/uploads/2014/10/NWP-2014-X-5-layout-for-PDF.pdf> (last visited Nov. 12, 2016).

3. Thomas J. Snape & Piers M. Forster, *Decline of Arctic Sea Ice: Evaluation and Weighting of CMIP5 Projections*, 119 *J. GEOPHYS. RES. ATMOS.* 546 (2014), <http://onlinelibrary.wiley.com/doi/10.1002/2013JD020593/full> (last visited Nov. 12, 2016); James E. Overland & Muyin Wang, *When Will the Summer Arctic be Nearly Sea Ice Free?*, 40 *GEOPHYS. RES. LETTERS*, 2097 (2013), <http://onlinelibrary.wiley.com/doi/10.1002/grl.50316/full>.

4. *The United Nations Convention on the Law of the Sea (A Historical Perspective)*, UNITED NATIONS DIVISION FOR OCEAN AFFAIRS AND THE LAW OF THE SEA, http://www.un.org/depts/los/convention_agreements/convention_historical_perspective (last visited Nov. 12, 2016) [hereinafter *Historical Perspective*].

working group was convened in 1993 until its expected entry into force in 2017,⁵ the clock is ticking for the development of international laws to deal with possible Northwest Passage traffic.

One commentator has noted that “[t]he most important thing for people to know about the governance of the Arctic is that we have a chance now to act to maintain the integrity of the system or to lose it.”⁶ Unregulated shipping transit threatens the Arctic system through emissions which blacken the ice, inducing global warming by reducing albedo,⁷ as well as adding to the already abundant level of greenhouse gasses in our atmosphere. Unregulated shipping also threatens the Arctic system by increasing the risk that fuel oil could be released hundreds of miles and days away from any emergency cleanup response.⁸

In short, use of this fragile region demands regulation. But regulations can strangle innovation and industry. International shipping is too important to the world economy to preclude use of what may be an economically efficient shortcut through the Arctic. What is needed is a legal regime that recognizes the importance of the Northwest Passage as a trade route, while protecting the Arctic’s ecological system. Technological innovation coupled with the resourceful use of international law can accomplish these objectives.

Instead of a new international instrument, this Note proposes how existing instruments could be adapted, in keeping with sound principles of ocean governance, to protect the Northwest Passage from some of the greatest risks to its environmental integrity—oil and emissions. By restricting oil as both cargo⁹ and bunker fuel,¹⁰ emissions that threaten the environment would be nearly eliminated, and the chance of a devastating oil spill greatly reduced. Restrictions on traditional oil-based fuels and propulsion methods will also further incentivize

5. LAWSON BRIGHAM, ARCTIC CLIMATE CHANGE ECONOMY AND SOCIETY (ACCESS) POLICY BRIEF NO.43, http://www.access-eu.org/modules/resources/download/access/fichiers_pdf/ACCESS-PolicyBrief4-Final.pdf (last visited Jan. 15, 2016).

6. Eleanor Imster, *Sylvia Earle: An Open Ocean in Arctic Summer*, EARTHSKY (Sept. 1, 2011), <http://earthsky.org/earth/sylvia-earle-an-open-ocean-in-the-arctic-in-summer> (quoting Sylvia Earle, Marine Biologist, National Geographic Explorer-in-Residence, 1998 Time Magazine Hero of the Planet, founder of Mission Blue).

7. Albedo is reflected solar radiation. Arctic ice cover functions as a reflective mechanism due to its light colored surface area. Randall S. Abate & Dr. Sarah Ellen Krejci, *Climate Change Impacts on Ocean and Coastal Law: Scientific Realities and Legal Responses*, CLIMATE CHANGE IMPACTS ON OCEAN AND COASTAL LAW 1, 4 (Randall S. Abate ed., Oxford 2013); See also John E. D. Larkin, *UNCLOS and the Balance of Environmental and Economic Resources in the Arctic*, 22 GEO. INT’L ENVTL. L. REV. 307 (2010).

8. DET NORSKE VERITAS, HEAVY FUEL IN THE ARCTIC (PHASE 1) 40 (Jan. 18, 2011), http://www.pame.is/images/03Projects/AMSA/Heavy_Fuel_in_the_Arctic/Phase_I_HFO_project_AMSA_rec_IB-Final_report.pdf [hereinafter DNV REPORT PHASE I].

9. Restrictions on oil tankers (carrying oil as cargo) are being contemplated, but discussion of the issue is outside the scope of this Note. VanderZwaag, *supra* note 2 at 116, 119.

10. “Bunker fuel” or “bunker oil” refers to the fuel supply needed to power the ship, similar to gasoline in a car. “Bunkering” is the process of transferring fuel to a ship. *Bunkering Oil on the Ship*, BRIGHT HUB ENGINEERING, <http://www.brighthubengineering.com/marine-engines-machinery/33665-bunkering-oil-on-the-ship/> (last visited on Feb. 27, 2017).

the development of alternative fuels and alternative power for cargo ships.¹¹

A. THE NORTHWEST PASSAGE

The Northwest Passage consists of various routes through the Western Arctic islands connecting the Labrador Sea, Baffin Bay, and Davis Strait in the east with the Beaufort Sea, Chukchi Sea, and Bering Strait in the west.¹² Because this Note focuses on commercial shipping, only the route most suitable for deep draught navigation will be considered. This route proceeds east to west through Baffin Bay (approximately 59 nautical miles (“nm”) to 350nm wide), the Barrow Strait (approximately 27nm to 57nm wide), Viscount Melville Sound (approximately 52nm to 64nm wide), the M’Clure Strait (approximately 64 to 87nm wide), to the Beaufort Sea.¹³ None of these bodies is narrow enough to be considered wholly territorial sea, which has a delimitation of 12nm from the coast.¹⁴ The Northwest Passage route transverses the Exclusive Economic Zones of Greenland, Canada, and the United States, linking the High Seas of the Atlantic and Pacific on either end, thus meeting the definition of an International Strait under the United Nations Convention on the Law of the Sea. This is contested by Canada, as will be discussed below.

Use of the Northwest Passage would considerably shorten voyages from the Atlantic to the Pacific. The Passage is over 6,400 miles shorter than existing routes from Eastern Asia to Europe through the Panama Canal and over 4,400 miles shorter than routes from Eastern Asia to Europe through the Suez Canal.¹⁵ In 2013, the Danish ship *Nordic Orion* completed the journey from Vancouver to Finland through the Passage, saving about \$200,000 and four days’ transit time.¹⁶ Coupled with recent Panama Canal delays of up to ten days,¹⁷ shipping companies and carriers using the Northwest Passage stand to cut transit time by as much

11. State-imposed financial penalties and economic incentives in Norway were a primary driver in alternative marine fuel adoption in that country. DET NORSKE VERITAS (U.S.A.), INC., LIQUEFIED NATURAL GAS BUNKERING STUDY 24 (Sep. 3, 2014), <http://www.marad.dot.gov/wp-content/uploads/pdf/DNVLNGBunkeringStudy3Sep14.pdf> [hereinafter DNV BUNKERING REPORT].

12. DONAT PHARAND, CANADA’S ARCTIC WATERS IN INTERNATIONAL LAW, 187–88 (Cambridge University Press 1988) [hereinafter PHARAND 1988].

13. *Id.* at 194–95.

14. United Nations Convention on the Law of the Sea pt. II, sec. 2, art. 3, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].

15. MarEx, *Arctic Ice Still Too Thick for Shipping*, MARITIME EXECUTIVE (Oct. 1, 2015), <http://maritime-executive.com/article/arctic-ice-still-too-thick-for-shipping>; D.K. Perovich, *The Changing Arctic Sea Ice Cover*, OCEANOGRAPHY 24(3):162–173, available at <http://dx.doi.org/10.5670/oceanog.2011.68> (last visited Jan. 16, 2016); Larkin, *supra* note 7, at 322.

16. Paul Waldie, *A Reality Check on the Northwest Passage “boom.”* GLOBE AND MAIL (Jan. 7, 2014), <http://www.theglobeandmail.com/report-on-business/breakthrough/will-cold-dark-northwest-passage-see-more-ships/article16231502>.

17. Reynolds Hutchins, *Delays of 10 Days Reported at Panama Canal*, J. COM. (Nov. 4, 2015) http://www.joc.com/maritime-news/container-lines/delays-10-days-reported-panama-canal_20151104.html.

as a third,¹⁸ saving millions of dollars annually. Visions of a Northwest Passage “express lane” intrigue scientists and shippers alike.¹⁹ However, environmental concerns permeate discussions about use of the Northwest Passage²⁰ and underlie national sovereignty claims on the region.²¹ Of particular concern is the effect an oil spill would have on this delicate and remote ecosystem.²²

B. LIQUEFIED NATURAL GAS AS FUEL

Another recent development in shipping is the “LNG revolution.”²³ As of April 2015, fifty-nine liquefied natural gas (“LNG”) ships were in use, with over eighty under construction.²⁴ Because of new restrictions on emissions, including restrictions on nitric oxides (“NOx”) and sulfur oxides (“SOx”), shipowners, shipping companies, and carriers face the dilemma of either switching to expensive distillate fuels²⁵ or installing expensive mitigating technologies such as scrubbers and catalytic reduction and recirculation systems.²⁶ Due to its lower price, as well as its lower emissions of SOx and NOx, LNG has become an attractive choice for newbuilds and has also prompted the conversion of ships that previously used heavy fuel oil.²⁷ In 2015 alone several leading shipping and shipbuilding companies launched or ordered LNG-fueled ships.²⁸ These companies have

18. Jonathan Masters, *The Thawing Arctic: Risks and Opportunities*, COUNCIL ON FOREIGN REL. (Dec. 16, 2013), <http://www.cfr.org/arctic/thawing-arctic-risks-opportunities/p32082>.

19. Robert S. Reid, *The Canadian Claim to Sovereignty over the Waters of the Arctic*, 12 CAN. Y.B. INT’L L. 111, 118 (1974).

20. Donald R. Rothwell & Christopher C. Joyner, *Domestic Regulation of the Marine Environment*, in PROTECTING THE MARINE POLAR ENVIRONMENT LAW AND POLICY FOR POLLUTION PREVENTION 152 (Davor Vidas ed., 1st ed. 2000).

21. *Id.*

22. DNV REPORT PHASE I, *supra* note 8, at 38.

23. Wendy Laursen, *The LNG-as-Fuel Revolution*, THE MARITIME EXECUTIVE (Oct. 23, 2015), <http://maritime-executive.com/article/the-week-in-review-the-lng-as-fuel-revolution>; Joseph Keefe, *Mondays with Maitland: LNG Boom on the Horizon*, MARITIME TV ON MARITIME PROFESSIONAL (Aug. 22, 2016), <http://www.maritimeprofessional.com/blogs/post/mondays-with-maitland-lng-boom-on-the-horizon-15155>.

24. CHRIS CHRYSYSAKIS, HENDRIK BRINKS, AND TOBIAS KING, THE FUEL TRILEMMA: NEXT GENERATION OF MARINE FUELS, DNV GL STRATEGIC RESEARCH & INNOVATION POSITION PAPER 20 (2015) [hereinafter TRILEMMA].

25. Distillate fuel refers to gasoline-heavy fuel oil blends, which cost almost double traditional, heavy oil bunker fuels. AMERICAN BUREAU OF SHIPPING, BUNKERING OF LIQUEFIED NATURAL GAS-FUELED MARINE VESSELS IN NORTH AMERICA 10 (2014) [hereinafter ABS REPORT].

26. CHRIS CHRYSYSAKIS, *Alternative Fuels for Shipping*, in IN FOCUS—LNG AS SHIP FUEL 8, https://www.dnvgl.com/Images/DNV%20GL_LNG%20Report%202015_tcm8-24903.pdf; ALEXANDROS CHIOTOPOULOS, GERD-MICHAEL WURSIG & ATLE ELLEFSEN, *Retrofitting Cruise Ships to LNG by Elongation: A Crazy Idea?*, in LNG AS SHIP FUEL: THE FUTURE—TODAY 18, <https://www.dnvgl.com/news/new-dnv-gl-report-lng-as-ship-fuel-the-future-today-4685>.

27. TRILEMMA, *supra* note 24.

28. Gothia Tanker Alliance, Harvey Gulf International Marine, Crowley Maritime, General Dynamics and Daewoo, as well as undisclosed others. GLADSTEIN, NEANDROSS, AND ASSOCIATES, LNG OPPORTUNITIES FOR MARINE AND RAIL 1 (2014); Laursen, *supra* note 23.

developed LNG containerships,²⁹ cruise ships,³⁰ and offshore supply vessels.³¹ 2016 saw a rapid increase in the number of LNG-powered car carriers, cruise ships, offshore supply vessels, cargo ships, containerships, ferries, and tugs.³² This technology holds the promise of savings over oil as a fuel; one that would not require expensive technology to meet new emissions regulations.³³ However, LNG ships cost around 30% more to build than traditionally fueled ships.³⁴

The production and use of LNG is not without controversy. Extraction methods are controversial for both environmental reasons and NIMBYism.³⁵ The public's fears of explosion and fire have fanned community opposition to the transportation of LNG as well as LNG bunkering terminals.³⁶ Although the use of LNG has a strong record of safe use,³⁷ it carries unique risks³⁸ and requires a heavy dose of domestic and international regulation for safe ship design and shore-side facilities.³⁹

C. SCOPE OF THIS NOTE

This Note proposes a single solution to both of these issues: a “Polar Express Lane” (“PEL”), which may only be used by ships using alternative (non-oil-based) fuels or alternative propulsion methods. This concept is similar to “Clean Pass” and “Clean Special Fuel Plates” schemes that allow automobiles on U.S. highways to take advantage of “High Occupancy Vehicle/Clean Air Vehicle (“HOV/CAV”)” express lanes. These programs were developed to stimulate the production and use of alternatively fueled cars by allowing them to use specially designated express lanes on certain roads, thus rewarding the owners of cleaner vehicles with reduced commuting time.

This Note will explore the existing international instruments related to regulations for the physical characteristics of ships, special environmental areas, and oil

29. MarEx, *World's First LNG-Powered Containership Delivered*, THE MARITIME EXECUTIVE (Oct. 15, 2015), <http://maritime-executive.com/article/worlds-first-lng-powered-container-ship-delivered>; Eric Haun, *TOTE's 2nd LNG Containership Launched*, MARITIME PROFESSIONAL (Aug. 31, 2015), <http://www.maritimeprofessional.com/news/totes-containership-launched-277064>.

30. MarEx, *Carnival Orders World's First LNG-Powered Cruise Ships*, THE MARITIME EXECUTIVE (June 15, 2015), <http://maritime-executive.com/article/carnival-orders-worlds-first-lng-powered-cruise-ships>.

31. Laursen, *supra* note 23; DNV BUNKERING REPORT, *supra* note 11, at 22.

32. *LNG Fuel Archives*, GCAPTAIN, www.gcaptain.com/tag/lng-fuel (last visited Oct. 14, 2016).

33. ABS REPORT, *supra* note 25.

34. *Id.* at 21.

35. NIMBY is an acronym for “Not In My Backyard”; DNV BUNKERING REPORT, *supra* note 11, at 29–30. Controversy surrounding hydraulic fracturing and other aspects of the LNG supply chain is significant, but outside the scope of this Note. Although these concerns are not without merit, the environmental impact of LNG extraction and transport can be mitigated. International trade depends on shipping, which at present requires fuel, and LNG is the most viable and environmentally friendly fuel choice currently available.

36. *Id.*

37. ABS REPORT, *supra* note 25, at 12.

38. *Id.*

39. Guidance: Use of Liquefied Natural Gas as a Marine Fuel, 80 Fed. Reg. 10,131 (Feb. 25, 2015).

pollution. Then, it will show how existing instruments can be modified to prohibit oil-powered ships from transiting the Northwest Passage, instead of creating a wholly new treaty or multilateral agreement. It will also present the various maritime territorial disputes in the region and how they might be resolved under the Law of the Sea and customary international law, especially when nations are motivated by the reduced environmental concerns these restrictions would accomplish. Restrictions on bunker fuels are a realistic possibility if sovereignty claims can be quieted, polar class requirements can be amended, and the Northwest Passage is designated as a special area. A lengthy and difficult new international convention is not necessary.

II. BACKGROUND

A. SHIPPING GENERALLY

Today, waterborne trade is the means by which we receive at least 90% of the things we buy.⁴⁰ In 2011, U.S. ports alone took in more than \$1.7 trillion worth of goods.⁴¹ In 2014, world seaborne trade moved 9.8 billion metric tons of cargo.⁴² Waterborne transportation employs millions of seafarers worldwide⁴³ and employs a vast number of workers in ports and land-based offices.⁴⁴ An international organization with cognizance over the subject matter notes that “[w]ithout shipping, the import/export of affordable food and goods would not be possible—half the world would starve and the other half would freeze!”⁴⁵ Shipping is the most used and also the most environmentally friendly method of transporting goods over distance.⁴⁶ It takes less fuel to move a container by ship from China to France than to move that same container by truck from the shipping terminal to a store in the downtown shopping district.⁴⁷

The shipping industry recently garnered much criticism from environmentalists during the Paris COP21 discussions in December of 2015.⁴⁸ There was

40. ROSE GEORGE, *NINETY PERCENT OF EVERYTHING* 3 (2013).

41. *Id.*

42. UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT, *WORLD SEABORNE TRADE BY TYPES OF CARGO AND COUNTRY GROUPS, ANNUAL 1970–2015*, <http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=32363> (last visited Jan. 16, 2016).

43. *Shipping and World Trade*, INT’L CHAMBER OF SHIPPING, <http://www.ics-shipping.org/shipping-facts/shipping-and-world-trade> (last visited Jan. 18, 2016).

44. Interview with James E. Caponiti, President of the American Maritime Congress, in Washington, D.C. (Jan. 14, 2016); *see also* GEORGE, *supra* note 40.

45. *Shipping Facts*, INT’L CHAMBER OF SHIPPING, <http://www.ics-shipping.org/shipping-facts/shipping-acts> (last visited Jan. 16, 2016).

46. BRUCE FARTHING, *FARTHING ON SHIPPING*, 15 (Proshanto K. Mukherjee and Brownrigg eds., 4th ed. 2013).

47. GEORGE, *supra* note 40, at 91–92.

48. Megan Darby, *Paris Climate Deal Must Tackle Shipping Emissions, Say Experts*, CLIMATE HOME (May 12, 2015, 4:01 PM), <http://www.climatechangenews.com/2015/12/05/paris-climate-deal-must-tackle-shipping-emissions-say-experts>.

widespread outcry from environmental groups that shipping was left out of the COP21 documents.⁴⁹ What these groups fail to realize is that shipping emissions *are* regulated—through shipping-specific international agreements such as MARPOL.⁵⁰ COP21 and the Kyoto protocol are not the appropriate fora for these discussions. Second, a widely-touted statistic claiming that shipping was responsible for emissions equivalent to all of Germany ignores the sheer magnitude of the world fleet.⁵¹ There are over 50,000 merchant vessels currently at sea.⁵² When the size of the world fleet is viewed in context, these emissions statistics not only become less shocking, they are impressive in demonstrating ocean shipping's efficiency. The magnitude of shipping and the worldwide number of ships is a necessity due to the public's need and desire for imported commodities. Where there is trade and consumer demand, there must be a transportation infrastructure to support the flow of goods. Although it generates a good deal of emissions, ocean shipping generates a small fraction of any other type of transport.⁵³

B. EXISTING GOVERNANCE REGIME

1. The IMO

The International Maritime Organization (“IMO”), established by the United Nations in 1948, is the international body that governs maritime matters.⁵⁴ It is responsible for ensuring the safety, security, and sustainability of shipping.⁵⁵ The IMO has promulgated several conventions such as the International Convention on Safety of Life at Sea (“SOLAS”), the International Convention for the Prevention of Pollution from Ships (“MARPOL”), and codes such as the Polar Code, which relates to safety and environmental protection in Arctic and Antarctic waters.⁵⁶

49. Julian Spector, *The Polluters the Paris Treaty Ignores*, THE ATLANTIC CITYLAB (Dec. 10, 2015), <http://www.citylab.com/weather/2015/12/cop21-paris-climate-treaty-shipping-aviation-pollution/419451>.

50. *International Convention for the Prevention of Pollution from Ships (MARPOL)*, INT'L MAR. ORG., [http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-\(marpol\).aspx](http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol).aspx) (last visited Mar. 1, 2017).

51. Fred Pearce, *After Paris, a Move to Rein in Emissions by Ships and Planes*, YALE ENVIRONMENT 360 (May 19, 2016), http://e360.yale.edu/features/reduce_co2_emissions_shipping_aviation_regulation_paris.

52. INT'L CHAMBER OF SHIPPING, *supra* note 45.

53. *Carbon Emissions*, WORLD SHIPPING COUNCIL, <http://www.worldshipping.org/industry-issues/environment/air-emissions/carbon-emissions> (last visited Jan. 16, 2016).

54. *Introduction to IMO*, INT'L MAR. ORG., <http://www.imo.org/en/About/Pages/Default.aspx> (last visited Jan. 16, 2016).

55. *IMO: What It Is*, INT'L MAR. ORG., http://www.imo.org/en/About/Documents/What%20it%20is%20Oct%202013_Web.pdf (last visited Jan. 16, 2016).

56. *Shipping in Polar Waters*, INT'L MAR. ORG., <http://www.imo.org/en/mediacentre/hottopics/polar/pages/default.aspx> (last visited Dec. 30, 2016).

Enforcement depends on the cooperation of Member States Parties.⁵⁷ To keep its instruments up to date the IMO uses a “tacit acceptance” procedure.⁵⁸ Under tacit acceptance, amendments enter into force unless a specified number of States Parties object.⁵⁹ This procedure has been effective in ensuring that safety and environmental regulations stay current with scientific evidence and technology and it has been used extensively for both SOLAS and MARPOL. The Polar Code, though not originally drafted as a binding document, will become mandatory in January 2017 by way of tacitly accepted amendments to SOLAS and MARPOL. This same tacit acceptance procedure could allow further amendments to the Polar Code through its related SOLAS and MARPOL provisions to create a Polar Express Lane in the Arctic Northwest Passage (NWP).

2. UNCLOS

The United Nations Convention on the Law of the Sea (“UNCLOS”) was adopted in 1982, entered into force in 1994, and is regarded as “a constitution for the seas.”⁶⁰ As of the date of this note, the United States is not a party to UNCLOS but maintains that many of its provisions are binding as a matter of customary international law.⁶¹ UNCLOS sets out a legal regime for navigation and the use of the sea and its resources.⁶² It establishes sea limits and maritime zones (based on States’ coastal baselines) and lays out States’ rights and responsibilities in regards to those zones.⁶³ For example, within 12nm from a State’s coastal baseline is a State’s territorial seas where ships enjoy a right of innocent passage but the coastal State can exercise jurisdiction over fiscal, immigration, sanitary and customs (“FISC”) matters.⁶⁴ Within 200nm of the coastal baseline is the Exclusive Economic Zone (“EEZ”) where coastal States have exclusive rights to marine resources.⁶⁵ If a State can show that its continental shelf extends further than its EEZ, the State can maintain exclusive rights to seabed resources for up to an additional 150nm.⁶⁶ Waters within a State’s baseline are considered internal waters, and a State has complete sover-

57. *Id.*

58. *Conventions: Introduction*, INT’L MAR. ORG., <http://www.imo.org/en/About/Conventions/Pages/Home.aspx> (last visited Jan. 16, 2016).

59. *Id.*

60. *Historical Perspective*, *supra* note 4.

61. THOMAS J. SCHOENBAUM, *ADMIRALTY AND MARITIME LAW*, 88 n.60 (5th ed. 2012).

62. *Historical Perspective*, *supra* note 4.

63. Tommy T.B. Koh, *A Constitution for the Oceans Remarks at the final session of the Conference at Montego Bay*, UNITED NATIONS (Dec. 11, 1982), http://www.un.org/depts/los/convention_agreements/texts/koh_english.pdf.

64. UNCLOS, *supra* note 14, sec. 3(a), art. 19.

65. *Id.* at pt. V, art. 56–57.

66. *Id.* at pt. VI, art. 76.

eignty over those waters as it does with its dry land.⁶⁷ UNCLOS also prescribes definitions and regimes for straits,⁶⁸ which are slightly more complicated than other zone delineations, and relate specifically to the NWP. The controversy regarding the status of the NWP as a strait is described in detail below.

UNCLOS respects State sovereignty and States' rights to exploit natural resources,⁶⁹ but also emphasizes the need for environmental protection and stewardship. Although criticized for being general and unenforceable,⁷⁰ article 192 explicitly asserts that "States have the obligation to protect and preserve the marine environment."⁷¹ States must take "all measures necessary" to prevent, reduce, and control pollution of the marine environment,⁷² including pollution from land-based sources,⁷³ and prevent the introduction of invasive species.⁷⁴ Articles 192 through 201 encourage States to participate in regional environmental agreements to help meet these obligations⁷⁵ and articles 208, 210, and 211 obligate States to regulate activities within their jurisdictions to prevent pollution.⁷⁶

C. LEGAL STATUS OF THE NWP

1. Canadian-U.S. Controversy

As discussed previously, there is some controversy surrounding which maritime zone the NWP occupies under UNCLOS. At the heart of the NWP dispute is Canada's claims to the region's waters. Although technically (geographically) an archipelago,⁷⁷ under UNCLOS the NWP more accurately fits the definition for an International Strait because it transverses Canada's territorial waters and its EEZ, connecting high seas on either end.⁷⁸ However, Canada instead claims that this region is a part of its internal waters.⁷⁹ Within internal waters, States enjoy the same rights and sovereignty as they do over their dry land and can completely prohibit any kind of passage.⁸⁰ However, they are left to be the sole enforcers of any laws and regulations, without international help.

67. *Id.* at pt. II, sec. 2, art. 8.

68. *Id.* at pt. III, sec. 1, art. 34–44.

69. *Id.* at pt. XII, sec. 1, art. 193.

70. Hans H. Hertell, Note, *Arctic Melt: The Tipping Point for an Arctic Treaty*, 21 *GEO. INT'L L. REV.* 565, 572 (2009).

71. *Id.* at pt. XII, sec. 1, art. 192.

72. *Id.* at pt. XII, sec. 1, art. 194.

73. *Id.* at pt. XII, sec. 5, art. 207.

74. *Id.* at pt. XII, sec. 1, art. 196.

75. *Id.* at pt. XII, sec. 2, art. 192–201.

76. *Id.* at pt. XII, sec. 5, art. 208, 210, 211.

77. *Archipelago Definition*, OXFORD DICTIONARY, <https://en.oxforddictionaries.com/definition/archipelago> (last visited Jan. 15, 2016). Although geographically an archipelago, the rights of an archipelagic state under UNCLOS do not attach because Canada also has a mainland. UNCLOS, *supra* note 14, pt. IV, art. 46.

78. UNCLOS, *supra* note 14, art. 37.

79. VanderZwaag, *supra* note 2, at 99.

80. UNCLOS, *supra* note 14, art. 2.

Canada bases its assertion in a historical claim,⁸¹ while at the same time acknowledging that it has never been declared as such in any legal instrument.⁸² However, for a claim of historical title to hold legal weight, it must be generally acquiesced to by other nations.⁸³ For the NWP, this has not been the case because the U.S. and other foreign ships have transited and continue to transit the passage and stand by their assertions that the NWP is not Canadian internal waters.⁸⁴

Although there has been some work by Canada to use the concept of “straight baselines”⁸⁵ to encompass the entire Arctic archipelago as internal waters, noted scholar Donat Pharand has extensively studied the idea⁸⁶ and concluded it would not be allowed under international law.⁸⁷ This has not stopped Canadian domestic legislation from proclaiming straight baselines in 1986,⁸⁸ but if challenged Canada will not likely be able to defend this pronouncement under either UNCLOS or customary international law. Under the *Anglo-Norwegian Fisheries Case*, the International Court of Justice (“ICJ”) ruled that Norway could draw straight baselines around its heavily indented coast thereby allowing waters “openly, continuously, and exclusively” treated by such a State as internal waters, to in fact be internal waters under customary international law.⁸⁹

Article 7 of UNCLOS effectively codifies the *Fisheries* holding, allowing straight baselines where there is a “fringe of islands along the coast in its immediate vicinity” or enough indentations that would make the drawing of traditional baselines impracticable.⁹⁰ The vast Canadian Arctic archipelago cannot be described as a fringe because it contains many larger islands with appreciably large bodies of water separating them and most islands therein are far from the coast; the region does not fit the article 7 description. The next criterion under *Fisheries* is that the waters must be consistently over time treated as internal waters. Although Canada has in recent times openly pronounced the NWP to be internal waters, this has not always been the case. As recently as 1969, Canada’s official legal position had been that the waters were *not* internal waters.⁹¹ Other nations have consistently rejected the international waters claim

81. PHARAND 1988, *supra* note 12, at 168–73.

82. DONAT PHARAND, *THE NORTHWEST PASSAGE ARCTIC STRAITS* 88 (Gerard J. Mangone ed., 1984) [hereinafter PHARAND 1984].

83. Gunther Handl, *Northwest Passage (Canadian–American Controversy)*, in *ENCYCLOPEDIA OF PUBLIC INT’L LAW* 688 (2008).

84. Headland, *supra* note 2.

85. Straight baselines are baselines drawn by connecting a series of straight lines from outermost points of an indented coastline. RR. CHURCHILL & A. V. LOWE, *THE LAW OF THE SEA* 34 (3d ed. 1999).

86. PHARAND 1988, *supra* note 12, pt. 3.

87. ERIK FRANCKX, *MARITIME CLAIMS IN THE ARCTIC: CANADIAN AND RUSSIAN PERSPECTIVES* 83 (1993).

88. DONAT PHARAND & SUZANNE LALONDE, *The Arctic Scholar*, in *INT’L LAW AND POLITICS OF THE ARCTIC OCEAN* 25 (Suzanne Lalonde & Ted L. McDorman eds., 2015) [hereinafter PHARAND & LALONDE].

89. *The Norwegian Fisheries Case* (U.K. v. Norway), 1951 I.C.J. 5, 1809 (Dec. 18) [hereinafter *Fisheries*].

90. UNCLOS, *supra* note 14, pt. II, sec. 2, art. 7.

91. Reid, *supra* note 19.

as well.⁹² Additionally, in response to Canada's 1986 declaration of straight baselines, the U.S. and European Community promptly filed formal complaints.⁹³ Third, under the *Fisheries Case*, as well as UNCLOS, the baselines drawn must not depart appreciably from the coast.⁹⁴ In the case of Canada, whose mainland coastline runs east-to-west, their claimed baselines encompassing the Arctic frequently run north-south, not following the shape of the mainland coast at all.⁹⁵ Last, under *Fisheries* (as well as any historical claim) there must be a history of long usage.⁹⁶ Because the NWP has not been regularly available for ships of any nationality to transverse it,⁹⁷ no claim can be made either way regarding its history of use. In fact, most of the ships to successfully navigate the passage have not been Canadian,⁹⁸ tipping the argument against "history of long use" based claims of sovereignty.

Canada's sovereignty claims primarily spring from tensions with the United States, and concerns about pollution.⁹⁹ The Canadian position has been a reactionary one, stirred by "ultranationalists" in the wake of two specific incidents of U.S. transit.¹⁰⁰ The first incident was the voyage of the S.S. *Manhattan* in 1969.¹⁰¹ The *Manhattan* was an ice-strengthened super tanker, owned by Exxon, and was escorted by the U.S. icebreaker *Northwind*.¹⁰² Neither Exxon nor the U.S. requested permission because they believed the NWP to be outside Canadian jurisdiction given Canada at the time claimed only 3nm as its territorial waters.¹⁰³ Canada's response to this perceived challenge to its sovereignty was friendly, but it promptly issued a policy statement that the region was "national terrain."¹⁰⁴ Additionally, Canada passed the 1970 Canadian Arctic Waters Pollution Prevention Act in response to fears that such passage threatened this fragile ecosystem, and simultaneously claimed up to 12nm for its territorial sea.¹⁰⁵ When the U.S. was informed about this legislation it issued a statement opposing any claims of sovereignty to these Arctic waters, stated that the area was part of the high seas, but now also maintains that the NWP is an International Strait¹⁰⁶ even though it is part of the Canadian EEZ and frequently contains

92. Larkin, *supra* note 7, at 318.

93. VanderZwaag, *supra* note 2, at 99.

94. *Fisheries*, *supra* note 90; UNCLOS, *supra* note 14, pt. II, sec. 2, art. 7.

95. PHARAND & LALONDE, *supra* note 89, at 32.

96. *Id.* at 34.

97. Larkin, *supra* note 7, at 312.

98. Headland, *supra* note 2.

99. Reid, *supra* note 19, at 120, 122, 124.

100. Reid, *supra* note 19, at 119.

101. *Id.*

102. MICHAEL BYERS, *INTERNATIONAL LAW AND THE ARCTIC* 134 (2013).

103. *Id.* at 135.

104. FRANCKX, *supra* note 88, at 78.

105. VanderZwaag, *supra* note 2, at 93.

106. Handl, *supra* note 84.

territorial waters as well. In 1973, Canada once again characterized the area as internal waters and denied that there could be an International Strait.¹⁰⁷

A second U.S. challenge to Canadian claims was the 1985 passage through the NWP of the U.S. Coast Guard icebreaker *Polar Sea*. Canada reacted again with friendliness and claimed that this posed no threat to sovereignty.¹⁰⁸ The incident led to the 1988 bilateral Arctic Cooperative Agreement between the U.S. and Canada, an agreement to disagree, with Canada reiterating its intention to facilitate transit through the NWP and requiring consent for passage, but also contained language stating that the agreement would not usurp each nation's respective position, or the Law of the Sea.¹⁰⁹

Canada has been active in international discussions regarding the region, but has stuck with its claims. In 2007, Prime Minister Harper pledged to increase naval resources dedicated to the task and declared "Canada has a choice when it comes to defending our sovereignty in the Arctic. Either we use it or lose it."¹¹⁰ However, it is widely acknowledged that this untenable position is more about domestic politics and hardline nationalistic voters than it is about Canada's place in the international community.¹¹¹

Although the U.S. and Canada have so far cooperated on NWP transit, the NWP's growing potential for year-round navigation brings the territorial dispute outside bilateral agreements and into the international arena. Uniform standards are important because shipping is a global industry.¹¹² If the NWP indeed opens up to year-round navigation, many countries, other than the U.S., will also be affected. Since UNCLOS has come into force, the issue of NWP jurisdiction should be effectively handled based on UNCLOS's articles, not just as an issue between Canada and the U.S., but instead between Canada and the rest of the world. Because the U.S. has not ratified UNCLOS it has a significantly diminished voice on the subject. If the United States takes a backseat to future discussion about the NWP's legal status—and revises its position on the NWP as high seas—it might be easier for Canada to retreat from its untenable internal waters claims. Retreating from exaggerated sovereignty claims would also allow for a peaceful resolution to the dispute. Canada is not the only nation to claim more aquatic territory than is allowed under UNCLOS. China's "nine dash line"

107. Memorandum for Mr. Kissinger on Imminent Canadian Legislation on the Arctic, U.S. DEPT. OF STATE (Mar. 12, 1970).

108. BYERS, *supra* note 103, at 139.

109. *Id.* at 140.

110. Michael Byers, *Time to Negotiate the Northwest Passage with the United States*, POLICY OPTIONS (Oct. 1, 2011), <http://policyoptions.irpp.org/magazines/the-new-normal-majority-government/time-to-negotiate-the-northwest-passage-with-the-united-states>.

111. *Id.*

112. Aldo Chircop, *International Arctic Shipping: Towards Strategic Scaling-Up of Marine Environment Protection*, in CHANGES IN THE ARCTIC ENVIRONMENT AND THE LAW OF THE SEA 177 (M.H. Nordquist, et. al. eds., 2010).

(a maritime boundary claimed by the Chinese that most nations agree violates international law) is an example of how straight baselines and expansive sovereignty claims can lead to aggression, conflict and destabilization.¹¹³ China's insistence on sovereignty over vast swaths of the South China Sea has been met with U.S. and other nations' warships patrolling the region to assert freedom of navigation.¹¹⁴ Duplicating this hostile international political environment by creating a Canadian nine dash line in the NWP would work against any of the laudable goals such as pollution prevention, peace, and safety that Canada seeks to meet with its claims.

2. Argument for International Strait Status

Which classification the NWP receives under UNCLOS is fundamental to the type of action that might be taken to regulate future shipping through it. This Note asserts that, under UNCLOS the NWP is most appropriately viewed as an International Strait. Article 37 "applies to straits which are used for international navigation between one part of the high seas or an exclusive economic zone and another part of the high seas or exclusive economic zone."¹¹⁵ If the NWP is considered to be one body of water it easily fits this definition because it provides passage between the Atlantic and Pacific oceans. Alternatively, if we look at the NWP as a series of straits, between islands which each have a territorial sea, it falls under UNCLOS article 45, which applies to "straits used for international navigation (b) between a part of the high seas or an exclusive economic zone and the territorial sea of a foreign state."¹¹⁶ The ICJ in the *Corfu Channel Case*, cited in *Anglo-Norwegian Fisheries*, clarified this meaning of the phrase "used for international navigation."¹¹⁷ The ICJ held that this criterion could be met if the strait in question provided a "useful route" and is in fact being used for international navigation.¹¹⁸ The ICJ did not require that this traffic meet a certain minimum frequency threshold.

The main difference between article 37 and article 45 straits is that in article 37 straits ships enjoy the right of transit passage, and in article 45 straits they enjoy the right of innocent passage as they would in territorial waters.¹¹⁹ In the case of the NWP, an analysis of Canadian interests would suggest that designation of the NWP as an article 37 strait would be beneficial. First, under transit passage, ships

113. David Lague, *Analysis: China's Nine-Dashed Line in the South China Sea*, REUTERS (May 25, 2012), <http://www.reuters.com/article/us-china-sea-boundary-idUSBRE84007520120525>.

114. Editorial, *Brinkmanship in the South China Sea*, N.Y. TIMES (Nov. 20, 2015), http://www.nytimes.com/2015/11/21/opinion/brinkmanship-in-the-south-china-sea.html?_r=0.

115. UNCLOS, *supra* note 14, pt. III, sec. 2, art. 37.

116. *Id.* at pt III, sec. 2, art. 45.

117. Fisheries, *supra* note 90 (citing to (U.K. v. Albania) I.C.J. 1949 I.C.J 4. 22, 1949 (Dec. 15)).

118. Donald R. Rothwell, *The Canadian-U.S. Northwest Passage Dispute: A Reassessment*, 26 CORNELL INT'L L.J. 331, 349 (1993).

119. UNCLOS, *supra* note 14, pt. III, sec. 2, art. 37, 45.

must move through the strait continuously and without delay.¹²⁰ There is no such requirement in innocent passage, only that ships may not jeopardize the peace or security of the coastal state.¹²¹ Designation as an article 37 strait could significantly restrict activities in the region apart from expeditious navigation. Innocent passage would allow ships to linger, and thus increase the chance of pollution, as opposed to transit passage, which requires movement through, and out of, the strait. Second, in an article 37 situation, states “may adopt laws and regulations relating to transit passage through straits” including laws and regulations for environmental protection, by giving effect to international regulations, as long as those laws do not discriminate between nations.¹²² In an innocent passage regime, as well as an internal waters regime, a state may enact and enforce its own environmental laws.¹²³

At first glance, it would seem that innocent passage or internal waters would be more attractive for environmental protection goals because Canada could enforce domestic legislation instead of giving effect to international regulation. However, this would also leave Canada as the sole enforcer of those laws. No nation acting alone has the capacity to manage this delicate region, nor should they have to.¹²⁴ Transit passage, coupled with the Polar Code and PEL, could be a more effective and enforceable regime, with the weight of the IMO behind it and the enforcement cooperation of many nations. Additionally, in innocent passage, states may not apply laws related to the physical characteristics of the ships themselves unless they are giving effect to international standards.¹²⁵

Much of Canadian domestic regulation to protect the Arctic regulates ship design and construction.¹²⁶ Article 211(6) of UNCLOS allows states to set higher mandatory rules and standards for the prevention of pollution within their EEZs.¹²⁷ Adoptions of these measures must be based on the particular oceanographical and ecological needs of a clearly defined area.¹²⁸ After consultation with other states, approval by the IMO, and notice to the international community, coastal states can adopt laws and regulations for additional prevention of pollution in these areas.¹²⁹

Until an international scheme such as the PEL is established, Canada has no right to enforce these provisions under an innocent passage regime. Under

120. *Id.* at pt. III, sec. 2, art. 38, 39.

121. *Id.* at pt. II, sec. 3(a), art. 19.

122. *Id.* at pt. III, sec. 2, art. 42.

123. *Id.* at pt. II, sec. 3(a), art. 21.

124. MarEx, *Zukunft: Partnerships Needed in the Arctic*, THE MARITIME EXECUTIVE (Aug. 30, 2016), <http://www.maritime-executive.com/article/zukunft-partnerships-needed-in-the-arctic>.

125. UNCLOS, *supra* note 14, pt. II, sec. 3(a), art. 21.

126. Lee Clark, *Canada's Oversight of Arctic Shipping: The Need for Reform*, 33 TUL. MAR. L.J. 79, 102 (2008).

127. UNCLOS, *supra* note 14, pt. XII, sec. 5, art. 211(6).

128. *Id.*

129. *Id.*

Canada's internal waters claim, Canada has the right to enforce any law it chooses, including prohibiting passage entirely, but it is on its own to enforce those laws. Perhaps if the PEL were established, meeting Canada's desire to prevent oil pollution, it would further ease a retreat from any internal waters claims as well as resolve issues related to the idea of a territorial seas regime.

3. Article 234

UNCLOS generally does not address the specific conditions present in the Arctic except for one—article 234.¹³⁰ Canadian reluctance to classify the NWP as an international strait, and its desire to enforce its domestic legislation led to the inclusion of article 234 in UNCLOS, which grants coastal states the right to make and enforce environmental laws in ice-covered areas.¹³¹ However, the NWP might no longer be an ice-covered area for much longer, and there will come a day when article 234 will no longer apply. It is questionable as to how strongly, and when, article 234 applies even now. Perhaps these changed circumstances will prompt Canada to let go of its sovereignty claims. When it was ice-covered, the sea was more like land and it would make sense for a state to have jurisdiction similar to land.¹³² But if there is enough Arctic ice melt, the logic behind article 234 also dissolves. Scientific evidence of the drastic changes in the NWP could provide a reason for Canada to change its position and politically justify its choice.

D. GLOBAL WARMING AND THE OPENING OF THE NWP

Since 1980, Arctic sea ice has been in steady decline.¹³³ There has been a 40% reduction in summer ice cover since 1979¹³⁴ and average winter temperatures in the region have increased as much as 7F.¹³⁵ This has allowed annual passage since the 1980s, culminating in a peak of 30 ships to transit the NWP in 2012, and the first large bulk carrier in 2013.¹³⁶ Over the summer of 2016, a passenger cruise ship, the *Crystal Serenity*, successfully transited the passage with a full load of wealthy tourists, and plans to do so again in 2017.¹³⁷ There are predictions that the NWP will be ice-free and ready for regular year-round

130. Hertell, *supra* note 70, at 573.

131. UNCLOS, *supra* note 14, pt. XII, sec. 8, art. 234.

132. Byers, *supra* note 111, at 132; FRANCKX, *supra* note 88, at 81.

133. D. Perovich, et. al., *Sea Ice*, ARCTIC REPORT CARD: UPDATE FOR 2014, http://www.arctic.noaa.gov/report14/sea_ice.html (last visited Jan. 16, 2016).

134. State of the Environment Report, *Trends in Arctic Sea Ice*, NORTHWEST TERRITORIES (2015), ftp://ftp.oar.noaa.gov/arctic/documents/ArcticReportCard_full_report2014.pdf.

135. Hertell, *supra* note 70, at 567.

136. *Id.* at 575.

137. Rebecca Gibson, *Crystal Serenity Completes Northwest Passage Voyage*, CRUISE & FERRY (Sept. 19, 2016), <http://www.cruiseandferry.net/articles/crystal-serenity-completes-northwest-passage-voyage-1#>.

passage by 2030.¹³⁸ Skeptics point out that the route will continue to be dark, cold, and tricky to navigate,¹³⁹ but the route is still an attractive option due to its significantly shorter distance than conventional routes.¹⁴⁰

E. LNG-AS-FUEL DEVELOPMENTS AND CONTROVERSY

Emission control regulations, especially the MARPOL Annex VI SO_x, NO_x, and carbon dioxide (“CO₂”) limits have placed an expensive burden on the shipping industry.¹⁴¹ The cost of scrubbers and associated abatement technologies¹⁴² needed to comply with new environmental regulations, as well as the volatility of the oil market, have led to a marked interest in alternative fuels and propulsion methods.¹⁴³ LNG powered vessels may be a solution. Although research is being done into the viability of wind power,¹⁴⁴ solar power,¹⁴⁵ electric power,¹⁴⁶ and fuels such as wood,¹⁴⁷ hydrogen,¹⁴⁸ methanol and ethanol,¹⁴⁹ LNG is a tried-and-true choice. Used first to power ferries in Norway beginning in the 1960s, there has been an LNG “revolution” in shipping today.¹⁵⁰ As of April 2015, there are fifty-nine LNG vessels in operation and eighty under construction.¹⁵¹ Since then, several LNG containerships have launched, and the U.S. flagged Marlin Class¹⁵² containership *Isla Bella* even completed passage through

138. Ker Than, *Arctic Meltdown Opens Fabled Northwest Passage*, LIVESCIENCE (Sept. 14, 2007), <http://www.livescience.com/1884-arctic-meltdown-opens-fabled-northwest-passage.html>; Snape & Forster, *supra* note 3; Overlord & Wang, *supra* note 3.

139. VanderZwaag, *supra* note 2, at 90.

140. Waldie, *supra* note 16; *see also* Dr. Lawson Brigham & Ben Ellis, ARCTIC MARINE TRANSPORT WORKSHOP (2004), https://www.arctic.gov/publications/other/arctic_marine_transport.html.

141. TRILEMMA, *supra* note 24, at 6.

142. *Id.* at 8.

143. *Id.*

144. Tristan Smith, *Researchers are Looking to Wind Power for the Next Generation of Ships*, PHYS.ORG: THE CONVERSATION (Aug. 6, 2015), <http://phys.org/news/2015-08-power-ships.html>.

145. Cat DiStasio, *Six Sun-Powered Ships*, ENGADGET: INHABITAT (Sept. 24, 2016), <https://www.engadget.com/2016/09/24/six-sun-powered-ships/>.

146. Valmet Oyj, *Valmet to Supply Automation to Game-Changing Electric Ferry Concept*, SHIP & BUNKER (Oct. 4, 2016), <http://shipandbunker.com/news/world/240098-valmet-to-supply-automation-to-game-changing-electric-ferry-concept>.

147. *Wood based biofuel testing success*, THE MOTORSHIP (Oct. 5, 2016), <http://www.motorship.com/news/101/fuels-and-oils/wood-based-biofuel-testing-success>.

148. *For Hydrogen-Fueled Ferry, Cost is the Only Obstacle*, THE MARITIME EXECUTIVE (Oct. 6, 2016), <http://www.maritime-executive.com/article/hydrogen-fueled-ferry-cost-is-the-only-obstacle>.

149. *EMSA Positive About Methanol and Ethanol*, THE MARITIME EXECUTIVE (June 8, 2016), <http://www.maritime-executive.com/article/ems-positive-about-methanol-and-ethanol>.

150. Laursen, *supra* note 23.

151. TRILEMMA, *supra* note 24, at 20.

152. Mike Schuler, *Introducing ISLA BELLA—World’s First LNG-Powered Containership Launched at Nassco*, GCAPTAIN (Apr. 19, 2015), <http://gcaptain.com/isla-bella-worlds-first-lng-powered-containership-launched-at-nassco>.

the Panama Canal in 2015.¹⁵³ This ship, and other ships in the Marlin class, boast a 98% NO_x, 97% SO_x, and 76% CO₂ reduction over traditionally fueled vessels.¹⁵⁴ Despite an estimated 30% higher cost over traditional builds,¹⁵⁵ many leaders in the shipping industry—including Crowley Maritime, Jensen Maritime, Harvey, Gothia Tanker Alliance, and Tote Maritime—are planning to build more LNG-fueled containerships, barges, tugs, and offshore supply vessels.¹⁵⁶ The United States Maritime Administration is piloting a grant-funding program for LNG conversion of existing U.S. flagged tugs and other U.S. flagged vessels.¹⁵⁷

The boom in LNG-as-fuel is not without controversy, however.¹⁵⁸ The risks of LNG onboard a vessel, even as bunker fuel, include risk of explosion and cryogenic damage.¹⁵⁹ Spilled LNG can fracture steel and may result in fire.¹⁶⁰ An LNG spill can produce a volatile combustible gas cloud and release an exponentially higher amount of energy than a traditional fire.¹⁶¹ Such a cloud could blow ashore and result in a disaster in a port or a populated location.¹⁶² Additionally, LNG is stored under high pressure.¹⁶³ A breach in the container tank could lead to rapid depressurization resulting in explosion.¹⁶⁴ Also, LNG is stored at extremely low temperatures, typically -161C.¹⁶⁵ At -120C, steel can fracture in as little as 10 minutes, causing significant damage, and allowing the ingress of seawater.¹⁶⁶ In addition to a heightened risk of ship foundering, a loss of steel integrity could

153. *First LNG-Powered Container Vessel Transits the Panama Canal*, THE MARITIME EXECUTIVE (Nov. 3, 2015), <http://maritime-executive.com/pressrelease/first-lng-powered-container-vessel-transits-the-panama-canal>.

154. *Id.*

155. TRILEMMA, *supra* note 24, at 21.

156. Laursen, *supra* note 23.

157. UNITED STATES MARITIME ADMINISTRATION: MARINE ENVIRONMENTAL AND TECHNICAL ASSISTANCE PROGRAM, <http://www.marad.dot.gov/environment-and-safety/office-of-environment/environmental-technology-assistance-initiative/> (last visited Jan. 16, 2016).

158. The controversy over LNG includes concerns in the U.S. over the side effects of hydraulic fracturing, a discussion of which is outside the scope of this paper.

159. TRILEMMA, *supra* note 24, at 14.

160. Michael Hightower, *Risk Mitigation of LNG Damage from Large Spills*, SANDIA NATIONAL LABORATORIES (2001), http://www.gastechnology.org/Training/Documents/LNG17-proceedings/5-6-Mike_Hightower.pdf.

161. James A. Fay, *Unusual Fire Hazard of LNG Tanker Spills*, COMBUSTION SCIENCE AND TECHNOLOGY 47-49 (1973) [Paper on file with author]; Mike Hightower, et. al., SANDIA NATIONAL LABORATORIES, *Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water*, (Dec. 2004) [Paper on file with author].

162. Fay, *supra* note 162, at 47.

163. Robert C. Reid, *Possible Mechanism for Pressurized-Liquid Tank Explosions or BLEVE's*, 203 SCIENCE 1263 (1987) [Article on file with author].

164. *Id.*; Christos Georgeakis, John Congalidis & Glenn C. Williams, *Model for Non-Instantaneous LNG and Gasoline Spills*, 58 FUEL 113, 114 (1979) [Paper on file with author].

165. Hightower, *supra* note 162; Letter from Quest Consultants to John Duckett, U.S. DEP'T OF ENERGY (Oct. 2, 2001) [Letter on file with author].

166. Hightower, *supra* note 162.

be of particular concern to port and canal infrastructure.¹⁶⁷ However, LNG spilled over water vaporizes quickly, without damaging the environment or spontaneously combusting.¹⁶⁸

Although these risks have been effectively mitigated by technology in ship architecture and engineering, and LNG is regarded as safe overall,¹⁶⁹ a few publications have influenced the public's perception, including a Bureau of Mines study on flammability and combustibility¹⁷⁰ and a 2012 Department of Energy report to Congress that included alarming photographs of large spill combustibility experiments.¹⁷¹ A reality TV star also recently aired a one-hour episode referring to LNG tankers as "floating bombs."¹⁷² But, despite these perceptions, "[t]he historical reality is that LNG has the best safety record of all common fuel types and is completely non-toxic."¹⁷³ There has never been a breach of containment even in the case of groundings.¹⁷⁴ Necessary comprehensive safety guidelines were promulgated by the IMO in 2009,¹⁷⁵ and by the U.S. Coast Guard in 2015 and 2016 for vessel structures and operations.¹⁷⁶ Nevertheless, bunkering operations remain controversial.¹⁷⁷ Press reports of incidents, such as the LNG explosion at the Williams Port in Washington State in April 2014, and a deadly fire in Korea that tempo-

167. *Id.*

168. DR. C. DOUGLAS LIND, DR. MICHAEL C. PARNAROUSKIS, & DR. ALLEN L. SCHNEIDER, U.S. DEP'T OF TRANSPORTATION, U.S. COAST GUARD LIQUEFIED NATURAL GAS RESEARCH AT CHINA LAKE, REPORT NO. USCG-M-03-80 [Report on file with author]; Bruce King, John Nordin, David Sheesley, & Thayne Routh, *The Department of Energy HAZMAT Spill Center Data Base* (2002) [Paper on file with author].

169. W.W. Crouch and John C. Hillyer, *What Happens When LNG Spills*, CHEMTECH 210 (1972) [Paper on file with author]; Hightower, *supra* note 162.

170. R.T. ARTZ ET AL., U.S. DEP'T OF THE INTERIOR BUREAU OF MINES, REPORT ON THE INVESTIGATION OF THE FIRE AT THE LIQUEFACTION, STORAGE, AND REGASIFICATION PLANT OF THE EAST OHIO GAS CO. (1946), <http://cplorg.cdmhost.com/cdm/ref/collection/p128201coll0/id/3562>.

171. U.S. DEP'T OF ENERGY, LIQUEFIED NATURAL GAS SAFETY RESEARCH (2012), http://energy.gov/sites/prod/files/2013/03/f0/DOE_LNG_Safety_Research_Report_To_Congre.pdf.

172. *Richard Hammond's Engineering Connections: Super Tanker*, BBC Two, <http://www.bbc.co.uk/programmes/b0116cw2> (last visited Jan. 17, 2016).

173. Edward Dodge, *How Dangerous is LNG?*, BREAKING ENERGY (Dec. 22, 2014), <http://breakingenergy.com/2014/12/22/how-dangerous-is-lng/>.

174. Andrew Clifton, *Safe Transport: LNG Shipping History*, COAST GUARD J. OF SAFETY & SEC. AT SEA: PROCEEDINGS OF THE MARINE SAFETY & SEC. COUNCIL, Fall 2015, at 52.

175. IMO MARITIME SAFETY COMMITTEE, IMO RESOLUTION NO. MSC.285(86), INTERIM GUIDELINES FOR NATURAL GAS-FUELED ENGINE INSTALLATIONS IN SHIPS (June 1, 2009), <http://www.uscg.mil/hq/cg5/lgcncoe/docs/IGF.pdf>.

176. U.S. COAST GUARD, LCG NCOE FIELD NOTICE 01-2015 16711/15-009, LNG BUNKERING RECOMMENDATIONS, (Sept. 23, 2015), <http://www.uscg.mil/lgcncoe/docs/15-009%20LGC%20NCOE%20Field%20Notice%2001-2015%20-%20LNG%20Bunkering%20Recommendations>; U.S. COAST GUARD, CG-ENG POLICY LETTER NO. 02-15, DESIGN STANDARDS FOR U.S. BARGES INTENDING TO CARRY LIQUEFIED NATURAL GAS IN BULK (Apr. 10, 2015), <http://www.uscg.mil/hq/cg5/lgcncoe/docs/Barge%20Policy%20LTR.pdf>; U.S. COAST GUARD, CG-521 POLICY LETTER NO. 01-12, EQUIVALENCY DETERMINATIONS—DESIGN CRITERIA FOR NATURAL GAS FUELS SYSTEMS (Apr. 19, 2012), <http://www.uscg.mil/hq/cg5/lgcncoe/docs/Equivalency%20Determination.pdf>.

177. ABS REPORT, *supra* note 25.

rarily halted liquid gas carrier shipbuilding,¹⁷⁸ have not helped public perception.¹⁷⁹ Fears of LNG ships becoming a target for terrorism have also spurred public concern.¹⁸⁰ However, the American Bureau of Shipping reports a general level of public acceptance for LNG fuel and proposes that bunkering operations sited away from densely populated areas will not be met with opposition.¹⁸¹

Bunkering operations, which entail connecting and disconnecting fuel delivery mechanisms, do carry an increased risk for accidental release as opposed to a ship underway.¹⁸² Because the risks that LNG poses are related to escapement, the highest-risk phase in the LNG supply chain is when the hoses and valves that carry LNG are coupled or uncoupled, and personnel interact with the fuel.¹⁸³ However, offshore barges can fuel ships at sea, reducing the number of times fuel lines must be connected or disconnected ashore.¹⁸⁴ Ship-to-ship bunkering is another alternative.¹⁸⁵ The U.S. Coast Guard is currently looking to refine its policy and close regulatory gaps in order to make LNG bunkering by barge more feasible.¹⁸⁶ International Organizations and industry groups are also developing guidance,¹⁸⁷ and ports are cooperating on standards.¹⁸⁸ LNG would still have to be stored on land, and although there are many such storage facilities in the United States,¹⁸⁹ community opposition to these kinds of facilities can exert

178. Mike Schuler, *DSME Told to Stop Work on LPG Ships After Fatal Fire*, GCAPTAIN (Nov. 11, 2015), <http://gcaptain.com/2015/11/11/dsme-told-to-stop-work-on-ships-after-fatal-fire/#.Vpvu7BEebw>; Ted Sickinger, *Gas Explosion at LNG Facility in Washington Prompts Concerns About Proposed Export Terminals in Oregon*, OREGON LIVE (Apr. 1, 2014), http://www.oregonlive.com/business/index.ssf/2014/04/gas_explosion_at_lng_facility.html; Joshua Schneyer, Timothy Gardner and Richard Valdmanis, *Blast at U.S. LNG Site Casts Spotlight on Natural Gas Safety*, REUTERS (Apr. 6, 2014), <http://www.reuters.com/article/us-lng-blast-analysis-idUSBREA3506Y20140406>.

179. ABS REPORT, *supra* note 25, at 109, 116, 127.

180. Karen Testa, *Are Ships Natural Gas "Boat Bombs" for Terror?*, NBC NEWS, http://www.nbcnews.com/id/4276348/ns/us_news-security/t/are-natural-gas-ships-boat-bombs-terror/#.Vpvv2BEebw (last visited Jan. 17, 2016); AP, *LNG Tanker Attack Would be Devastating*, FOX NEWS (Dec. 20, 2004), <http://www.foxnews.com/story/2004/12/20/ap-lng-tanker-attack-would-be-devastating.html>.

181. ABS REPORT, *supra* note 25, at 110.

182. Interview with LCDR (Ret.) Ken Smith, General Engineer, U.S. Coast Guard Headquarters, Division of Vessel and Facility Operating Standards, in Washington, D.C. (Aug. 13, 2015) [on file with author].

183. Roy Bleiberg and LT Christina Nelson, *Liquefied Gas Barges: Bunker and Cargo Considerations*, COAST GUARD J. OF SAFETY & SEC. AT SEA: PROCEEDINGS OF THE MARINE SAFETY & SEC. COUNCIL, Fall 2015, at 48.

184. ABS REPORT, *supra* note 25.

185. Mike Schuler, *First Ship-to-Ship LNG Bunkering Completed in Sweden*, GCAPTAIN (Sep. 14, 2016), <http://gcaptain.com/first-ship-to-ship-lng-bunkering-completed-in-sweden/>.

186. Scott V. LaBurn & Timothy Meyers, *LNG as Fuel: Projects and New Design/Operating Standards*, COAST GUARD J. OF SAFETY & SEC. AT SEA: PROCEEDINGS OF THE MARINE SAFETY & SEC. COUNCIL, Fall 2015, at 56.

187. Wendy Laursen, *More Clarity on LNG Bunkering Coming*, THE MARITIME EXECUTIVE (Sep. 5, 2015), <http://maritime-executive.com/article/more-clarity-on-lng-bunkering-coming>.

188. *Ports Join to Harmonize LNG Bunkering Standards*, MARITIME EXECUTIVE (Oct. 6, 2016), <http://www.maritime-executive.com/article/ports-join-to-harmonize-lng-bunkering-standards>.

189. GLADSTEIN, *supra* note 28, at 29.

strong political pressure against them.¹⁹⁰ State officials can, and do, veto LNG coastal projects, a further setback to the industry.¹⁹¹ Although there has been some Canadian pushback against LNG in places such as Passamaquoddy Bay and Head Harbor Passage,¹⁹² these battles focus on the specific navigational challenges to those areas and economic competition between Canadian and U.S. companies. The economic playing field between the U.S. and Canadian LNG companies is drastically different now than it was when those disputes erupted. Siting LNG bunkering operations in the relatively less inhabited regions of the Arctic would likely be less controversial.¹⁹³

III. GOVERNANCE

A. HYPOTHESIS

Concerns about the protection of the Arctic environment, particularly from oil and emissions pollution, have been addressed by the unilateral actions and international conventions described above. However, current instruments do not go far enough in addressing the threat to the Arctic region should the NWP open up to year-round navigation. Current environmental regulations place steep economic burdens on the shipping industry, leading to interest in alternative fuels such as LNG, but these newbuilds are more expensive than than building traditional vessels. Research into even more environmentally friendly methods is also capital-intensive. LNG faces challenges from the public and politicians and does come with unique safety risks. If we were to designate the NWP as an “express lane” for cleaner fuel, similar to HOV/CAV express lanes on U.S. highways, LNG ships would spend less time near populated areas, the Arctic would not be exposed to potential oil spills or air and particulate pollutants, and the shipping industry would have a stronger economic incentive to invest in new technologies.

Overall, the HOV/CAV lane initiative on U.S. highways has been successful, and many purchasers of hybrid or “clean” fuel cars cite use of the express lanes to reduce commuting time as a primary factor in their decision to invest in this

190. David Giambusso, *Port Ambrose Project Faces Another Round of Questions*, POLITICO (May 23, 2015), <http://www.politico.com/states/new-york/albany/story/2015/05/port-ambrose-project-faces-another-round-of-questions-000000>.

191. Michael Balsamo & David Klepper, *Cuomo to Reject Proposed Gas Terminal Off Coast*, PITTSBURGH POST-GAZETTE (Nov. 12, 2015), http://www.post-gazette.com/powersource/latest-oil-and-gas/2015/11/12/APN_ewsBreak-Cuomo-to-reject-proposed-gas-terminal-off-coast-1/stories/201511120154; Letter from Chris Christie, Governor of New Jersey, to David T. Matsuda, Maritime Administrator U.S. Dep’t of Transportation (Feb. 8, 2011), <http://catskillcitizens.org/learnmore/christie%20veto.PDF>; James Kraska, *The Law of the Sea and LNG: Cross-Border Law and Politics Over Head Harbor Passage*, 37 CAN.–U.S. L. J. 131 (2012).

192. Kraska, *supra* note 192; Neil Craik, *Presumed Innocent: Navigation Rights and Risk-Based Activities in the Passamaquoddy Bay*, 58 U.N.B. L.J. 167 (2008).

193. ABS REPORT, *supra* note 25, at 66.

technology.¹⁹⁴ Criticisms of the programs point out that the steep increase in the number of hybrid or “clean” fuel cars on the road since inception of HOV/CAV permits has in fact undermined the initial goal of reducing overall vehicle congestion by encouraging carpooling, because HOV/CAV lanes permit single “clean” drivers access to lanes that were previously reserved for cars with multiple passengers.¹⁹⁵ However, this criticism only emphasizes how instrumental express lanes have been in terms of incentivizing alternatively powered cars and increasing their numbers on the road. Similarly, allowing alternatively powered ships to use the “Polar Express Lane” instead of the much slower lanes of the Panama and Suez Canal routes or cape routes could also incentivize investment and use of new, cleaner technologies, while keeping deadly oil out of the Arctic, and potentially risky LNG away from populated areas.

The PEL could accomplish these goals and provide the economic incentives necessary to influence political thought and overcome obstacles to ratification of more regulations on an already burdened industry. This PEL could be established through the modification of existing instruments.

B. PRINCIPLES OF OCEAN GOVERNANCE

A responsible way to approach any new regulation for the marine environment should encompass the Principles of Ocean Governance, a set of principles derived from existing regional and global instruments as collected, developed, and presented by David Freestone at the International Union for the Conservation of Nature Fourth World Conservation Congress.¹⁹⁶ A PEL would meet these principles as follows:

- *Conditional Freedom of the Seas*
Instead of restricting navigation in the NWP altogether, the PEL would allow ships, without prejudice, to transit the passage as long as they met the physical characteristics for alternative power.
- *Protection and Preservation of the Marine Environment*
A ban on oil in the NWP would eliminate some of the gravest threats to the Arctic environment: pollution by oil, emissions, and particulate matter.

194. See generally Daniel Ramish, Note, *Government Regulatory Initiatives Encouraging the Development and Sale of Gas/Electric Hybrid Vehicles: Transforming Hybrids from a Curiosity to an Industry Standard*, 30 WM. & MARY ENVTL. L. & POL'Y REV. 231 (2005); See generally Elizabeth Robbins, Note, *Cruising Down the HOV Lane: Federal and Local Incentives Steer Drivers to Purchase Hybrid Vehicles*, 20 VILL. ENVTL. L.J. 75 (2009).

195. See generally Zachary W. Silverman, Note, *Hybrid Vehicles: A Practical and Effective Short-Term Solution to Petroleum Dependence*, 9 GEO. INT'L ENVTL. L. REV. 543 (2007).

196. DAVID FREESTONE, *Modern Principles of High Seas Governance: the Legal Underpinnings*, in INTERNATIONAL ENVIRONMENTAL POLICY & LAW 44 (2009).

- *International Cooperation*

The PEL would be part of existing international agreements. Canada would not need to shoulder the burden of NWP protection alone through unilateral and domestic laws, but have the support and enforcement mechanisms of the IMO and its member States.

- *Science-Based Approach*

The creation of areas necessary for the PEL would be evaluated using the best available scientific data, including the vast wealth of research and study that identify the unique threats of oil, emissions, and particulate matter, as well as the unique challenges of the Arctic region.

- *Precautionary Approach*

Establishment of the PEL could occur before enough Arctic ice melts to open the NWP for year-round shipping. Instead of reactive measures after a damaging incident, the PEL would be a regulatory regime already in place to prevent such incidents.

- *Ecosystem Approach*

Because the PEL would address the risk of pollution to the environment generally, it can protect the whole ecosystem, not just address the effect of oil on living resources, air pollution in the atmosphere, or particulate matter on albedo separately.

- *Sustainable and Equitable Use*

The restrictions for the PEL could lead to more sustainable use of the NWP and the Arctic in general, but because the only restriction for passage would be for physical characteristics of the vessel, there would be no restrictions on equitable use based on nationality or transit purpose.

- *Public Availability of Information and Transparent, Open Decision-making*

The PEL would be established through international conventions that are already public and use open, internationally established mechanisms for amendment to the existing instruments.

- *Responsibilities of States as Stewards*

Without an international regime for the NWP, Canada, as the main coastal State, is faced with the bulk of the stewardship burden. By using international agreements and conventions, and working with classification societies, all states who are members of the IMO, signatories to the conventions, flag states, and seafaring nations, will participate in stewardship.

C. EXISTING INSTRUMENTS

1. Polar Code and Classification Societies

a. Summary

UNCLOS article 211(6) does not allow for coastal states to pass regulations governing the design or construction of ships not already addressed by “interna-

tional rules and standards,”¹⁹⁷ so we need to look towards other international instruments that do govern the physical characteristics of ships. For the Arctic, this is the Polar Code and SOLAS.

Because of the unique hazards associated with the “remote, vulnerable and potentially harsh polar waters,”¹⁹⁸ in November of 2014, the Polar Code (“Code”) and SOLAS amendments were adopted during the 94th session of IMO’s Maritime Safety Committee (MSC) and in May 2015, the environmental provisions of the Code and MARPOL amendments were adopted during the 68th session of the Marine Environment Protection Committee (MEPC).¹⁹⁹ The Code is expected to enter into force through tacit amendments to SOLAS and MARPOL on January 1, 2017.²⁰⁰

The Code focuses mostly on the structure and design of ships permitted to operate in polar waters. Three categories of ships are listed (A, B, and C) and are permitted to operate depending on ice thickness.²⁰¹ The IMO, referred to in the Code as the “Organization,” has broad powers to decide which ships conform to these requirements.²⁰² The requirements are largely enforced using classification societies that inspect, evaluate, and determine if ships are acceptable for Arctic passage. In most instances, in order to operate, ships must obtain classification from one of these societies; this makes the Code and the International Association of Classification Societies’ (“IACS”) prescriptions essentially binding upon shipbuilding, operations, and navigation.²⁰³ The IACS requirements include specifications for hulls, bows, framing and other structural elements.²⁰⁴ However, neither the Code nor the IACS regulate choice of fuel.

b. Proposal

The purpose of the Polar Code is to protect the polar environment by “addressing risks present in polar waters not adequately mitigated by existing

197. Rainer Lagoni, *Marine Protected Areas in the EEZ*, in INTERNATIONAL MARINE ENVIRONMENTAL LAW: INSTITUTIONS, IMPLEMENTATION AND INNOVATIONS 162 (Andree Kirchner ed., 2003); UNCLOS, *supra* note 14, at pt. XII, sec. 5, art. 211(6).

198. *International Code for Ships Operating in Polar Waters*, INT’L MAR. ORG. (2008), <http://www.imo.org/en/MediaCentre/HotTopics/polar/Documents/POLAR%20CODE%20TEXT%20AS%20ADOPTED.pdf> [hereinafter Polar Code].

199. *Shipping in Polar Waters*, INT’L MAR. ORG., <http://www.imo.org/en/MediaCentre/HotTopics/polar/Pages/default.aspx> (last visited Jan. 17, 2016).

200. *Id.*

201. Polar Code, *supra* note 199, at 12.

202. *Id.* at 14.

203. Without classification, it is extremely difficult, if not impossible, for ships to obtain insurance or flag; shippers typically avoid using uninsured and unflagged ships to transport their cargo and port states are more likely to refuse entry. These economic pressures make the IACS standards *de facto* mandatory.

204. INT’L ASS’N OF CLASSIFICATION SOCIETIES, *Requirements Concerning Polar Class, II*, (Oct. 2007), http://www.iacs.org.uk/document/public/Publications/Unified_requirements/PDF/UR_I_pdf410.pdf.

instruments.”²⁰⁵ Risks to the NWP in particular have not been adequately addressed yet. The simplest way to amend the Polar Code to allow for the PEL is to add a special definition for this specific area and a new category of ship specifically for PEL use. If the Polar Code were to add a class D ship designation for alternatively powered ships (which would also encompass the necessary requirements laid out elsewhere in the Code) and add a chapter relating to choice of fuel, the IACS could then add a section for this class with the necessary fuel-related technical specifications. This additional requirement for classification to comply with Code obligations would restrict NWP transit to ships that only use alternative fuel or other alternative propulsion methods.²⁰⁶

2. Particularly Sensitive Sea Areas

a. Summary

Another method for designating special areas is under the IMO’s Particularly Sensitive Sea Areas (“PSSA”) scheme. A PSSA is an area that is especially vulnerable to damage by shipping traffic.²⁰⁷ These areas must have recognized special ecological and scientific concerns.²⁰⁸ The designation of a PSSA is related to a MARPOL special area designation as well as special SOLAS regulations.²⁰⁹ A PSSA is first identified by one or more coastal States and presented to the IMO. It can apply to internal or territorial waters, as well as straits and the EEZ.²¹⁰ PSSAs can also contain a broader range of regulations including mandatory pilotage and reporting.²¹¹ This has been particularly successful in the Great Barrier Reef PSSA and Torres Strait.²¹²

b. Proposal

Because the Polar Code governs a much larger expanse than just the NWP, the PEL will need special designation. One way to accomplish this would be for interested States to petition the IMO for a PSSA. This approach has already been taken for the Great Barrier Reef, the Cuban Archipelago of Sabana-Camaguey, the Columbian Malepo Island, the Florida Keys, and the Wadden Sea.²¹³

205. Polar Code, *supra* note 199, at 14.

206. A similar system could also be used to restrict oil as cargo.

207. BENEDICTE SAGE-FULLER, *THE PRECAUTIONARY PRINCIPLE IN MARINE ENVIRONMENTAL LAW* 225 (2013).

208. *Id.*

209. *Id.* at 226.

210. Lagoni, *supra* note 198, at 163.

211. *Id.* at 164.

212. Byers, *supra* note 111, at 164.

213. Lagoni, *supra* note 198, at 163.

In order to establish a PSSA, a coastal State must submit an application to the IMO.²¹⁴ Canada is likely in the best position to do this. First, there must be a geographically sound description and delineation of the area proposed.²¹⁵ Because the NWP is a specific navigational route, through the Canadian archipelago, and can also meet the definition of an International Strait, this designation and delineation can be charted. Second, there must be a description of the significance of the area.²¹⁶ The area proposed must meet one of 11 criteria.²¹⁷ The NWP could meet ecological criteria for uniqueness or rarity,²¹⁸ naturalness,²¹⁹ integrity as a biologically functional unit,²²⁰ or fragility.²²¹ Because much research has already been done on the fragility of the Arctic region,²²² this criteria might be the easiest to meet. Third, there must be a showing of the vulnerability of the area, including vessel traffic characteristics.²²³ To restrict bunker oil, operational characteristics²²⁴ could point towards the danger of emissions and the possibility of an accidental discharge. Section 5.1.2 could be used to describe the vessel type that poses the risk—traditional systems, which involve oil. Under 5.1.4, harmful substances include fuel, so this is also a useful clause to identify bunker oil as a threat to the area's vulnerability.²²⁵ Fourth, the application must outline proposed Associated Protective Measures.²²⁶ These measures may include three listed measures: the designation of the area as a MARPOL Special Area under Annexes I, II, V, or VI;²²⁷ special SOLAS routing;²²⁸ and “development and adoption of other measures aimed at protecting specific sea areas against environmental damage from ships, provided that they have an identified legal basis.”²²⁹ Designation of the NWP as a MARPOL special area, described below, will be useful in creating the framework for the PEL. SOLAS routing,

214. INT'L MAR. ORG., *Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas* (Dec. 1, 2005), <http://channelislands.noaa.gov/sac/pdfs/imo-area-based-protection.pdf> [hereinafter PSSA Guidelines].

215. *Id.*

216. *Id.*

217. Sage-Fuller, *supra* note 208, at 227.

218. PSSA Guidelines, *supra* note 215, at 4.4.1.

219. *Id.* at 4.4.8.

220. *Id.* at 4.4.9.

221. *Id.* at 4.4.10.

222. See Henry Huntington and Gunther Weller, *An Introduction to the Arctic Climate Impact Assessment*, ACIA SCIENTIFIC REPORT (Nov. 2005), http://www.acia.uaf.edu/PDFs/ACIA_Science_Chapters_Final/ACIA_Ch01_Final.pdf; See also PHARAND 1984, *supra* note 83, at 122.

223. INT'L MAR. ORG., A.927 (22) *Guidelines for the Designation of Special Areas under MARPOL 73/78 and Guidelines for the Identification And Designation of Particularly Sensitive Sea Areas* (Jan. 15, 2002), http://www.gc.noaa.gov/documents/gcil_sad_imo_927.pdf [hereinafter *Special Areas Guidelines*].

224. PSSA Guidelines, *supra* note 215, at 5.51.

225. *Id.* at 5.1.4.

226. *Special Areas Guidelines*, *supra* note 224.

227. PSSA Guidelines, *supra* note 215, at 6.1.1.

228. *Id.* at 6.1.2; *supra* note 224.

229. *Id.* at 6.1.3.

under the Polar Code, described above, would be a valuable tool in prescribing physical characteristics for classing ships for the PEL, as well as UNCLOS routing for International Straits.

3. MARPOL

a. Summary

Perhaps the most influential instrument for potential changes in choice of fuel is the International Convention for the Prevention of Pollution from Ships (MARPOL). Annex I regulates oil and Annex VI regulates emissions. MARPOL also establishes protected special areas²³⁰ and emissions control areas.²³¹ A special area is defined as “a sea area where for recognized technical reasons in relation to the oceanographical and ecological conditions and the particular character of its traffic, the adoption of special mandatory methods for the prevention of pollution by oil, noxious liquid substances, or garbage, as applicable is required.”²³² Although several areas are designated as special areas under MARPOL, the Arctic, as a whole, is not included.²³³ The low level of Arctic protection under MARPOL might be related to the current low level of traffic in the Arctic area.²³⁴ However, because that traffic is poised to increase with projected ice melts, the Arctic Council has recommended that the Arctic be considered for special area status.²³⁵ Special areas under MARPOL are designated by way of amendment to the relevant MARPOL annex.²³⁶ Within these protected areas, ships are subject to more stringent restrictions, for example, prohibitions on oily mixture discharge.²³⁷

Annex VI governs the Prevention of Air Pollution by Ships and designates particular Emission Control Areas (“ECA”s) within which strict emissions regulations apply.²³⁸ In order to designate an area as an ECA, a party (in this case Canada is probably the most qualified) submits a proposal to the IMO.²³⁹ The

230. International Convention for the Prevention of Pollution by Ships, Nov. 2, 1973, 1340 U.N.T.S. 184, Annex I [hereinafter MARPOL].

231. *Id.* Annex VI.

232. Lagoni, *supra* note 198, at 164.

233. Hertell, *supra* note 70, at 574.

234. Aldo Chircop, *Regulatory Challenges for International Arctic Navigation and Shipping in an Evolving Governance Environment*, COMITÉ MARITIME INTERNATIONAL (2012), [http://www.comitemaritime.org/Uploads/Aldo%20Chircop%20\(Regulatory%20Challenges%20for%20Arctic%20Navigation%20and%20Shipping\)%20\(Final\).pdf](http://www.comitemaritime.org/Uploads/Aldo%20Chircop%20(Regulatory%20Challenges%20for%20Arctic%20Navigation%20and%20Shipping)%20(Final).pdf).

235. ARCTIC COUNCIL, ARCTIC MARINE SHIPPING ASSESSMENT 2009 REPORT 7, 61 (2009) http://www.arctic.noaa.gov/detect/documents/AMSA_2009_Report_2nd_print.pdf; Hertell, *supra* note 70, at 578.

236. Lagoni, *supra* note 198, at 165.

237. MARPOL, *supra* note 231.

238. *Id.* Annex VI.

239. *Consideration and Adoption of Amendments to Mandatory Instruments* INT’L MAR. ORG. (July 31, 2008), <http://www.sjofartsverket.se/pages/14228/58-5-6.pdf>.

proposal must include a geographic definition of the area, the types of emissions to be regulated, the human and environmental risk from these ship emissions, an assessment of adverse environmental impacts, the nature of traffic, a description of land-based pollution controls in the area and cost analysis, and an assessment of the supply availability of fuels meeting the standards proposed.²⁴⁰

b. Proposal

MARPOL does not have an annex relating to choice of fuel but does address oil pollution in Annex I and air pollution in Annex VI. If Annex I were to completely ban oil in the NWP, and Annex VI set bench marks for emissions at current LNG and alternative propulsion method levels, this may have the effect of restricting the NWP to alternatively powered vessels. A bolder approach would be to add an Annex VII addressing the choice of fuel. This would be a leap towards meeting MARPOL's goal to "achieve the complete elimination of intentional pollution of the marine environment by oil and other harmful substances and the minimization of accidental discharge of such substances."²⁴¹

As outlined above, the oceanographical and ecological considerations are well documented and include the fragility of the Arctic region as well as its remoteness. ECA applications require that the nature of the traffic through the particular area be specified—and in the case of the NWP the nature of traffic is predominantly shipping. Special Areas receive stricter regulations for discharges, both operational and accidental.²⁴² Once the NWP is designated as a PSSA based on the guidelines described above it will need to be listed in one or more of the MARPOL Annexes.

Annex I, the Prevention of Pollution by Oil, mostly applies to restrictions on oil tankers.²⁴³ However, under Unified Interpretation chapter 5, "Fuel Oil", a subsection 5.3 could be added, restricting oil as fuel within the special area of the NWP. Additionally, the listing of the NWP as a PSSA could prohibit oil tankers from operating in the region, perhaps through the addition of a Regulation 13I, Prevention of Oil Pollution from Ships Operating in Certain PSSAs. Regulation 13I could apply to all ships, allowing only those with alternative fuel or propulsion methods to transit the NWP.

Annex VI, the Prevention of Air Pollution from Ships, governs what emissions are permitted in which areas, imposing strict restrictions within ECAs.²⁴⁴ Designating the NWP as an ECA would help to establish the PEL. For the NWP, as described above, geographic delineation can be provided. Regulated emissions

240. *Id.*

241. MARPOL, *supra* note 231.

242. Lagoni, *supra* note 198, at 165.

243. MARPOL, *supra* note 231, Annex I.

244. *Id.* Annex VI.

should include all available substances, currently SO_x, NO_x, and particulate matter. The human and environmental risks will include albedo reduction and greenhouse gas emissions, both of which contribute to global warming. The nature of the traffic posing the risk would be traditionally fueled ships. A description and cost analysis of land-based sources in the area does not apply. Statistics on the current availability of LNG as a fuel, along with shipbuilding statistics on LNG-fueled vessels, as well as the research and development of other alternative methods, could be useful to satisfy the last requirement. Once the NWP can be designated as an ECA, stricter restrictions on emissions would apply, reducing the kind of traffic allowed.

Another approach would be to add a new tier of restrictions in Annex VI. Currently, Tier III is the strictest, limiting NO_x.²⁴⁵ MARPOL could be amended to add a Tier IV, which would limit all SO_x and NO_x emissions to a level unachievable by traditional oil-fueled ships, but at levels already attained by LNG-fueled ships. Alternatively, an Annex VII could be adopted, governing the use of fuel and propulsion methods. Under Annex VII, ships using oil as fuel could be prohibited from operating in PSSAs, special areas, or ECAs such as the NWP as this Note proposes.

4. Canadian Legislation

a. Summary

Articles 211(6) and 234 of UNCLOS permit coastal States to promulgate additional regulations. Canada already has several in place, including the Arctic Waters Pollution Prevention Act of 1970, the Fisheries and Oceans Act of 1985, the Ocean Act of 1966, and the Shipping Act of 2001.²⁴⁶ Additionally, Canada has issued a moratorium on oil tankers in northern British Columbia, which the Minister of Transport seeks to formalize.²⁴⁷

The two main pieces of Canadian domestic legislation that relate to the NWP in particular are the Arctic Waters Pollution Prevention Act of 1970 (“AWPPA”) and the Canada Shipping Act of 2001 (“CSA”).²⁴⁸ The AWPPA creates a 100nm wide environmental protection zone in Canada’s Arctic waters, prohibiting the

245. *Prevention of Air Pollution From Ships*, INT’L MAR. ORG., <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Air-Pollution.aspx> (last visited Jan. 17, 2016).

246. Arctic Waters Pollution Prevention Act, R.S.C. 1985, c.A-12 § 12 et seq.; Oceans Act, S.C. 1966, c. 31, s. 42 et seq.; Canada Shipping Act, S.C. 2001, c.26, s. 319 et seq.

247. Letter from Justin Trudeau, Prime Minister of Canada, to Marc Garneau, Minister of Transport (Nov. 20, 2015), <http://pm.gc.ca/eng/minister-transport-mandate-letter>; Robert Hage, *A Tanker Ban is the Hard Way to Deal with Northern Gateway*, THE GLOBE AND MAIL (Nov. 21, 2015), <http://www.theglobeandmail.com/report-on-business/rob-commentary/a-tanker-ban-is-the-hard-way-to-deal-with-northern-gateway/article27401228/>.

248. Arctic Waters Pollution Prevention Act, *supra* note 247; Canada Shipping Act, 2001 (S.C. 2001, c. 26); *see also* TAFSIR JOHANSSON & PATRICK DONNER, THE SHIPPING INDUSTRY, OCEAN GOVERNANCE AND ENVIRONMENTAL LAW IN THE PARADIGM SHIFT: IN SEARCH OF A PRAGMATIC BALANCE FOR THE ARCTIC 25 (2015).

discharge of wastes in the region.²⁴⁹ Part of the AWPPA is the Arctic Shipping Pollution Prevention Regulations, which prescribe ship design and construction standards.²⁵⁰ The CSA encompasses previous overlapping legislation such as the Migratory Birds Act and the Fisheries Act, and governs vessel-source pollution.²⁵¹

b. Proposal

Current Canadian laws could be amended to help facilitate establishment of the PEL. Perhaps the PEL would be a welcome compromise, assuaging Canada's fears of pollution, while reassuring the shipping industry that the route will be available. Perhaps if the PEL were established, Canada may be willing to publicly regard the NWP as an International Strait, because under UNCLOS Canada would have greater influence over, and assistance in, regulating its use and enforcing protective measures than it could for archipelagic waters, territorial sea, or internal waters. Additionally, instead of bearing the entire burden and expense of enforcing these provisions in the NWP as an International Strait, the IMO could lend leverage and enforcement weight.

Specifically, an amendment to shipping Safety Control Zones established in the Arctic Waters Pollution Prevention Act ("AWPPA") could be most useful to helping to create the PEL. Under the AWPPA section 11, the Governor in Council may prescribe areas of the Arctic as Shipping Safety Control Zones ("SCZs").²⁵² Under the AWPPA and CSA, the Minister of Transport, in concert with the Governor in Council, could designate the NWP as a special zone.²⁵³ Within these SCZs the Governor in Council can prohibit ship traffic unless vessels meet certain requirements.²⁵⁴ These requirements include restrictions on the type of cargo carried and the amount of fuel carried, but currently there are no restrictions on the type of fuel carried.²⁵⁵ A sub section (ix) could be added to section 12 to give the Governor in Council authority to prescribe restrictions in a NWP SCZ to restrict types of bunker fuel, effectively only allowing alternative fuel or alternative methods of propulsion in the NWP. These measures, under UNCLOS article 211(6) and Canadian domestic legislation, can provide an identifiable sound legal basis for the PEL as a new measure to protect the Arctic environment.

249. *Id.* at 26.

250. VanderZwaag, *supra* note 2, at 94.

251. Johansson & Donner, *supra* note 249.

252. Arctic Waters Pollution Prevention Act, *supra* note 247.

253. *Id.*

254. *Id.*

255. *Id.*

CONCLUSION

“Adventure is just bad planning.”— Roald Amundsen

Adventure has a romantic connotation of danger, risk, and uncertainty. However, these concepts are the opposite of what the delicate area of the Arctic needs and what the shipping industry wants. We need to plan now for the effective governance of future transit in the NWP. Although we may have over a decade or more before the NWP is open for year-round use, international conventions such as the Law of the Sea and Polar Code typically take decades to develop, negotiate, and bring into force. A simpler solution is available by amending instruments already in force. If changes similar to the proposed clauses above are adopted into the Polar Code, MARPOL, and domestic legislation, a “cleaner fuel” express lane could be created, keeping most oil, SO_x, and NO_x out of the fragile Arctic environment and assuaging Canadian concerns about oil pollution and emissions. Under UNCLOS, Canada could still exercise some unilateral control in the NWP as an International Strait, and further bolster environmental protections with the support of the international community.

Shipping companies and carriers stand to save miles, days, and millions of dollars through use of the NWP as an express route between Asia to the U.S. and Europe. Establishment of a Polar Express Lane can be accomplished without the need for a new legal instrument, in part through the expedient “tacit acceptance” procedure. Although companies and shipbuilders are already developing and employing alternative power sources such as LNG, methane, wind, and solar, a requirement for ‘cleaner fuels’ in the NWP could further incentivize technological development. The benefit to the shipping industry of using the NWP could offset the increased cost of constructing LNG-fueled ships. A more environmentally sustainable shipping industry can also be a more financially sustainable shipping industry through the creation of a Polar Express Lane.