

AQUATIC INVASIVE ALIEN SPECIES AND THE EVOLUTION OF CANADIAN AND U.S. BALLAST WATER REGULATIONS IN THE GREAT LAKES— ROWING IN TANDEM OR MUDDYING THE WATERS?

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INTRODUCTION

Ballast water released from large ships is a vector for the introduction of aquatic invasive alien species.¹ The establishment of these foreign plants, animals, and organisms has significant economic and ecological impacts.² Due to high ship traffic on the St. Lawrence Seaway and the Great Lakes, many bio-invasions have resulted from ballast water release.³ Since the late 1980s, the United States and Canada have introduced regulations concerning the release of ballast water, evolving from ineffective voluntary guideline measures to more stringent mandatory ones.⁴

Both countries took similar, corresponding management measures, until late in the 2000s when the United States applied its Clean Water Act to ballast water release.⁵ The State of New York enforced this new application rigorously, and generated strict regulations.⁶ Canada vociferously denounced the enhanced regulations.⁷ In February 2012, New York decided to discontinue these more stringent ballast water regulations and wait for the enactment of stricter federal ballast regulations.⁸

However, if New York had continued to apply a more stringent

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1. Jennifer L. Molnar et al., *Assessing the Global Threat of Invasive Species to Marine Biodiversity*, 6 FRONTIERS IN ECOLOGY AND THE ENV'T 485-92 (2008).

2. HAROLD A. MOONEY ET AL., *INVASIVE ALIEN SPECIES: A NEW SYNTHESIS 2* (2005).

3. JEFF ALEXANDER, *PANDORA'S LOCKS: THE OPENING OF THE GREAT LAKES-ST. LAWRENCE SEAWAY 103* (1st ed. 2009).

4. EUGENE H. BUCK, CONG. RESEARCH SERV., *BALLAST WATER MANAGEMENT TO COMBAT INVASIVE SPECIES* (2012), archived at <http://perma.cc/V26F-QMQD>; GREAT LAKES SEAWAY BALLAST WATER WORKING GROUP, *2012 SUMMARY OF GREAT LAKES SEAWAY BALLAST WATER WORKING GROUP 11-14* (2013), archived at <http://perma.cc/Q5JV-2YKL>.

5. Donald E. Tuxill, *Ballast Water Discharges: Protecting New York's Waters from Invasive Species*, N.Y. STATE DEPT. OF ENVTL. CONSERVATION, <http://www.dec.ny.gov/chemical/79079.html> (last visited Dec. 30, 2013, archived at <http://perma.cc/XZE7-B8RT>).

6. *Id.*

7. *Ballast Water and the Great Lakes-St. Lawrence Seaway System*, TRANSPORT CAN., <http://www.tc.gc.ca/eng/mediaroom/backgrounders-b11-hs007-6535.htm> (last updated Oct. 23, 2012, archived at <http://perma.cc/Z5S9-B9P2>).

8. *Government of Canada Applauds New York State for Withdrawing its Ballast Water Requirements*, TRANSPORT CAN. (Feb. 23, 2012), <http://news.gc.ca/web/article-en.do?nid=659649>, archived at <http://perma.cc/567V-WVZ3>.

regulation, Canada could have challenged this regulation under provisions contained in the Boundary Waters Treaty (BWT) of 1909, including the concept of free, navigable waters.⁹ This approach could have been used as legal grounds to bring the regulations to the International Joint Commission (IJC) for revocation.¹⁰

In this paper, I outline the management structures surrounding the Great Lakes, the threat that aquatic invasive alien species (IAS) generate, and the concept of ballast water technology. Following these introductions, I consider the development of international norms of transboundary harm and international agreements surrounding ballast water. I will also outline ballast water regulations, and the loophole present for ships carrying little ballast water in the regulations of both countries, and examine the US case from 2005 that enabled ballast water to be viewed as a pollutant under the Clean Water Act. Canada's approach to lobbying New York to rescind its regulations related to the Clean Water Act is examined. Finally, how future Great Lakes ballast water regulations will evolve, particularly in relation to a recent additional annex in the Great Lakes Water Quality Agreement for aquatic invasive alien species,¹¹ the reiteration of the Vessel General Permit, and the eventual enactment of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, will be discussed.

WATERBORNE IAS

The use of the St. Lawrence and the Great Lakes shipping route expanded greatly during the industrial boom of the 1800s.¹² Global trade linkages and technological development increased the variety and frequency of vectors for biotic transfer. The impact of the industrial revolution on bio-invasions can be seen in the building of the Welland Canal, linking Lakes

9. Treaty Between the United States and Great Britain Relating to Boundary Waters, and Questions Arising Between the United States and Canada, U.S.-Gr. Brit., Jan. 11, 1909, 36 Stat. 2448 [hereinafter *Boundary Waters Treaty*].

10. JOHN H. CURRIE ET AL., *INTERNATIONAL LAW: DOCTRINE, PRACTICE, AND THEORY* 349 (2007); *Who We Are*, INT'L JOINT COMM'N, http://www.ijc.org/en/backgroundX/ijc_cmi_nature.htm (last updated Jan. 25, 2013, archived at <http://perma.cc/FN2J-CWSF>); see also *Boundary Waters Treaty*, *supra* note 9, arts. 3, 8.

11. Agreement on Great Lakes Water Quality, U.S.-Can., Apr. 15, 1972, 23 U.S.T. 301 (superseded by Great Lakes Water Quality Agreement of 1978, U.S.-Can., Nov. 22, 1978, 30 U.S.T. 1383, as amended Oct. 16, 1983, and Nov. 18, 1987) [hereinafter *GLWQA*]; see also Protocol Amending the Agreement Between Canada and the United States of America on Great Lakes Water Quality, 1978, as amended on October 16, 1983, and on November 18, 1987, U.S.-Can., Sept. 7, 2012 [hereinafter *Protocol Amending GLWQA*], archived at <http://perma.cc/3CQZ-NYEG>.

12. ALEXANDER, *supra* note 3, at xxviii.

Ontario and Erie in the 1830s, and in the development of a lock system from 1847 to 1855 on the St. Lawrence River.¹³ This series of technological innovations allowed the St. Lawrence Seaway to become a major artery for international trade, as ships could pass from the Atlantic Ocean to Lake Superior uninterrupted. After World War II, with intensified trade, a need arose to expand the navigable waters of the Seaway, prompting dredging to expand its depth.¹⁴ The increased trade and transit post industrialization generated a new vector for bio-invasion, since ships released untreated ballast water into the waterways.¹⁵ Untreated ballast water contains alien species, and some of these species have the characteristics necessary to invade Great Lakes ecosystems.

The Canadian Invasive Alien Species Strategy defines non-native species as “species of plants, animals, and micro-organisms introduced by human action outside their natural past or present distribution.”¹⁶ Non-native species do not always constitute invasive species because many do not take over ecosystems. Non-native species can be helpful and aesthetically pleasing, and are used in agriculture and landscaping. However, IAS are “harmful alien species whose introduction or spread threatens the environment, the economy, or society, including human health.”¹⁷ The release of ballast water into the Seaway and the Great Lakes as a result of the industrial boom resulted in the introduction of a significant number of IAS.¹⁸

By 1990, “hundreds of exotic algae, fish, invertebrates, and various plant invaders [had] become established in the Great Lakes basin.”¹⁹ The rate of bio-invasion has drastically increased concurrently with global trade and has placed more pressure on the Great Lakes ecosystem. “More than one-third of these invasive organisms were introduced since the 1960s, and many now dominate the aquatic community in both numbers and biomass.”²⁰ Ballast water release has resulted in the establishment of at least twenty-four invasive species in the Great Lakes since 1959.²¹ IAS established in the Great Lakes include “common carp, Eurasian ruffe, Eurasian water milfoil, purple loosestrife, quagga mussel, round goby, rusty

13. *Id.*

14. *Id.*

15. *Id.* at xxi.

16. GOV'T OF CAN., AN INVASIVE ALIEN SPECIES STRATEGY FOR CANADA 1 (2004), archived at <http://perma.cc/D7NG-TEQY>.

17. *Id.*

18. Joel T. Bowers, *Little Leviathans: Michigan's Battle Against Invasive Species in the Great Lakes*, 52 WAYNE L. REV. 1249, 1249-50 (2006).

19. GREAT LAKES SCIENCE CENTER, STRATEGIC SCIENCE PLAN 38 (2005), archived at <http://perma.cc/C8MK-NVK9> [hereinafter STRATEGIC SCIENCE PLAN].

20. *Id.*

21. Christopher Costello et al., *Evaluating an Invasive Species Policy: Ballast Water Exchange in the Great Lakes*, 17:3 ECOLOGICAL APPLICATIONS 655, 655 (2007).

crayfish, sea lamprey, spiny waterflea, and the zebra mussel.”²²

IAS constitute a significant threat to aquatic ecosystems, and as a result, impact the economic function of industries that require healthy aquatic ecosystems. These species can out-compete native species, transmit diseases, or inter-breed with native species, contaminating the genome.²³ “These . . . species alone have contributed to massive extinctions of native fauna, severe alterations in local food webs . . . and in cases such as the zebra mussel, have resulted in millions of dollars of damage to water intake and treatment facilities.”²⁴ IAS have also caused botulism in species that feed on them, as well as thiamine deficiency syndrome.²⁵ They have caused blue-green algal blooms and contributed to the expansion of the “dead zone” in Lake Erie.²⁶

Due to the extensive impacts of IAS, it is of crucial importance to prevent their introduction as effectively as possible. As ballast water is a primary vector for their entry, the regulation of ballast water has been of significant concern to both US and Canadian officials.

AN OVERVIEW OF BALLAST TECHNOLOGY

Ballast is defined by the Canadian government as “any solid or liquid that is brought on board a vessel to increase the draft, change the trim, regulate the stability or to maintain stress loads within acceptable limits.”²⁷ Ballast technology has been employed to stabilize ships since the Phoenicians began to trade by sea.²⁸ Since that time, the seemingly innocuous release of ballast has been a primary vector for IAS. Even prior to the use of water as ballast, bio-invasions resulted from the release of gravel or dirt ballast.²⁹ This dirt and gravel contained insects, microbes, and plant seeds.³⁰ For example, some experts believe purple loosestrife was introduced initially to North America through dirt ballast from European

22. STRATEGIC SCIENCE PLAN, *supra* note 19, at 38-39.

23. Jeremy Firestone & James J. Corbett, *Coastal and Port Environments: International Legal and Policy Responses to Reduce Ballast Water Introductions of Potentially Invasive Species*, 7 SUSTAINABLE DEV. L. & POL'Y 45, 45 (2006).

24. STRATEGIC SCIENCE PLAN, *supra* note 19, at 39.

25. See *Invasive Species - Rochester, NY Area*, ROCHESTERENVIRONMENT.COM, http://rochesterenvironment.com/invasive_species.htm (last visited Dec. 30, 2013, archived at <http://perma.cc/ZP6B-Z3XR>).

26. *Id.*

27. *Ballast Water Defined*, TRANSPORT CAN., <http://www.tc.gc.ca/eng/marinesafety/oep-environment-ballastwater-defined-249.htm> (last updated Jan. 21, 2010, archived at <http://perma.cc/EY95-N7GQ>).

28. Firestone & Corbett, *supra* note 23.

29. JASON VAN DRIESCHE & ROY G. VAN DRIESCHE, *NATURE OUT OF PLACE: BIOLOGICAL INVASIONS IN THE GLOBAL AGE* 56 (2000).

30. *Id.*

ports.³¹

The transition to water ballast increased the frequency and magnitude of aquatic bio-invasion. In addition, the globalization of trade, in combination with increases in the number, size, and speed of ships, created more opportunity to introduce species to new aquatic environments.³² Marine transportation is the primary agent of international trade, and the volume of international trade has increased greatly in the last century. Therefore, marine transportation has become the primary vector for invasive species introduction.³³

Current shipping technology uses water almost exclusively as ballast. Water enters onboard tanks through pumping or gravity.³⁴ The International Maritime Organization (IMO), in the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) defines "ballast water" in article 1 as "water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of the ship"³⁵ and "sediments" as "matter settled out of Ballast Water within a ship."³⁶

WATER MANAGEMENT AND THE GREAT LAKES

The Great Lakes and the St. Lawrence Seaway are under the shared jurisdiction of the United States and Canada.³⁷ These complex ecosystems are significant watercourses for shipping. When considering the general principles of international law related to shared waterways, harm is discussed most frequently in the context of how a development will harm ecosystem health or navigability of a waterway to the detriment of a neighboring riparian state.³⁸ If one state actor initiates a development that threatens the sustainable utilization of a specific inland waterway, that offending state has an obligation to mitigate its effects.³⁹

It is nearly impossible to determine liability for an accidental species introduction via ballast water based on common law tort principles, and the

31. *Id.*

32. Firestone & Corbett, *supra* note 23.

33. *Id.*

34. *Id.*

35. International Conference on Ballast Water Management for Ships, Feb. 16, 2004, *Adoption of the Final Act and Any Instruments, Recommendations and Resolutions Resulting from the Work of the Conference, International Convention for the Control and Management of Ships' Ballast Water and Sediments*, IMO Doc. BWM/CONF/36, Annex, art. 1, para. 2 [hereinafter BWM], archived at <http://perma.cc/JX9X-HMXV>.

36. *Id.* Annex, art. 1, para. 11.

37. ALEXANDER, *supra* note 3, at xii.

38. The 1966 Helsinki Rules on the Uses of the Waters of International Rivers, Int'l Law Ass'n, art. 7, Aug. 1966, (1967), archived at <http://perma.cc/J77Z-KTVX>.

39. CURRIE ET AL., *supra* note 10, at 348.

challenge also applies to various other environmental law situations. Environmental legal scholar Albert Lin states:

In such instances, common law tort provides neither sufficient redress for widespread harms nor adequate mechanisms for anticipatory intervention. To address these shortcomings, the legal system turned to public law—legal structures based on statutes and administrative regulations. For nearly the last four decades, direct governmental regulation has been the principal means of addressing environmental harm.⁴⁰

Thus, domestic, bi-national, and international regulatory schemes have been the best means of discouraging the transfer of IAS.

Developing regulations related to the Great Lakes is a challenging endeavor for international law because of both the significance of the ecosystem and the shared nature of the resource. The Great Lakes-St. Lawrence River Basin contains 21 percent of the world's fresh water and 84 percent of North America's fresh surface water.⁴¹ More than 150 native species of fish and more than 50 native plant communities are threatened by IAS in the Great Lakes system.⁴² The problem of jurisdiction presents an enormous challenge for Great Lakes management. Their management requires not only the cooperation of two federal governments, but also harmonization with the regulatory approaches of ten states and provinces.⁴³

The St. Lawrence Seaway is considered a boundary waterway, and it falls within the jurisdiction of the Canadian and US federal governments under the BWT.⁴⁴ The BWT is administered by the IJC. The governments established the IJC to settle boundary water related disputes.⁴⁵ However, provinces and states also have the right to develop policies surrounding the protection of the aquatic environment. The federal, state, and provincial actors have signed environmental protection policies that bind both countries and the affected states and provinces.⁴⁶

40. Albert C. Lin, *The Unifying Role of Harm in Environmental Law*, 2006 WIS. L. REV. 897, 908 (2006).

41. *Basic Information*, ENVTL. PROT. AGENCY, <http://www.epa.gov/greatlakes/basicinfo.html> (last updated July 5, 2012, archived at <http://perma.cc/5YUF-7FWV>).

42. David Pimentel et al., *Environmental and Economic Costs of Nonindigenous Species in the United States*, 50 *BIOSCIENCE* 53 (2002).

43. Alan M. Schwartz, *The Canada-US Environmental Relationship: Calm Waters but Slow Sailing*, 60 *INT'L J.* 437, 437 (2005).

44. *Boundary Waters Treaty*, *supra* note 9.

45. *Who We Are*, *supra* note 10.

46. *See, e.g.*, Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement, Dec. 13, 2005 [hereinafter Sustainable Water Resource Agreement], archived at <http://perma.cc/9225-UR5F>.

Despite the divergent rights and responsibilities of various jurisdictions, cooperation has been the most common approach to Great Lakes management. Following the BWT of 1909 and the establishment of the IJC, other agreements stand in testament to a desire to harmonize approaches to their management. The Great Lakes Water Quality Agreement (GLWQA) was signed in 1972 to maintain and restore the ecosystem function of the Basin.⁴⁷ The GLWQA, with the cooperation of ministries and departments on both sides of the border, attempts to meet bi-national water quality standards.⁴⁸ The GLWQA establishes a cooperative framework to manage the Great Lakes ecosystem.⁴⁹

Comparatively, the IJC is an investigative body formed to settle disputes along the boundary waters of Canada and the United States.⁵⁰ The IJC can monitor and recommend actions on problems like pollution.⁵¹

The GLWQA, the BWT, and the IJC are the joint agreements between Canada and the United States that can be applied to the prevention and monitoring of IAS. The GLWQA now specifically refers to IAS in Annex 6.⁵² These agreements could be applied to managing IAS introduced through ballast water if ballast water containing foreign biota was determined to constitute pollution under law. The United States recently adopted a policy where ballast water constitutes pollution under the Clean Water Act.⁵³ Canada does not yet recognize ballast water as pollution.⁵⁴

However, both countries have developed national ballast water regulations and throughout their histories have attempted to harmonize their management policies. The desire for harmonized policies has been particularly apparent when considering the shared waterways of the Great Lakes and the St. Lawrence Seaway.

INTERNATIONAL OBLIGATIONS RELATING TO BALLAST WATER

International law clearly identifies IAS as harmful to ecosystem function. Under the Convention on Biological Diversity (CBD), article 8(h) requires that parties “shall, as far as possible and as appropriate: . . . [p]revent the introduction of, control or eradicate those alien species which

47. See generally GLWQA, *supra* note 11.

48. *Treaties and Agreements*, INT’L JOINT COMM’N, <http://www.ijc.org/rel/agree/quality.html> (last visited Oct. 19, 2013).

49. *Id.*

50. *Who We Are*, *supra* note 10.

51. *Id.*

52. See Protocol Amending GLWQA, *supra* note 11, Annex 6 (referred to as Aquatic Invasive Species [AIS]) (Discussed in greater depth *infra* notes 222-228 and accompanying text.)

53. Clean Water Act, 33 U.S.C. § 402 (2012) [hereinafter CWA].

54. *Ballast Water Defined*, *supra* note 27.

threaten ecosystems, habitats or species. . . .”⁵⁵ Similarly, the United Nations Convention on the Law of the Sea (UNCLOS) provides in article 196 that “[s]tates shall take all measures necessary to prevent, reduce and control . . . the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto.”⁵⁶

These articles imply an obligation to prevent harm and that a nation should attempt to prevent the spread of IAS. However, it is nearly impossible to determine *ex post facto* liability for an accidental species introduction via ballast water based on these bodies of law.⁵⁷ The international obligation that arises from CBD and UNCLOS relates to a state’s responsibility not to generate harm,⁵⁸ and, thus, flagships have a duty to reduce the risk of introduction. This obligation is most often fulfilled by flagships’ obeying the domestic laws regarding ballast water release. The flagship has no obligation to exceed its domestic regulations, unless duty-bound by its flag state.⁵⁹ Thus, the international obligation requires ships to follow the mandates of the state’s waters into which they are venturing even though they may exceed the regulations of their flag country.

However, the International Marine Organization (IMO) developed a new ballast water treaty called the International Convention for the Control and Management of Ships’ Ballast Water and Sediments (BWM) in 2004.⁶⁰ It addresses both the responsibility of domestic and regional fleets to do no harm, and the need to create ballast water regulations within a country’s domestic waters.⁶¹ The BWM expects countries to eventually apply stringent regulations on ballast release on their own fleet.⁶² It also expects signatories to apply stringent regulations on ships entering their waters.⁶³ The BWM is not yet in force since entry into force requires the endorsement of thirty states that represent at least 35 percent of world

55. United Nations Convention on Biological Diversity art. 7, June 5, 1992, 1760 U.N.T.S. 79, archived at <http://perma.cc/CND4-NRZ6> [hereinafter CBD] (alteration added).

56. United Nations Convention on the Law of the Sea art. 196, para. 1, Dec. 10, 1982, U.N. Doc. A/CONF.62/122, 21 I.L.M. 1261 (1982), archived at <http://perma.cc/YX2L-UVA2> [hereinafter UNCLOS] (alteration added).

57. Suzanne Bostrom, *Halting the Hitchhikers: Challenges and Opportunities for Controlling Ballast Water Discharges and Aquatic Invasive Species*, 39 ENVTL. L. 867, 871-72 (2009).

58. Justin Pidot, *The Applicability of Nuisance Law to Invasive Plants: Can Common Law Liability Inspire Government Action?*, 24 VA. ENVTL. L.J. 183 (2005); but see Daniel P. Larsen, *Combating the Exotic Species Invasion: the Role of Tort Liability*, 5 DUKE ENVTL. L. & POL’Y F. 21 (1995).

59. CRAIG R. JOHNSON, SEAWEED INVASIONS: A SYNTHESIS OF ECOLOGICAL, ECONOMIC AND LEGAL IMPERATIVES 119 (2008).

60. BWM, *supra* note 35.

61. *Id.* art. 2.

62. *Id.*

63. JOHNSON, *supra* note 59, at 443.

merchant shipping tonnage.⁶⁴ Currently, the Convention has 33 signatories, representing 26.46 percent of world tonnage.⁶⁵ Canada is a contracting state party as of April 8, 2010, but the United States is not.⁶⁶ However, both countries frequently cite the IMO BWM, making it the standard measure by which ballast regulation is measured.⁶⁷

Canada and the United States measure their domestic programs against the standards of the IMO BWM.⁶⁸ The BWM requires all ships to manage their ballast water discharge as per Regulation D-2.⁶⁹ The Ballast Water Performance Standard for the BWM states:

Ships conducting ballast water management shall discharge less than 10 viable organisms per cubic metre greater than or equal to 50 micrometres in minimum dimension and less than 10 viable organisms per milliliter less than 50 micrometres in minimum dimension and greater than or equal to 10 micrometres in minimum dimension; and discharge of the indicator microbes shall not exceed the specified concentrations.⁷⁰

This measure provides a specific maximum concentration of living material to determine what constitutes a harmful discharge of ballast. Small concentrations of materials can contribute to a species establishment but the less biotic material present, the lower the chances that bio-invasions will occur.⁷¹ The standard will be phased in slowly, and gradually become more stringent over time.⁷² The BWM also calls for an on-board ballast water treatment system.⁷³

Ballast water treatment refers to chemical or mechanical means of removing aquatic IAS and their propagules. Mechanical means of ballast

64. BWM, *supra* note 35, at art. 18, para. 1.

65. *Ballast Water International Efforts*, NAT'L OCEANIC AND ATMOSPHERIC ADMIN., http://www.gc.noaa.gov/gcil_ballast_intl.html (last updated Aug. 12, 2013, archived at <http://perma.cc/JXR4-UQR9>).

66. *Id.*

67. BWM, *supra* note 35.

68. See *Ballast Water and the Great Lakes-St. Lawrence Seaway System*, *supra* note 7; see also NAT'L OCEANIC AND ATMOSPHERIC ADMIN., CURRENT STATE OF UNDERSTANDING ABOUT THE EFFECTIVENESS OF BALLAST WATER EXCHANGE (BWE) IN REDUCING AQUATIC NONINDIGENOUS SPECIES (ANS) INTRODUCTIONS TO THE GREAT LAKES BASIN AND CHESAPEAKE BAY, USA: SYNTHESIS AND ANALYSIS OF EXISTING INFORMATION 27 (Gregory M. Ruiz & David F. Reid eds., 2007), archived at <http://perma.cc/KMG7-XX3Y>.

69. BWM, *supra* note 35, at 22.

70. *Id.*

71. CHARLES PERRINGS ET AL., BIOINVASIONS AND GLOBALIZATION: ECOLOGY, ECONOMICS, MANAGEMENT AND POLICY (Oxford Univ. Press, 2010).

72. BWM, *supra* note 35 at 22.

73. BWM, *supra* note 35, at regulation D-2.

water treatment include filtration and separation. Physical methods include sterilization by ultraviolet light, ozone, heat, electric current, or ultrasound. Chemical methods include the use of biocides. However, many of these treatments can generate harmful environmental discharges or can be challenging or unsafe for crews to complete, corrosive to ballast tanks, or expensive.⁷⁴ Since these technologies are expensive, jurisdictions are allowing the ballast water exchange approach for the intermediary time.⁷⁵ This BWM standard requires extensive procedural checks, including the pumping of ocean water through tanks three times.⁷⁶ Ballast water exchange is discussed in greater depth below.

In addition, the transboundary harm principle is essential to understanding ballast water regulation. For the purposes of this paper, I rely on the concept of harm as “damage to things, setting back of another’s interests, or wrongful violation of another’s rights.”⁷⁷ The international harm doctrine is a customary international legal norm that operates upon the understanding that if a state’s action or threatened action generates a serious threat to another state’s environment, the offending state has the duty to take preventative measures. Unlike the precautionary principle, where the threat is unknown, the “do no harm” principle focuses upon a scientific understanding of an actual potential threat from an activity.⁷⁸ One of the first applications of this principle was the Trail Smelter arbitration.

Transboundary sulphur dioxide pollution produced by the Consolidated Mining and Smelting Company Limited of Canada in Trail, British Columbia, resulted in significant harm to the State of Washington.⁷⁹ The emissions crossed the international boundary and caused damage to the Columbia River Valley.⁸⁰ Canada and the United States underwent legal arbitration at the IJC twice, once from 1928 to 1931 and again from 1935 to 1941.⁸¹ Each arbitration concluded with Canada paying damages to the United States.⁸²

The arbitrations resulted in the establishment of the customary norm of “do no harm” responses to transboundary pollution. After the 1941 arbitration, the smelter had to refrain from causing any serious damage by altering its production rate based on wind velocity and direction, turbulence, barometric pressure, and the concentration of sulfur dioxide

74. U.S. GEOLOGICAL SURVEY, BALLAST WATER RESEARCH AT THE WFRC (2006), archived at <http://perma.cc/TN6Z-YWY5>.

75. Bostrom, *supra* note 57, at 876.

76. ALEXANDER, *supra* note 3, at ch. 9.

77. Lin, *supra* note 40, at 924.

78. *Id.* at 921 n.148.

79. J.E. Read, *The Trail Smelter Dispute*, 1 CAN. YEARBOOK INT'L L. 213 (1963).

80. *Id.*

81. *Id.*

82. *Id.*

emissions.⁸³ The emissions had to be kept at or below the level determined by the IJC.⁸⁴ This testing occurred in order to prevent further harm, and to hold Canada accountable for harm if it did occur.⁸⁵ Therefore, the Trail Smelter arbitrations established a standard approach to transboundary environmental harm where offending states must take responsibility for their actions. In addition, scientific knowledge played a key role in generating responsibility.⁸⁶

The customary law that emerged was that states were responsible for damages that they caused. Transboundary environmental harm requires that physical impacts will occur or have occurred, that those impacts were caused by humans, that the damage is severe or substantial, and that this harm is present in a state adjacent to the other state where the activity occurs.⁸⁷ The harm generated by aquatic IAS in the St. Lawrence-Great Lakes basin fulfills all of these components. Due to the fact that the transboundary harm presented by IAS is non-accidental – meaning, it occurs gradually and incrementally after repeated incidents of ballast water release – prevention, mitigation, and cooperation are more appropriate resolutions.⁸⁸ Actions of everyday life, such as ballast water release, will have cumulative impacts. However, the threshold for severity must be determined by both the acting state and the offended state.⁸⁹ Determining the threshold of severity for the Great Lakes has been challenging due to the multitude of perspectives. In particular, the debate between Canada and New York State indicates the divergent understandings of that threshold. In the following section, I will discuss the development of bi-national regulatory thresholds for ballast water discharge.

BALLAST WATER REGULATION FOR THE GREAT LAKES FROM 1989 TO 2008

According to the Geological Survey Western Fisheries Research Center, “[o]ne ship may contain more than 12 million gallons of ballast water providing a very efficient vector for aquatic microbes, plants, and animals. In fact, it is estimated that 7,000 different species are transported around the world daily in ballast water.”⁹⁰ In 2006, there were more than 45,000 commercial cargo-carrying vessels that used ballast water.⁹¹

83. *Id.* at 217-20.

84. *Id.* at 220.

85. *Id.*

86. See TRANSBOUNDARY HARM IN INTERNATIONAL LAW: LESSONS FROM THE TRAIL SMELTER ARBITRATION 6-8 (Rebecca M. Bratspies & Russell A. Miller eds., 2006), *archived at* <http://perma.cc/3YX-TBEB>.

87. HANQIN XUE, TRANSBOUNDARY DAMAGE IN INTERNATIONAL LAW ch. 1 (2003).

88. *Id.* at 13-14.

89. *Id.* at 15.

90. U.S. GEOLOGICAL SURVEY, *supra* note 74 (alteration added).

91. *Id.*

Historically, this water was released without consideration of its ecosystem effects.⁹² The first regulatory approaches attempted to reduce the impact of species introduction by encouraging voluntary ballast water exchange.⁹³

Ballast water exchange (BWE) is a simple process, and requires no new technology. A ship takes in coastal ballast water in port. During a crossing in international ocean waters, the ship exchanges the coastal water for mid-ocean water. When the ship reaches its destination port, it discharges the mid-ocean water.⁹⁴ Freshwater and coastal ecosystems are drastically different from their mid-ocean counterparts, thus drastically reducing the likelihood of establishing species from mid-ocean ecosystems into coastal ecosystems.⁹⁵ In addition, in freshwater ecosystems like the Great Lakes, seawater rinses can kill freshwater organisms.⁹⁶ The Smithsonian Environmental Research Center states that “[c]orrectly completed mid ocean ballast water exchange can replace up to 99% of the volume of initial coastal waters with ocean waters and can remove over 90% of the coastal zooplankton trapped within the ballast tank, depending on ship type and ballast tank design.”⁹⁷

Due to the simplicity and relative ease of this process, ballast water exchange has been the regulatory focus of both the Canadian and US regimes until very recently.⁹⁸ Voluntary provisions for ballast water exchange were first introduced in Canada in 1989 for ships traveling to the Great Lakes.⁹⁹ Similar voluntary guidelines were implemented into law in the United States in the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.¹⁰⁰ The international community followed suit in 1991 with the IMO introducing voluntary BWE guidelines.¹⁰¹ The United States made the voluntary BWE guidelines mandatory in the Great Lakes in

92. PERRINGS ET AL., *supra* note 71, at 3.

93. *Preface*, TRANSPORT CAN., <http://www.tc.gc.ca/eng/marinesafety/tp-tp13617-preface-2086.htm> (last updated Jan. 18, 2010, *archived at* <http://perma.cc/ZRZ6-NGZG>).

94. *Mid Ocean Ballast Water Exchange*, SMITHSONIAN ENVTL. RESEARCH CTR., http://www.serc.si.edu/labs/marine_invasions/vector_ecology/bw_exchange.aspx (last visited Oct. 19, 2013, *archived at* <http://perma.cc/9GVM-N3WH>).

95. *See Id.*

96. *Id.*

97. *Id.* (alteration added).

98. ENVTL. PROT. AGENCY, 2013 FINAL ISSUANCE OF NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) VESSEL GENERAL PERMIT (VGP) FOR DISCHARGES INCIDENTAL TO THE NORMAL OPERATION OF VESSELS: FACT SHEET § 4.4.3.5.1 (2013), *archived at* <http://perma.cc/C797-3Q6M> (stating the benefits of ballast water treatment systems over current standards of ballast water exchanges).

99. *Preface*, *supra* note 93.

100. Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, Pub. L. No. 101-646, § 1101, 104 Stat. 4761 (codified as amended in scattered sections of 16, 18, and 33 U.S.C.).

101. BUCK, *supra* note 4, at 10.

1992.¹⁰² However, the BWE regulations remained voluntary in all other US waters until 1996.¹⁰³ There was a low compliance rate for the voluntary BWE program in both jurisdictions.¹⁰⁴

BWE became a requirement throughout the United States when the National Invasive Species Act (NISA)¹⁰⁵ supplanted the Nonindigenous Aquatic Nuisance Prevention and Control Act for ships entering US waters.¹⁰⁶ Reports confirming BWE activities became mandatory in 2004 for all ships entering the Great Lakes,¹⁰⁷ and in 2005, ballast water reporting became mandatory in all US waters.¹⁰⁸ This 2005 amendment meant ships that were traveling only within the US Exclusive Economic Zone must undergo BWE, even if travel was solely within US waters.¹⁰⁹ This provision attempted to prevent the spread of invasive species between US ports. Initially, reporting compliance was low, as only 30.4 percent of vessels entering the US Exclusive Economic Zone filed reports.¹¹⁰ The regulations established penalties for failure to report non-compliance and the Coast Guard began to enforce this law, entrenching the norm that ballast water management is mandatory.¹¹¹

In Canada, the voluntary guidelines were revised and expanded in 2000 to cover all waters under Canadian jurisdiction.¹¹² The guidelines were still voluntary and were renamed *Guidelines for the Control of Ballast Water Discharge from Ships in Waters under Canadian Jurisdiction, TP 13617*.¹¹³ The management companies for the St. Lawrence Seaway, the Canadian owned St. Lawrence Seaway Management Corp., and the American owned St. Lawrence Seaway Development Corp. agreed in 2002 to amend their joint practices and procedures to comply with the best practice provisions of the guidelines.¹¹⁴ These regulations were further bolstered by Canada's entry into the BWM in 2004, which expanded standards for ballast water treatment.¹¹⁵ This standard was applied to all Canadian waters in 2006 through an amendment to the Canadian Shipping

102. *Id.* at 3.

103. *Id.* at 4.

104. ALEXANDER, *supra* note 3, ch. 9.

105. National Invasive Species Act of 1996, Pub. L. No. 104-332, 110 Stat. 4073 (1996) (codified as amended in scattered sections of 16 U.S.C.).

106. BUCK, *supra* note 4, at 4.

107. *Id.*

108. *Id.*

109. *See id.*

110. *Id.*

111. ALEXANDER, *supra* note 3, ch. 19.

112. *Preface*, *supra* note 93.

113. *Id.*

114. *Id.*

115. NAT'L OCEANIC AND ATMOSPHERIC ADMIN., *supra* note 68.

Act.¹¹⁶

Within these regulatory regimes, a major gap existed. Fully loaded freighters, with no ballast on board, known as “NoBOBs,”¹¹⁷ carry a muddy slop at the bottom of tanks that contains significant foreign invader propagules.¹¹⁸ When BWE regulations emerged, they were only applied to ships with full ballast tanks entering Canadian or US waters.¹¹⁹ Ships that declared that they did not have pumpable volumes of ballast water did not have to undergo BWE.¹²⁰ Thus, NoBOBs were not required to flush their tanks with ocean water before entering the seaway.¹²¹ Transport Canada estimates that “90 per cent of ships entering the Great Lakes through the St. Lawrence Seaway are fully loaded with cargo and therefore do not require ballast water for stability or safe operation.”¹²²

NoBOBs are a major vector for IAS. The average NoBOB actually carries 157 metric tons of slop, and when considered within the context of a year, the NoBOB loophole resulted in the release of 858 million tons of ballast water and sediment into the Great Lakes based on 1995 data.¹²³ This NoBOB component represents 84 percent of ballast water released.¹²⁴ Jeff Alexander, in his book *Pandora's Locks*, describes the means by which NoBOBs release ballast water into the Great Lakes:

When NoBOBs dropped off cargo at a Great Lakes port, the vessels sucked lake water into their ballast tanks to maintain stability during the next leg of their journey. That lake water mixed with the residual sediment and water in ballast tanks, which was hauled into the lakes from ports overseas. The ship would then discharge some, if not all, of that mix of domestic and foreign ballast water—and all that lived in it—when taking on cargo at another Great Lakes port.¹²⁵

By flushing NoBOB tanks with salt water, 95 percent of organisms

116. Ballast Water Control and Management Regulations, SOR/2011-237, 1-2 (Can.), available at <http://laws-lois.justice.gc.ca/PDF/SOR-2011-237.pdf>.

117. *Ballast Water Management*, TRANSPORT CAN., <http://www.tc.gc.ca/eng/marinesafety/oep-environment-ballastwater-management-1963.htm> (last updated Aug. 4, 2011, archived at <http://perma.cc/EN7T-GDEQ>).

118. *Id.*

119. ALEXANDER, *supra* note 3, ch. 9.

120. *Ballast Water Management*, *supra* note 117.

121. ALEXANDER, *supra* note 3, at 138.

122. *Ballast Water Management*, *supra* note 117.

123. ALEXANDER, *supra* note 3, at 140.

124. *Id.*

125. *Id.* at 141.

are killed or purged in ballast water.¹²⁶ Thus, by considering the remnant remains within a tank as ballast water requiring BWE, one can drastically reduce the threat of IAS.

The US, Canadian, and IMO standard definition of ballast water does not specify the amount of water or sediment required to constitute ballast.¹²⁷ Thus, Canadian and US jurisdictions should interpret even a marginal amount of sludge at the bottom of tanks as ballast requiring BWE. This understanding of what constitutes ballast water is underscored by the acknowledgement of the Canadian government that Canadian BWE regulations must be harmonized to the maximum possible extent with US and international provisions.¹²⁸

However, this harmonization began to fracture in the late 2000s. Canada closed the NoBOB loophole in 2006, and follows a “Best Practices” guideline in line with the IMO’s BWE standards for NoBOBS.¹²⁹ The loophole in the United States was closed in 1996 by requiring BWE for all vessels with ballast tanks including NoBOBS.¹³⁰ However, despite the regulatory change, the Coast Guard did not implement BWE monitoring for NoBOBS and did not enforce BWEs for NoBOBS.¹³¹ The St. Lawrence Seaway Development Corp. managed to develop a means of overcoming the US Coast Guard’s lack of enforcement related to NoBOBS.¹³² The American agency that is responsible for the US portion of the seaway required a ballast water rinse similar to the Canadian regulations before entering the waterway.¹³³ This approach compensated for the inactions of the US Coast Guard. Now, “[v]irtually every ship entering the Seaway System undergoes inspection in Montreal by the US Coast Guard, Transport Canada, and the two Seaway Corporations to assure they are compliant with the saltwater flushing and exchange requirements.”¹³⁴ Thus, the St. Lawrence Seaway Development Corp. dealt with the problem of NoBOBS before the US Coast Guard was willing to, despite the fact that the US Coast Guard was the agency charged with their management.

Despite improvements in ballast water release management in the Great Lakes and the St. Lawrence Seaway, the inaction of the US Coast Guard created significant problems. The fact that “the number of [IAS] in

126. *Id.* at 148.

127. *Id.*

128. *Preface, supra* note 93.

129. *Id.*

130. ALEXANDER, *supra* note 3, at 148.

131. *Id.*

132. *Id.*

133. *Id.*

134. GREAT LAKES BALLAST WATER WORKING GROUP, 2007 SUMMARY OF GREAT LAKES BALLAST WATER MANAGEMENT 4 (2008), *archived at* <http://perma.cc/P7VQ-46YG> (alteration added).

the lakes soared from 139 in 1990 to 186 in 2008, a 34 percent increase," suggests that the regulatory design was ineffective.¹³⁵ Twenty of the new species introduced after 1993 could be directly attributed to ballast water.¹³⁶ However, since the introduction in 2006 of the bi-national inspection and enforcement process in the St. Lawrence Seaway to ensure BWE and salt water flushing, no new species have been established within the Great Lakes.¹³⁷

The enforcement process for the bi-national inspection requires that ballast tanks are physically checked before entering the Seaway.¹³⁸ The process is under the shared responsibility of the US and Canadian Seaway Corporations, and Transport Canada.¹³⁹ The US Coast Guard also participates in the monitoring, now that the US Seaway Corporation has made it mandatory.¹⁴⁰ The monitoring consists of an onboard verification process whereby ballast tanks are physically checked and the water tested to ensure reported salinity levels are valid.¹⁴¹ By confirming that the salinity levels are in compliance, the inspectors can ensure that saltwater flushing actually occurred.¹⁴²

NORTHWEST ENVIRONMENTAL ADVOCATES v. EPA

Ballast water regulation continues to evolve as a result of a case successful for environmental activists: *Northwest Environmental Advocates v. EPA*.¹⁴³ Environmental groups consisting of Northwest Environmental Advocates, the Ocean Conservancy, and Waterkeepers Northern California, and the plaintiff intervenor states of New York, Illinois, Michigan, Minnesota, Wisconsin, and Pennsylvania challenged the US Environmental Protection Agency's exemption of ballast water under the Clean Water Act.¹⁴⁴ In 1973, the US EPA declared ballast water exempt from the Clean Water Act.¹⁴⁵ In 1999, the plaintiff groups filed a petition against the Clean

135. ALEXANDER, *supra* note 3, at 150 (alteration added).

136. *Id.*

137. *Ballast Water and the Great Lakes-St. Lawrence Seaway System*, *supra* note 7.

138. THE ST. LAWRENCE SEAWAY MGMT. CORP., BACKGROUND PAPER 1 (2008), archived at <http://perma.cc/NR6-72NP>.

139. *Id.*

140. *Id.*

141. *Id.*

142. *Id.*

143. *Nw. Env'tl. Advocates v. EPA*, No. C 03-05760 SI, 2006 WL 2669042 (N.D. Cal. Sept. 18, 2006).

144. *Id.* at *1; Clean Water Act, 33 U.S.C. §§ 1251-1387.

145. *Nw. Env'tl. Advocates*, 2006 WL 2669042, at *1 n.2 ("The following discharges do not require NPDES permits: (a) Any discharge of sewage from vessels, effluent from properly functioning marine engines, laundry, shower, and galley sink wastes, or any other discharge incidental to the normal operation of a vessel.").

Water Act exemption.¹⁴⁶ The EPA denied this petition in 2003.¹⁴⁷ Following the denial, the exemption was challenged again in 2005 in the United States District Court for the Northern District of California when these groups claimed that ballast discharge resulted in bio-invasions, and that ships must comply with the provisions of the Clean Water Act and obtain a permit to release ballast water.¹⁴⁸ This approach would make ballast water discharge a point-source pollutant.¹⁴⁹ The District Court concluded that exempting ballast water from the Clean Water Act was beyond the EPA's authority and that these discharges would require permits.¹⁵⁰ The Non-Indigenous Aquatic Nuisance Prevention Act of 1990 and the National Invasive Species Act of 1996 did not excuse the EPA from its regulatory responsibilities under the Clean Water Act.¹⁵¹ The court revoked the ballast water exemption in the Clean Water Act and ordered that ballast water discharges be regulated nationwide by September 30, 2008.¹⁵² The EPA and the shipping industry appealed the decision in 2008, but in the Court of Appeals, the ruling was upheld.¹⁵³

By concluding that ballast water should be regulated under the Clean Water Act, all ships would require ballast treatment systems and a permit to emit untreated or partially treated water.¹⁵⁴ Regulations developed from the ruling are much more stringent than current provisions. In November 2011, the EPA proposed developing and augmenting the Vessel General Permit (VGP) to regulate ballast emissions by creating a numerical incident discharge effluent requirement on the amount of living biological material present, along with stricter administrative requirements.¹⁵⁵ As the first iteration of the VGP expired on December 18, 2013,¹⁵⁶ the EPA has implemented a new form of the regulation. This version sets numeric effluent limits for ballast water discharges from large commercial vessels.¹⁵⁷ In addition, it reduces the duplication of documentation for

146. *Id.* at *5.

147. *Id.*

148. *Id.* at *6.

149. Loren Remsberg, *Too Many Cooks in the Galley: Overlapping Agency Jurisdiction of Ballast Water Regulation*, 76 GEO. WASH. L. REV. 1412, 1415 (2007).

150. *Nw. Envtl. Advocates*, 2006 WL 2669042, at *12, *15.

151. ALEXANDER, *supra* note 3, at 266.

152. *Nw. Envtl. Advocates*, 2006 WL 2669042, at *15.

153. Remsberg, *supra* note 149, at 1414.

154. Clean Water Act, 33 U.S.C. §§ 1251-1387.

155. VESSEL GENERAL PERMIT FOR DISCHARGES INCIDENTAL TO THE NORMAL OPERATION OF VESSELS (VGP): AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM No. 9733-7 (2013) [hereinafter VGP 2013], *archived at* <http://perma.cc/VV62-T88R>.

156. H.R. REP. NO. 112-266, at 18 (2011), *archived at* <http://perma.cc/5MPU-ZUCB>.

157. VGP 2013, *supra* note 155, pt. 2.2.3.5.

vessel owners and operators by streamlining the process.¹⁵⁸ The new VGP took effect December 19th, 2013 and expires December 18th, 2019.¹⁵⁹

The new VGP introduces numeric limits on living organisms for ballast water discharge.¹⁶⁰ The EPA concludes that treatment technologies, such as biocides, are now economically achievable.¹⁶¹ The new VGP uses the IMO's standards from the BWB agreement. The numeric limitations on biocide discharges can be met in four different ways: (1) discharging treated ballast water meeting the applicable numeric limits (i.e., by using treatment technology); (2) transferring the ship's ballast water to a third party for on-shore treatment; (3) using treated municipal/potable water as ballast water; or (4) not discharging ballast water.¹⁶²

Water quality concerns related to biocides and pesticides being added to ballast water to prevent IAS are also areas of major concern for the VGP, as this issue is new and previously unaddressed.¹⁶³ The Clean Water Act, along with state specific water quality legislation could preclude the dumping of chemically treated ballast water.¹⁶⁴ However, the EPA is between a rock and a hard place – without using the best available technology, new IAS may be introduced but alternatively, biocide treatments could introduce synthetic chemicals into the ecosystems. The introduction of chemical treatment into ballast water will be an important problem to monitor. The VGP acknowledges that ballast water treatment systems and the use of biocides may contribute to the violation of state-based water quality standards.¹⁶⁵ The VGP sets the limits of effluents at “200 micrograms per liter (µg/l) of chlorine dioxide, 500 µg/l of peracetic acid, 100 µg/l of ozone, and 1,000 µg/l of hydrogen peroxide.”¹⁶⁶

The new VGP will be phased in gradually over a four-year period.¹⁶⁷ Certain new vessels will not be impacted by the numeric limits of the draft VGP, including vehicles “that operate solely within the Great Lakes (commonly known as Lakers).”¹⁶⁸ Therefore, ballast water treatment is not

158. *Id.* pt. 1.

159. *Id.*

160. *Id.*

161. CLAUDIA COPELAND, EPA'S VESSEL GENERAL PERMIT: BACKGROUND AND ISSUES 7 (2013) [hereinafter VGP BACKGROUND], archived at <http://perma.cc/3JYP-Y79G>.

162. *Id.*

163. *Id.* at 6-7, 12 n.27.

164. *Id.* at 12-14.

165. VGP 2013, *supra* note 155, pt. 2.2.3.5.1.1.5.

166. VGP BACKGROUND, *supra* note 161.

167. *Id.* (“Under the VGP, new vessels constructed after December 1, 2013, must comply with the permit’s numeric limits upon delivery. . . . [E]xisting vessels, constructed before [that date, must] comply under a staggered schedule. . . . The IMO D-2 standard includes a phased schedule for similar ballast water capacity sizes of vessels, but with slightly different implementation dates.”).

168. *Id.*

yet required in the Great Lakes.¹⁶⁹ However, if treatment technologies for Lakers become available during the permit term, EPA will “promptly exercise the permit reopener to modify the permit” sooner than the proposed four-year limit to modify these requirements accordingly.¹⁷⁰

Therefore, Canadian ships may be significantly impacted in the near future by another country’s regulatory scheme. The EPA suspects that this program will be successful in reducing the introduction of IAS and estimates that “2,880 domestic and 5,270 foreign vessels are potentially subject to the ballast water standards because they operate with on-board ballast water tanks, and the agency anticipates that about 40% of covered vessels will comply by installing a ballast water treatment system.”¹⁷¹ The cost of introducing these systems is estimated at approximately \$315,000 per vessel.¹⁷² The reactions of various states to the updated VGP, in particular New York, has yet to be seen. In the following section, the ramifications of the slow inclusion of ballast water into previous iterations of the VGP and the bi-national strain it created are discussed.

CANADA AND NEW YORK STATE, DIVERGING PERSPECTIVES

Due to the slow progress of the Vessel General Permit ballast regulation system, New York State, in 2011, declared its intention to develop regulations based on the Clean Water Act. Within section 401(d) of the Clean Water Act, a state can develop further, more stringent conditions as part of a federal emissions permit in order to protect the state’s own water quality.¹⁷³ A Vessel General Permit is

required for most commercial vessels greater than 79 feet in length that operate in US waters. The [Vessel General Permit] regulates 26 different discharges from vessels that are incidental to the normal operation of a vessel. Some of these discharges are deck runoff, bilge water, gray water, chain locker effluent, and ballast water.¹⁷⁴

“Part 6.22 of the Vessel General Permit contains the additional requirements provided to the EPA by New York in its Water Quality

169. VGP 2013, *supra* note 155, pt. 2.2.3.4.

170. VGP BACKGROUND, *supra* note 161.

171. *Id.*

172. BAY PLANNING COMMISSION, BALLAST WATER & INVASIVE SPECIES (2012), *archived at* <http://perma.cc/RT9M-PQUD>.

173. *Vessel General Permit*, N.Y. STATE DEPT. OF ENVTL. CONSERVATION, <http://www.dec.ny.gov/permits/72399.html> (last visited Oct. 19, 2013, *archived at* <http://perma.cc/A446-SUAE>).

174. *Id.* (alteration added).

Certification.”¹⁷⁵ Based on this rationale, New York State developed a regulatory scheme within the Vessel General Permit that would require the treatment of ballast water within the Vessel General Permit prior to its discharge.¹⁷⁶

Cost estimates of ballast water treatment vary based on the type of treatment and the type of vessel being used. However, the average “cost of retrofitting vessels to treat ballast water on board is estimated at between \$200,000 and \$310,000 per vessel for mechanical treatment and around \$300,000 for chemical treatment.”¹⁷⁷ The shipping industry considers this expense prohibitive.¹⁷⁸ However, for NoBOBs, treatment may prove the best means of preventing the spread of propagules as BWE is not sufficient according to the scientific community.¹⁷⁹

The regulations for ballast water treatment could apply to any vessel within New York State waters.¹⁸⁰ Two of the locks within the St. Lawrence Seaway fall entirely within New York jurisdiction.¹⁸¹ Therefore, these regulations applied to all ships entering the Great Lakes via the St. Lawrence Seaway. In a Fall 2011 press release, New York State laid out the proposed and subsequent expectations related to their ballast water regulations:

1. Ballast water exchange and/or flushing for all vessels is required in entering New York’s waters, not just vessels from outside 200 miles of New York’s coast.
2. All vessels, except military vessels, will comply with ballast water discharge standards starting on January 1, 2012, which will require the installation of ballast water treatment.
3. Ships constructed on or after January 1, 2013 are to employ technology to meet ballast water discharge standards, which are even more protective of New York’s waters.¹⁸²

175. *Id.*

176. *Id.*

177. OFFICE OF THE GOVERNOR, STATE OF WASH., PUGET SOUND ACTION TEAM, BALLAST WATER MANAGEMENT IN WASHINGTON STATE: RECOMMENDATIONS FOR IMPROVEMENT 19 (Kevin Anderson ed., 2007), archived at <http://perma.cc/Q57V-PXVF>.

178. *Ballast Water Management*, *supra* note 117.

179. *Mid Ocean Ballast Water Exchange*, *supra* note 94.

180. Tuxill, *supra* note 5.

181. GREAT LAKES BALLAST WATER WORKING GROUP, *supra* note 134 at 11.

182. Tuxill, *supra* note 5.

The regulation had stringent numeric limits of biota and rapid onset expectations,¹⁸³ as the proposed above schedule demonstrated. As a result of this regulatory approach, New York State faced significant opposition from municipalities, states, shippers, and the Canadian government.¹⁸⁴ The Port of Oswego Authority challenged the regulations in the New York Supreme Court, where the Court found that the regulatory proposal was reasonable and consistent with the state's authority within the Clean Water Act.¹⁸⁵ This ruling affirmed that New York had both the grounds and authority to implement these regulations.¹⁸⁶

New York State's application of the provisions within the Clean Water Act created a complicated scenario for Canadian legislators. Canada argued that New York's proposed regulations were 100 to 1000 times more stringent than those of the US Coast Guard.¹⁸⁷ Canada began to lobby extensively against the New York regulatory approach.¹⁸⁸ On the Transport Canada website in November 2011, the Canadian government issued an appeal to the public and to New York in an attempt to dissuade them.¹⁸⁹ The language used in the appeal is strong and condemningly stated:

1. *Approved ballast water treatment systems are not available to meet the required standard.* The EPA Science Advisory Board recently concluded that no current treatment system types will be able to meet New York's standard. The requirements are therefore creating uncertainty for shipowners and delaying installation of available ballast water treatment systems. This in turn delays environmental protection.
2. *It is not possible to test systems to the level required.* There is no approval protocol to test the operation of ballast water treatment systems beyond the International Maritime Organization's standard.

183. *Id.*

184. *Battle over Ballast Water*, 116:11 MARINE LOG 37, 37 (2011), archived at <http://perma.cc/877Q-B8NE>.

185. *Matter of Port of Oswego Auth. v. Grannis*, 881 N.Y.S.2d 283, 289-90 (N.Y. Sup. Ct. 2009).

186. Tuxill, *supra* note 5.

187. *Battle over Ballast Water*, *supra* note 184.

188. Press Release, Statement by the Parliamentary Secretary to the Minister of Transport, Infrastructure and Communities, Pierre Poilievre, on Ballast Water Management for the Great Lakes-St. Lawrence Seaway System (Nov. 17, 2011), archived at <http://perma.cc/54XD-4EPT> [hereinafter Statement by the Parliamentary Secretary].

189. *Ballast Water and the Great Lakes-St. Lawrence Seaway System*, *supra* note 7; see also Statement by the Parliamentary Secretary, *supra* note 188.

Testing these systems is a complex and difficult process, requiring significant laboratory work and large volumes of water. The EPA Science Advisory Board recently concluded that current available methods prevent testing of New York's standard.

3. *The requirements apply to all vessels operating in New York waters, regardless of whether they plan to discharge ballast water.* As two Seaway locks near the entrance to the Great Lakes lie within New York waters, enforcement of the requirements on transiting ships would stop commercial traffic on the Seaway, including domestic ships travelling between Canadian ports. Additionally, Canadian shipments to and from the Port of New York and New Jersey would be curtailed.¹⁹⁰

Canada goes on to estimate the economic impacts to the St. Lawrence Seaway at almost \$11 billion in revenue and more than 72,000 jobs lost in Canada and the United States.¹⁹¹ Canada developed an extensive lobbying strategy to prevent a unilateral decision by New York that Canada felt would undermine twenty years of cooperative regulatory approaches.¹⁹² Within their appeal, they requested that New York adopt an internationally compatible approach in line with IMO standards, particularly for ships that are merely traveling through New York waters or locks on their way to ports in other jurisdictions.¹⁹³ Canada encouraged New York to take an ecosystem approach,¹⁹⁴ meaning one that "places humans within and dependent on the functioning ecosystem rather than apart and independent from the natural system."¹⁹⁵

If New York had gone through with its proposed ballast water regulatory approach, Canada may have attempted to use legal recourse to prevent the regulation. Canada could have argued to the IJC that the regulations were in contravention of article 1 of the Boundary Waters Treaty (BWT) of 1909.¹⁹⁶ article 1 states:

190. *Ballast Water and the Great Lakes-St. Lawrence Seaway System*, *supra* note 7.

191. *Id.*

192. *Id.*

193. *Id.*

194. *Id.*

195. Jamie Benidickson, *The Great Lakes and the Mediterranean Sea: Ecosystem-Management and Sustainability in the Context of Economic Integration*, 14 J. ENVTL. L. & PRAC. 107, 108 (2004).

196. Boundary Waters Treaty, *supra* note 9.

The High Contracting Parties agree that the navigation of all navigable boundary waters shall forever continue free and open for the purposes of commerce to the inhabitants and to the ships, vessels, and boats of both countries equally, subject, however, to any laws and regulations of either country, within its own territory, not inconsistent with such privilege of free navigation and applying equally and without discrimination to the inhabitants, ships, vessels, and boats of both countries.¹⁹⁷

By requiring significant ballast regulation, trade on the waterways would have been inhibited. There is no definition in the text of the BWT to explain what is meant by the freedom of navigation. It could be interpreted to suggest that extensive law and regulation harming the economic viability of the St. Lawrence Seaway could interfere with freedom of navigation.¹⁹⁸ Generally, within the principles of navigable waterways, national laws cannot interfere with the freedom of navigation.¹⁹⁹

The concept of “rights of police” can apply to navigable waterways, based on the Helsinki Rules on the Uses of the Waters of International Rivers.²⁰⁰ Jurisdictions have the right to regulate for health and safety over the portion of the river that is subject to their own jurisdiction.²⁰¹ However, they must not interfere with the freedom of navigation.²⁰²

As a result, the IJC, the body that deals with pollution-based debates between parties, would alternatively have to determine whether New York State was exercising its right to police or interfering with the freedom of navigation. The IJC would have to determine if the regulations developed were reasonable, and whether the damage that the regulations would have to the economy outweighed the potential environmental damage. This predicament may still occur if ballast water regulations are not harmonized bi-nationally.

This debate is complicated by the complexities associated with determining non-accidental environmental harm. One state could view the environmental harm as severe and promote vigorous restrictions on transit, while the other might view the damage as within tolerable limits. For the process of regulation to be viable, the determination of the threshold of severity must be a cooperative effort, since the burden of environmental harm is shared between New York and Canada. Conceivably, in the context

197. *Id.* art. I (emphasis added).

198. CURRIE ET AL., *supra* note 10, at 354.

199. *Id.*

200. Int'l Law Ass'n, *The 1966 Helsinki Rules on the Uses of the Waters of International Rivers*, art. 4, Aug. 1966, archived at <http://perma.cc/XM8H-GY69>.

201. CURRIE ET AL., *supra* note 10, at 349.

202. *Id.*

of the Great Lakes and St. Lawrence River, Canada has a greater burden of harm due to its extensive coastline. For example, potential impacts to the fishery of Lake Superior would not be viewed by New York State as consequential.

In the Trail Smelter case, the IJC was able to determine Canada's culpability for the damage in Washington State.²⁰³ The threshold for pollution was ill-defined, and consequentially was set by the IJC.²⁰⁴ If Canada were to bring New York State to the IJC, it would need to determine if New York State's proposed threshold limit to its coastal waters was too severe, and beyond the cooperative and agreed upon threshold previously generated in harmonized legislation. Therefore, the rights to police and to determine the severity of threshold for environmental harm are muddled by an ineffective legal regime in determining non-accidental harm. The regulations within the Clean Water Act may be interpreted to often apply to scenarios of non-accidental harm where this harm can be regulated with emission permits and threshold limits.

Due to the amendment to the Clean Water Act, ballast water would likely be viewed as water pollution by the IJC, despite the fact that to date Canada does not equate ballast water with pollution and the GLWQA does not define IAS as pollution. The IJC, in a conference presentation,²⁰⁵ considers policies related to ballast water and IAS as follows in article 4 of BWT: "the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other."²⁰⁶ Therefore, the IJC would likely interpret ballast water as pollution if Canada took action against New York's regulations.

Therefore, any challenges Canada brought to the Commission would hinge on the interpretation of freedom of navigation and whether the pollution that ballast release generates would be consistent with New York State's right to police.

However, international legal approaches never needed to be applied. In late February 2012, New York State folded to considerable lobbying pressure related to the tremendous economic impacts that the proposed regulations would generate.²⁰⁷ The delight of the Canadian government was

203. TRANSBOUNDARY HARM IN INTERNATIONAL LAW: LESSONS FROM THE TRAIL SMELTER ARBITRATION, *supra* note 86, at 3.

204. *Id.*

205. BINATIONAL AQUATIC INVASIVE SPECIES RAPID RESPONSE AND ASSESSMENT PLANNING- INTERNATIONAL JOINT COMMISSION WORKING GROUP COMMITTEE, PRESENTED AT THE 17TH ANNUAL INTERNATIONAL CONFERENCE ON AQUATIC INVASIVE SPECIES (2010), *archived at* <http://perma.cc/8LK5-UAEU>.

206. Boundary Waters Treaty, *supra* note 9, art. IV.

207. *Government of Canada Applauds New York State for Withdrawing its Ballast Water Requirements*, *supra* note 8.

apparent in a press release issued shortly after the New York Department of Environmental Conservation Commissioner, Joe Martens, agreed to pursue national regulatory approaches proposed by the EPA to ballast water discharges managed under the Clean Water Act and to rescind the state-based regulatory approach.²⁰⁸ In the release, Parliamentary Secretary to the Minister of Transport, Infrastructure and Communities Pierre Poilievre said, “Canada applauds New York State for withdrawing its unattainable ballast water requirements and agrees that uniform standards are the best way to protect the marine environment. . . . We welcome this action as enforcement of the rules on transiting ships would have stopped commercial shipping on the Seaway.”²⁰⁹

As the new iteration of VGP ballast water release standards under the Clean Water Act emerges, the focus of the regulatory regime seems to be moving towards harmonizing standards between not only Canada and the United States, but also internationally. New York’s actions were vehemently attacked by Canada as uncooperative, damaging, and unattainable.²¹⁰ They were particularly unattainable because they were approached without multi-lateral cooperation and not consistent with international standards developed by the IMO.²¹¹ The Canada-New York ballast water release battle resulted in a disappointing pandering towards less stringent regulations than initially proposed.²¹² However, the New York regulatory design was formulated without due consideration for technology available and the needs of other jurisdictions.²¹³ The impacts of the new VGP may go a long way for developing a united vision of ballast water. Future regulatory design will need to focus upon harmonization and managing the costs of technological requirements to treat the ballast water.

FUTURE REGULATIONS

Currently, US environmental and regulatory authorities have more restrictive policies where physical or chemical ballast treatments are mandated.²¹⁴ Despite Canada’s aggressive lobbying against New York State’s ballast water treatment requirements,²¹⁵ the IMO BWM calls for the eventual phasing out of BWE in favor of more effective ballast treatment

208. *Id.*

209. *Id.*

210. *Id.*

211. *Id.*

212. *New York State Will Follow National Ballast Water Standard*, CANADIAN SAILINGS, <http://www.canadiansailings.ca/?p=3810> (last updated March 5, 2012, archived at <http://perma.cc/3856-AWGB>).

213. *Government of Canada Applauds New York State for Withdrawing its Ballast Water Requirements*, *supra* note 8.

214. VGP 2013, *supra* note 155.

215. Statement by the Parliamentary Secretary, *supra* note 188.

technology.²¹⁶ Canada has acknowledged its commitment to phase out BWE in favor of ballast water treatment by signing the Treaty and by acknowledging its intent on the Transport Canada website.²¹⁷ However, as the Treaty is not yet in force, Canada has no international obligation to comply at this time. Once the Treaty is in force, Canada will need to develop means of ballast water treatment and must ensure regulations are met in Canadian waters.²¹⁸

Concurrently, the proposed VGP will also pressure Canadian ships into treatment technologies,²¹⁹ particularly if lakers are eventually included in the numeric limitation guidelines. Lakers are bulk carriers that move within the shared waterways of the Great Lakes and St. Lawrence Seaway. The VGP will apply to all vessels entering US waters,²²⁰ meaning that all Lakers, as well as salties (sea-going cargo ships) and other vessels that are Canadian must comply with the ballast water treatment standards. Thus, Canadian vessels in the Great Lakes must comply with the US standard, despite the fact that it lacks a Canadian equivalent. BWE is still the minimum treatment level required in Canadian waters.²²¹

The updated approach to invasive species in the Great Lakes Water Quality Agreement (GLWQA) also affirms the tandem approach that the United States and Canada need to take. Annex 6 ratifies that the United States and Canada will develop a bi-national invasive species strategy, in particular, implementing a ballast water discharge program,²²² based on the request of the IMO that standards be set based on the BWM's standards when possible.²²³ The GLWQA also calls for coordinated risk assessments, education and outreach strategies, early detection and rapid response strategies, and scientific investment.²²⁴ The reporting of progress towards Annex 6's goals is required every three years.²²⁵ The inclusion of an invasive species strategy and a ballast water strategy in the GLWQA agreement shows a significant stride towards policy development. Bi-nationally, governments responded to the increased stress and included the risk of IAS within the GLWQA. Developing bi-national standards for ballast water treatment could be the next logical step.

Standards for ballast water discharge, meaning the amount of

216. *Preface*, *supra* note 93.

217. *See id.*

218. *See id.*

219. VGP 2013, *supra* note 155 at 17.

220. *Id.*

221. Ballast Water Control and Management Regulations, SOR/2011-237, (Can.), available at <http://laws-lois.justice.gc.ca/PDF/SOR-2011-237.pdf>.

222. GLWQA, *supra* note 11, Annex 6 (referred to as biofouling in Annex 5).

223. VGP 2013, *supra* note 155 at 36.

224. GLWQA, *supra* note 11, Annex 6.

225. *Id.*

acceptable species or propagules within ballast water, are necessary so that industries can evolve their technology and treatment standards to meet that level.²²⁶ This approach, as recommended in the IMO BWM, standardizes the amount of acceptable biological pollution within ballast water.²²⁷ Ballast water treatment technology must be developed that is cost effective, non-toxic, and removes IAS propagules. Concurrently, ballast water regulations must be generated that require the use of the best available technology. The proposed Vessel General Permit legislation related to the Clean Water Act will require the best available technology and could meet these demands.²²⁸ However, Canada needs to participate actively if the permit is reopened to prevent conflict.

The United States can now proceed on a new legislative and enforcement approach due to the inclusion of ballast water within the Clean Water Act. They will soon have to treat ballast water before releasing it due to the development of ballast water discharge standards in the proposed VGPs. The United States has thus begun to regulate ballast water as pollution.²²⁹

226. ALEXANDER, *supra* note 3, at 150.

227. *Id.*

228. VGP 2013, *supra* note 155, pt. 4.1.1.1.

229. The United States has officially defined ballast water as pollution within the proposed VGP:

In today's permit, EPA is establishing effluent limitations to control a variety of materials, which, for the purposes of this fact sheet, have been classified into 7 major groups: Aquatic Nuisance Species (ANS), nutrients, pathogens (including *E. coli* & fecal coliform), oil and grease, metals, most conventional pollutants (Biochemical Oxygen Demand, pH, Total Suspended Solids), and other toxic and non-conventional pollutants with toxic effects. EPA is establishing effluent limitations to control these materials, because such materials are constituents in the, depending on the particular vessel, industrial waste, chemical waste and/or garbage 'pollutant' discharge resulting from the activities of these vessels. 'Industrial waste,' 'chemical waste' and 'garbage' are expressly included in the CWA's definition of 'pollutant,' which governs, among other things, which discharges are properly subject to CWA permitting. See CWA § 402(a) (allowing EPA to issue permits for a 'discharge of any pollutant'); CWA § 502(12) (defining 'discharge of a pollutant' to include 'any addition of any pollutant to navigable waters from any point source'); and CWA § 502(6) (defining 'pollutant' as 'dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water' [emphasis added]). The discharge from vessels addressed in today's permit – a worthless or useless flow discharged during a vessel's normal operations – falls within those broad pollutant categories. See, e.g., Webster's II New Riverside University Dictionary (1988) (defining 'waste' as 'a worthless or useless by-product' or 'something, such as steam, that escapes without being used'; 'industrial' as 'of, relating to, or derived from industry' and 'industry['] as 'the commercial production and sale of goods and

Canada, in following with the spirit of harmonization that has guided many of its previous ballast water policies, may need to treat ballast water similarly under domestic legislation. The required legislation will seek to change the standards for Canadian flagships in the Great Lakes and mean new technological requirements. Regulatory design that mirrors this development seems inevitable. Identifying ballast water as a polluting substance would lead to a regulatory shift in how invasive species are viewed within Canada, as it did within the United States.²³⁰ This transition could ensure that tighter regulatory approaches are generated towards not only ballast water, but also IAS as a whole.

CONCLUSION

Ballast water release requirements in the Great Lakes have evolved slowly. The regulatory evolution has been outpaced by the bio-invasions of stowaway foreign matter in ballast tanks. Through trial and error, ballast water regulations have become more stringent. The development of stricter BWE standards, the inclusion of ballast water within the Clean Water Act, and mounting international pressure resulting from the BWM may result in extensive reductions in ballast water induced bio-invasions. Economic and environmental concerns must be balanced to ensure the continuance of the shipping economy and the health of the Great Lakes and St. Lawrence Seaway.

services'; 'chemical' as 'of or relating to the action of chemicals'; and 'garbage' as 'worthless matter, trash'). . . . EPA understands that a lot of attention has been paid to whether, under various circumstances, ANS are properly considered 'pollutants' under CWA §502(6). Today's permit controls ANS because such ANS are one constituent of concern in the waste stream that constitutes the 'pollutant' subject to today's permit.

ENVTL. PROT. AGENCY, 2008 FINAL ISSUANCE OF NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) VESSEL GENERAL PERMIT (VGP) FOR DISCHARGES INCIDENTAL TO THE NORMAL OPERATION OF VESSELS: FACT SHEET § 3.4 (2008), *archived at* <http://perma.cc/46LN-XZFA>.

230. *Id.*