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## Note

# Will Viral Hemorrhagic Septicemia (VHS) Be the Straw That Breaks the Camel's Back? The Balkanization of Great Lakes Ballast Water Law

Brian D. Clark\*

It's just human nature to take time to connect the dots. I know that. But I also know that there [may] be a day of reckoning, when you wish you had connected the dots more quickly.

Al Gore, *An Inconvenient Truth*<sup>1</sup>

Every day 10,000 aquatic species are carried in the ballast water<sup>2</sup> of ships around the world and many of these are later discharged into foreign bodies of water.<sup>3</sup> In the Great Lakes alone, there is a new aquatic nuisance species (ANS) identified every eight months,<sup>4</sup> usually contained in some of the six million metric tons of ballast water dumped into the Great Lakes each year by ocean-going vessels.<sup>5</sup> The damage caused by

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\* Brian D. Clark is a J.D. Candidate at the University of Minnesota Law School.

1. *An Inconvenient Truth*, Minute 1:11–1:12 (Paramount Pictures 2004).

2. *Fednav, Ltd. v. Chester*, 505 F. Supp. 2d 381, 384 (E.D. Mich. 2007) (“Ballast [water] is weight put into the hull of a ship to improve its stability at sea.”) (internal citation omitted).

3. Eugene H. Buck, *Ballast Water Management to Combat Invasive Species*, Cong. Research Serv. Report for Cong. RL32344, 1, (Updated Oct. 2, 2006), available at <http://www.ncseonline.org/NLE/CRSreports/06Oct/RL32344.pdf>.

4. See INT'L JOINT COMM'N, TWELFTH BIENNIAL REPORT ON GREAT LAKES WATER QUALITY 15 (2004) [hereinafter TWELFTH BIENNIAL REPORT].

5. See ERIC REEVES, MICH. DEPT OF ENVTL. QUALITY, ANALYSIS OF LAWS & POLICIES CONCERNING EXOTIC INVASIONS OF THE GREAT LAKES: A REPORT TO THE

zebra and quagga mussels will eventually exceed \$5 billion in Lake Erie alone<sup>6</sup> and invasive species cost the global economy \$1.4 trillion annually.<sup>7</sup>

A new ANS in the Great Lakes highlights the need for immediate action to strengthen laws regulating invasive species. The new viral disease, Viral Hemorrhagic Septicemia (VHS),<sup>8</sup> causes a fish's internal organs and skin to hemorrhage. VHS is highly lethal among many native fish species found in the Great Lakes.<sup>9</sup> First discovered in the Great Lakes in 2005,<sup>10</sup> VHS is presumed to have been introduced via ballast water.<sup>11</sup> VHS threatens the fishing industry in the Great Lakes valued at \$5 billion,<sup>12</sup> and like nearly all ANS brought to the Great

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OFFICE OF THE GREAT LAKES 1 (Mar. 15, 1999), *available at* <http://www.deq.state.mi.us/documents/deq-water-great-lakes-aquatics-exotic2.pdf>.

6. Scott Fields, *Great Lakes: Resource at Risk*, 113 ENVTL. HEALTH PERSPECTIVES 164, 171 (2005); *see also* David Pimentel et al., *Environmental and Economic Costs of Nonindigenous Species in the United States*, 50 BIOSCIENCE 53, 61 (2000) (noting the United States loses \$137 billion per year to damage caused by invasive species).

7. David Pimentel et al., *Economic and Environmental Threats of Alien Plant, Animal, and Microbe Invasions*, 84 AGRIC., ECOSYSTEMS, & ENV'T 1, 14 (2001) (explaining results of study concerning global impact of invasive species and noting the total cost of damage caused by invasive species is five percent of global GDP).

8. VHS is technically not a "species," as it is a non-living virus. For the sake of clarity it will be referred to as an ANS in order to incorporate its destructive effects into the broader ballast water debate. *See* REEVES, *supra* note 5, at 10 (noting viruses are presumably not included in most estimates as invasive 'species', but indicating their importance to the ballast water problem).

9. Sea Grant Michigan, *Viral Hemorrhagic Septicemia (VHS) in the Great Lakes*, <http://www.miseagrant.umich.edu/downloads/ais/07-700-fs-VHS.pdf> (last visited Sept. 22, 2008) (noting the strain of VHS in the Great Lakes appears to affect most species of game fish, including northern pike, bluegill, freshwater drum, muskellunge, walleye, bass, and crappie).

10. Ken Phillips, *Viral Hemorrhagic Septicemia: A New Invader in the Great Lakes*, 5 FISH LINES 8, 8 (2007), *available at* <http://www.fws.gov/Midwest/Ashland/documents/VHS.pdf> (explaining VHS was first found by researchers in 2003 in Lake St. Clair, but the specimen was not examined until a confirmed VHS fish kill in December 2005).

11. Sea Grant Michigan, *Viral Hemorrhagic Septicemia (VHS) in the Great Lakes*, *available at* <http://www.miseagrant.umich.edu/downloads/ais/07-700-fs-VHS.pdf> (last visited Sept. 22, 2008) (characterizing ballast water discharge as a "likely means of introduction" for VHS). *But see* Email from David Reid, Director, NOAA National Center for Research on Aquatic Invasive Species, to author (Oct. 25, 2007, 16:23 CST) (on file with author) ("[T]here is no scientific evidence that ballast water is a significant vector for moving VHS, or that ballast water introduced VHS to the lake ecosystem.").

12. Libby Sander, *Michigan's Summer Fishing Turns Less Carefree*, N.Y. TIMES, July 13, 2007, at A12.

Lakes, appears to be impossible to eradicate.<sup>13</sup> VHS is responsible for large fish kills in every Great Lake except Lake Superior.<sup>14</sup> Its spread there is especially feared because VHS is most active in colder waters such as those found in Lake Superior.<sup>15</sup> VHS and other invasive species threaten the vitality and economic well-being of a community of 33 million Canadians and Americans.<sup>16</sup> VHS highlights the environmental and financial risks at stake from the imminent threat posed by ANS contained in the ballast water of ships travelling the Great Lakes.<sup>17</sup> Its appearance at a time when U.S. regulations are being considered at the federal and state levels and U.S. litigation is pending increases VHS's potential to spur the enactment of a Great Lakes ballast water regime.

This Note investigates the rise of state ballast water regulations in response to the failure of the Canadian and U.S. governments to effectively regulate ballast water discharges and the ANS they contain. Part I of this Note describes the history of the ballast water problem, United States and Canadian regulatory efforts, and the rise of state implemented ballast water regulations in the Great Lakes. Part II outlines the failure of the Canadian and U.S. federal governments to effectively regulate ballast water discharges. Part III explains that this failure is grossly inefficient and costly for the Great Lakes community. Part IV describes the balkanization of Great

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13. See Krishna Ramanujan, *Deadly Virus in Freshwater Fish is Found in Northeast for the First Time by Cornell Researchers*, CORNELL U. C. OF VETERINARY MED., June 14, 2006, available at <http://www.vet.cornell.edu/news/articles/fishvirus.htm> (noting that “[i]n a large ecosystem . . . there really is no treatment. . . . The best management option is to try and contain the spread of it as best we can.”).

14. See Jeff Smith, *Battle Plan to Halt Fish Killer's Advance: National Parks and Grand Portage Tribe Band Together to Prevent the Spread of Viral Hemorrhagic Septicemia (VHS) to Lake Superior Fish*, TRAVERSE MAG., Mar. 19, 2008, available at <http://www.mynorth.com/My-North/March-2008/Battle-Plan-to-Halt-Fish-Killers-Advance/>.

15. See *id.*

16. Bradley C. Karkkainen, *Managing Transboundary Aquatic Ecosystems: Lessons from the Great Lakes*, 19 PAC. MCGEORGE GLOBAL BUS. & DEV. L.J. 209, 212 (2006).

17. While there have been a number of efforts aimed at preventing the spread of VHS between the Great Lakes and inland lakes, this note will focus primarily on legislative responses to the problem posed by the initial vector of VHS, ballast water. See, e.g., Press Release, Ontario Government, Ministry of Natural Resources, Ontario Government Acting Swiftly to Control Further Spread of New Fish Virus (Jan. 8, 2007), available at [http://www.mnr.gov.on.ca/en/Newsroom/LatestNews/MNR\\_E004140.html](http://www.mnr.gov.on.ca/en/Newsroom/LatestNews/MNR_E004140.html) (noting Ontario's efforts to restrict the transportation of baitfish between lakes).

Lakes ballast water policy and why state ballast water measures cannot be the end goal for ballast water regulation. Part V concludes that the United States and Canada should pass legislation imposing higher treatment standards for ballast water discharge.

## I. BACKGROUND ON THE BALLAST WATER PROBLEM: PAST AND PRESENT EFFORTS TO FIX AN OLD FOE

The history of the ballast water problem in the Great Lakes is long, but so too is the course of regulations enacted by Canada and the United States. Recent developments indicate there may be a movement towards state implemented regulations.

### A. HISTORY OF THE BALLAST WATER PROBLEM IN THE GREAT LAKES

Diseases and invasive species have been transported via ships engaged in international trade for hundreds of years.<sup>18</sup> As noted in the introduction, when these organisms are brought into new bodies of water they are referred to as ANS and may cause harm to indigenous species and their environment.<sup>19</sup> The primary vector<sup>20</sup> for ANS in the Great Lakes is ballast water from ocean-going ships.<sup>21</sup>

The Great Lakes have historically been isolated from ANS by geographical barriers<sup>22</sup> and a lack of ocean-going ships to

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18. REEVES, *supra* note 5, at 18 (noting that black rats and fleas transported by ships in the fourteenth century carried Black Death across Europe).

19. National Invasive Species Act of 1996, 16 U.S.C. § 4701(a)(2) (2007) (explaining that “when environmental conditions are favorable . . . [ANS may] become established, may compete with or prey upon native species of plants, fish, and wildlife, may carry diseases or parasites that affect native species, and may disrupt the aquatic environment and economy of affected near-shore areas”); see generally TWELFTH BIENNIAL REPORT, *supra* note 4, at 15.

20. In the context of this invasive species and ballast water, a vector is the ballast water carried by ships that provides a means for an ANS to enter the Great Lakes ecosystem. See REEVES, *supra* note 5, at 18 (“[s]hips have always been carriers of plague.”).

21. INT’L JOINT COMM’N, ELEVENTH BIENNIAL REPORT ON GREAT LAKES WATER QUALITY 32 (2002) [hereinafter ELEVENTH BIENNIAL REPORT].

22. GREAT LAKES FISHERY COMM’N, SEA LAMPREY: A GREAT LAKES INVADER, FACT SHEET 3, at 1 (2000), available at [http://www.glfc.org/pubs/FACT\\_3.pdf](http://www.glfc.org/pubs/FACT_3.pdf) (“Prior to the opening of the Welland Canal in 1829 . . . Niagara Falls served as a natural barrier. . .”).

introduce the diseases.<sup>23</sup> The addition of a system of canals and locks has allowed ANS to enter the Great Lakes through the newly connected waterways<sup>24</sup> by “hitch-hiking” in the ballast water of the ships that travel these waterways.<sup>25</sup> Water taken up in special “ballast tanks” provides a cheap way to accomplish stabilization, so huge amounts of water<sup>26</sup> are pumped into these tanks in the waters of foreign harbors.<sup>27</sup> The waters often contain dozens of invasive species that are sucked into the ballast tanks.<sup>28</sup>

Every year an average of 500 ocean-going ships traverse the Great Lakes<sup>29</sup> to drop off and load cargo,<sup>30</sup> taking in and discharging ballast water as needed. That discharge could contain several different ANS that may become established in a harbor and subsequently spread to any of the Great Lakes.<sup>31</sup> Once ANS arrive in the Great Lakes, any local ship taking on ballast water can act as a vector, carrying the ANS to other areas of the Great Lakes. Subsequently smaller recreational

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23. REEVES, *supra* note 5, at 10 (“Large transoceanic vessels could not enter the Great Lakes until after the opening of the St. Lawrence Seaway in 1959. . .”).

24. The canals enabling ships to traverse the Great Lakes have also allowed ANS to enter the Great Lakes under their own power. See, e.g., GREAT LAKES FISHERY COMM’N 1, *supra* note 22 (explaining how sea lampreys entered the Great Lakes “through manmade locks and shipping canals”).

25. This “hitch-hiking” by ANS is due to ships travelling from foreign jurisdictions to the Great Lakes taking on water to make the ship more navigable. See Steven A. Wade, *Stemming the Tide: A Plea For New Exotic Species Legislation*, 10 J. LAND USE & ENVTL. L. 343, 357 (1995) (noting how ships can pick up ANS in their ballast water).

26. See Mike J. Prather, *International Trade and the Bioinvasion; A Price for Everything and Everything for a Price*, 10 CURRENTS: INT’L TRADE L.J. 45, 49 (Winter 2001) (“The ballast tanks of the world’s larger ships can hold up to 200,000 cubic meters of seawater or more.”).

27. See Wade, *supra* note 25, at 357.

28. A recent study of the ballast water of 159 Japanese ships found 367 varieties of marine organisms. Wade, *supra* note 25, at 357.

29. See Sharon Moen, *Law Center Identifies Potential Leaks in Michigan Ballast Water Legislation*, MINN. SEA GRANT (Feb. 2007), available at [http://www.seagrants.umn.edu/newsletter/2007/02/law\\_center\\_identifies\\_potential\\_leaks\\_in\\_michigan\\_ballast\\_water\\_legislation.html](http://www.seagrants.umn.edu/newsletter/2007/02/law_center_identifies_potential_leaks_in_michigan_ballast_water_legislation.html) [hereinafter Moen, *Michigan BWM Law*].

30. See REEVES, *supra* note 5, at 17 (noting that forty percent of ocean-going ships change ballast water inside the Great Lakes).

31. See THOMAS JOHNGEN ET AL., ASSESSMENT OF TRANSOCEANIC NOBOB VESSELS AND LOW-SALINITY BALLAST WATER AS VECTORS FOR NONINDIGENOUS SPECIES INTRODUCTIONS TO THE GREAT LAKES, FINAL REPORT, at i, xiii–xiv (2005), available at [http://www.glerl.noaa.gov/res/Task\\_rpts/2001/nobob\\_a\\_final\\_report.pdf](http://www.glerl.noaa.gov/res/Task_rpts/2001/nobob_a_final_report.pdf) (noting risk of ANS spreading between the Great Lakes in ballast water).

boats continue the spread of ANS to inland lakes and waterways.<sup>32</sup>

## B. HISTORY OF INTERNATIONAL EFFORTS AND FAILURES TO COMBAT THE BALLAST WATER PROBLEM

The problem of ballast water as a vector for the introduction of ANS has been recognized as an international problem since at least 1973 when the International Marine Organization first considered studying diseases carried in ballast water.<sup>33</sup> While there have been many efforts to address the spread of ANS through ballast water management (BWM) regulations, the three efforts discussed in this section—the GLWQA, CWA, and USCG & TC regulations—are the most relevant to the rise of state ballast water regulations.<sup>34</sup>

### 1. *The Great Lakes Water Quality Agreement*

The Great Lakes Water Quality Agreement (GLWQA) of 1972,<sup>35</sup> as amended in 1978,<sup>36</sup> was intended to “restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem.”<sup>37</sup> The GLWQA specifically mandates that “[t]he discharge of toxic substances in toxic amounts be prohibited and the discharge of any or all persistent toxic substances be virtually eliminated.”<sup>38</sup> The GLWQA empowers the International Joint Commission (IJC) to supervise the enactment of its provisions.<sup>39</sup> The IJC and

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32. GARY E. WHELAN, MICH. DEPT' NATURAL RES., VIRAL HEMORRHAGIC SEPTICEMIA VHS BRIEFING PAPER 3 (Aug. 1, 2007), *available at* [http://www.michigan.gov/documents/dnr/Viral-Hemorrhagic-Septicemia-Fact-Sheet-11-9-2006\\_178081\\_7.pdf](http://www.michigan.gov/documents/dnr/Viral-Hemorrhagic-Septicemia-Fact-Sheet-11-9-2006_178081_7.pdf) (noting that VHS is transmitted by baitfish, ballast water, live-well water, releasing infected fish in lakes or hatcheries, and natural movement of infected fish).

33. REEVES, *supra* note 5, at 18.

34. There is some overlap between the three regulatory schemes but a separate focused examination is important because each of the regulations have been discussed as an alternative to solving the ballast water problem.

35. Agreement on Great Lakes Water Quality, U.S.-Can., Apr. 15, 1972, 23 U.S.T. 301, T.I.A.S. No. 7312.

36. Agreement Between the United States of America and Canada on Great Lakes Water Quality, U.S.-Can., Nov. 22, 1978, 30 U.S.T. 1983. [1383, T.I.A.S. No. 9257] [hereinafter GLWQA].

37. *Id.* art. II.

38. *Id.*

39. The IJC was created by the Boundary Waters Treaty of 1909 between

GLWQA have been a large factor in reducing point source pollutants<sup>40</sup> in the Great Lakes,<sup>41</sup> and continue to provide a strong framework for Canada and the United States to address general water quality issues. The agreement does not directly regulate ballast water, but instead calls for regular meetings and studies by Canadian and U.S. officials regarding “pollution from shipping sources.”<sup>42</sup>

The IJC has taken up the GLWQA’s charge to investigate water pollution with vigor, producing thirteen comprehensive reports on the Great Lakes since 1978,<sup>43</sup> and numerous other reports, as well as holding conventions and public hearings regarding dozens of issues important to the Great Lakes.<sup>44</sup> The IJC has also made repeated attempts to raise awareness of the ANS problem since 1980 under its charge to investigate such issues under the GLWQA.<sup>45</sup>

## 2. *The CWA’s Permitting System and Canada’s Shipping Act*

The Clean Water Act (CWA)<sup>46</sup> provides that “the discharge of any pollutant by any person shall be unlawful” from point

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Canada and the United States. Boundary Waters Treaty, U.S.-Gr. Brit. (for Canada), Jan. 11, 1909, 36 Stat. 2448; see IJC, A GUIDE TO THE GLWQA, available at <http://www.ijc.org/en/activities/consultations/glwqa/guide2bw.pdf> (last visited Sept. 22, 2008) (noting the IJC’s role of assisting in “the formal process of cooperation” was continued with the GLWQA).

40. “The term ‘point source’ means any discernible, confined, and discrete conveyance . . . from which pollutants are or may be discharged.” 33 U.S.C. § 1362(14) (2002).

41. Karkkainen, *supra* note 16, at 213 (noting how in the 1960’s and 1970’s tributaries to the Great Lakes caught on fire and raw sewage and taconite tailings indicated extreme pollution).

42. GLWQA, *supra* note 36, at Annex VI “Review of Pollution from Shipping Sources” (“The Canadian and the United States Coast Guard shall continue to review services, systems, programs, recommendations, standards, and regulations relating to shipping activities for the purpose of maintaining or improving Great Lakes water quality.”); see REEVES, *supra* note 5, at 41 (noting the U.S. and Canadian authorities issued a report on Annex VI in 1997 to adopt a Binational Ballast Water Research Strategy).

43. See INT’L JOINT COMM’N, GREAT LAKES BIENNIAL REPORTS, available at [http://www.ijc.org/en/publications/rpts\\_bi.htm](http://www.ijc.org/en/publications/rpts_bi.htm) (last visited Sept. 22, 2008).

44. See INT’L JOINT COMM’N, PUBLICATIONS, available at <http://www.ijc.org/en/publications/focus.htm> (last visited Sept. 22, 2008).

45. ELEVENTH BIENNIAL REPORT, *supra* note 21, at 28 (“Since the 1980s, the [IJC] has issued alerts about the threat of aquatic alien invasive species. . .”).

46. 33 U.S.C. § 1251–1387 (2007).

sources, unless the discharge is allowed elsewhere in the Act.<sup>47</sup> A pollutant under the CWA is defined to include, inter alia, “biological materials,”<sup>48</sup> which presumably includes ANS carried in the ballast water of ships.<sup>49</sup> Under the CWA, a point source includes a “vessel or other floating craft, from which pollutants are or may be discharged.”<sup>50</sup> Discharge of such “biological materials” from ships would require special authorization, called a “National Pollutant Discharge Elimination System” (NPDES)<sup>51</sup> permit. The EPA promulgated a regulation relating to NPDES permits immediately after the CWA was passed in 1972 granting an exception for most common ship-based pollution discharges.<sup>52</sup> The exemption specified that no NPDES permit was required for a “discharge incidental to the normal operation of a vessel.”<sup>53</sup>

The CWA<sup>54</sup> in the United States may quickly supersede other BWM regulation efforts due to a recent California U.S. Federal District Court ruling.<sup>55</sup> The court ruled in September 2006 that the EPA exception for ship-based pollution exceeded the agency’s authority.<sup>56</sup> The Ninth Circuit recently affirmed the decision<sup>57</sup> and the EPA has begun the process of

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47. 33 U.S.C. § 1311(a).

48. 33 U.S.C. § 1362(6).

49. See Development of Clean Water Act National Pollutant Discharge Elimination System Permits for Discharges Incidental to the Normal Operation of Vessels, 72 Fed. Reg. 34,241, 34,242 (June 21, 2007) (noting the “potentially wide variety of discharges incidental to the normal operation of vessels” and suggesting ballast water would be included among these).

50. 33 U.S.C. § 1362(14) (2007).

51. An NPDES permit “controls water pollution by regulating point sources that discharge pollutants into waters of the United States.” EPA, NPDES: OVERVIEW, available at <http://cfpub.epa.gov/npdes/> (last visited Sept. 22, 2008).

52. Development of Clean Water Act National Pollutant Discharge Elimination System Permits for Discharges Incidental to the Normal Operation of Vessels, 72 Fed. Reg. 34,241, 34,242 (June 21, 2007) (explaining the EPA’s enactment of the regulation exempting ship-based pollution from NPDES permitting).

53. 40 C.F.R. § 122.3(a) (2007).

54. While the movement towards CWA regulation of ballast water is technically not an international effort, given the potential for the CWA to add more stringent enforcement to ballast water pollution considering its relevance to the ANS problem is important.

55. *Nw. Env’tl. Advocates v. EPA*, No. C 03-05760 SI, 2006 WL 2669042, at \*1 (N.D. Cal. Sept. 18, 2006) (holding the CWA is applicable to ship-based pollution such as ballast water).

56. *Id.* at \*1 (granting permanent injunction against enforcement of the EPA’s exception for ship-based pollution and mandating enforcement of the CWA against ships beginning on September 30, 2008).

57. *Nw. Env’tl. Advocates v. EPA*, 537 F.3d 1006 (9th Cir. 2008).

promulgating new regulations for NPDES's permitting of ship-based pollution<sup>58</sup> because the district court imposed a September 30, 2008, deadline for the EPA's new regulation.<sup>59</sup>

Canadian legislation that may influence the regulation of ballast water include the Canadian Shipping Act and Canada's equivalent of the CWA, the Canadian Fisheries Act, which prohibits discharges that could harm fish or fish habitats.<sup>60</sup> There are no efforts to enforce the Canada Fisheries Act similar to EPA's attempt to enforce the CWA, so its involvement in ballast water regulation appears minimal.<sup>61</sup> The Canadian Shipping Act also appears to have similarly broad language empowering Canada's federal government to regulate ballast water, but the specific BWM regulations enforced by Canada do not appear to track this language.<sup>62</sup>

### 3. *United States Coast Guard and Canadian Transport Canada Implemented Regulations*<sup>63</sup>

The U.S. Coast Guard and Canada's Transport Canada are both empowered to enforce measures relating to ballast water discharge.<sup>64</sup> In response to growing calls for regulation of ballast water and the damage caused by zebra mussel

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58. Development of Clean Water Act National Pollutant Discharge Elimination System Permits for Discharges Incidental to the Normal Operation of Vessels, 72 Fed. Reg. 34,241, 34,241 (June 21, 2007) (explaining the current case law of the regulation).

59. *Nw. Envtl. Advocates*, 2006 WL 2669042, at \*1.

60. REEVES, *supra* note 5, at 101 (citing Canada Fisheries Act, R.S.C., ch. F-14 §§ 34(1)(a), 36(1)(a), 36(3)).

61. GOVERNMENT OF CANADA, CANADA'S RESPONSE TO THE RECOMMENDATIONS IN THE ELEVENTH BIENNIAL REPORT ON GREAT LAKES WATER QUALITY OF THE IJC, Ch. 3-1 (2003), available at <http://www.on.ec.gc.ca/laws/eleventh-ijc/PDFs/Canadas-Response-11th-Report-E.pdf> (noting Canada is relying on amendments to its Shipping Act to regulate ballast water discharges).

62. Canadian Shipping Act, R.S.C., ch. S-9, §§ 654, 657; see REEVES, *supra* note 5, at 101 (noting the Canadian Shipping Act is "as broad . . . as the U.S. Clean Water Act").

63. Some readers might note that it was the GLWQA that suggested the Canadian and U.S. Coast Guard agencies be responsible for ballast water regulation, so including discussion of these agencies' regulations under a separate heading is not logical. See GLWQA, *supra* note 36, at Annex 6. They are treated separately here because they are not enacted within the framework of the IJC or GLWQA and have the effect of being a separate effort of coordination between the U.S. and Canadian governments.

64. See REEVES, *supra* note 5, at 37.

infestation,<sup>65</sup> the U.S. Congress enacted the Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) and the National Invasive Species Act of 1996 (NISA).<sup>66</sup> Both NANPCA and NISA mandate that the Coast Guard “issue voluntary guidelines to prevent introduction and spread of aquatic nuisance species into the Great Lakes through the exchange of ballast water of vessels prior to entering those waters.”<sup>67</sup>

NISA requires ships traversing the Great Lakes to manage ballast water by: (1) conducting mid-ocean ballast water exchange;<sup>68</sup> (2) retaining ballast water on board; or (3) using a Coast Guard approved alternative treatment method.<sup>69</sup> The regulations contain two notable exceptions, the first permits ships to ignore the rules if following them would endanger the ship or crew.<sup>70</sup> Second, “as a matter of custom”<sup>71</sup> ships declaring they have “no ballast on board” (NOBOB) are also exempted.<sup>72</sup> NOBOBs are ships that enter the Great Lakes without pumpable ballast water because they are laden with cargo and do not need the stability provided by ballast water, but often still hold “residual volumes of unpumpable ballast water and

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65. Congress specifically noted its purpose in enacting new legislation by declaring that “if preventive management measures are not taken nationwide to prevent and control unintentionally introduced nonindigenous aquatic species in a timely manner, further introductions and infestations of species . . . may occur.” 16 U.S.C. § 4701(a)(13) (1996).

66. 16 U.S.C. §§ 4701–51.

67. 16 U.S.C. § 4711(a)(1) (mandating rules be promulgated within six months); see Eugene H. Buck, *Ballast Water Management to Combat Invasive Species*, CONG. RESEARCH SERV. REP. FOR CONG. RL32344 (2007), available at <http://www.ncseonline.org/NLE/CRSreports/07Jul/RL32344.pdf> (explaining series of regulations issued by the Coast Guard in response to NISA).

68. 33 C.F.R. § 151.1510(a) (2001). Saltwater exchange relies on the idea that most organisms cannot survive the highly saline waters contained in mid-ocean waters. JOHENGEN, *supra* note 31, at xiv.

69. 33 C.F.R. § 151.1510(a); Ballast Water Management for Vessels Entering the Great Lakes that Declare No Ballast Onboard. 70 Fed. Reg. 51831, 51832 (Aug. 31, 2005) (ships declaring “NOBOB . . . have discharged ballast water in order to carry cargo, and as a result, have only unpumpable residual water and sediment in [ballast] tanks”).

70. 33 C.F.R. § 151.1514 (2007).

71. REEVES, *supra* note 5, at 45 n.70.

72. *Id.* at 46 n.71 (“[T]he U.S. Coast Guard still does not have an operational plan for how to regulate the NOBOBs with the unpumpable slop.”); see JOHENGEN, *supra* note 31, at xiii (noting NOBOBs are not currently regulated by U.S. authorities).

sediment [which may] contain live aquatic organisms . . . .”<sup>73</sup> Compliance rates with the voluntary regulations were only 30.4% from 1999 to 2001.<sup>74</sup> Consequently, under the Coast Guard’s regulatory scheme<sup>75</sup> the ballast water regulations became mandatory in 2004<sup>76</sup> and added new monetary<sup>77</sup> and criminal penalties.<sup>78</sup> Despite becoming mandatory for some ships, the regulations are still voluntary<sup>79</sup> for the roughly eighty percent<sup>80</sup> of ocean-going ships declaring NOBOB status as they enter the Great Lakes.<sup>81</sup> The U.S. Congress is currently considering enacting statutory reforms that would make the ballast water regulations mandatory for NOBOBs and increase treatment standards for ballast water discharges.<sup>82</sup>

Canada’s Transport Canada initially had regulations similar to those enforced by the U.S. Coast Guard. The Canadian regulations were first enacted in 1985,<sup>83</sup> but later amended in 1989.<sup>84</sup> The voluntary guidelines under the 1998

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73. JOHENGEN, *supra* note 31, at i.

74. Buck, *supra* note 67, at 5.

75. 64 Fed. Reg. 26672–90 (May 17, 1999) (providing voluntary guidelines effective July 1, 1999); see Buck, *supra* note 67, at 5 (noting that Coast Guard regulations became mandatory because of low compliance rates).

76. Mandatory Ballast Water Management Program for U.S. Waters, 69 Fed. Reg. 44952, 44955 (July 28, 2004).

77. 33 C.F.R. § 151.1518(a) (2007) (providing for a fine of up to \$27,500 for each day a provision of the mandatory ballast water regulations are violated); see also Coast Guard Office of Operating and Environmental Standards, *Ballast Water Management Program*, available at <http://www.uscg.mil/hq/g-m/mso/bwm.htm> (last visited Sept. 22, 2007).

78. 33 C.F.R. § 151.1518(b) (providing that a knowing violation of the new mandatory ballast water regulations is a class C felony).

79. Ballast Water Management for Vessels Entering the Great Lakes That Declare No Ballast Onboard, 70 Fed. Reg. 51831, 51835 (Aug. 31, 2005) (recommending voluntary “best management practices” for ships entering the Great Lakes without pumpable ballast water).

80. See JOHENGEN, *supra* note 31, at i (noting that “[o]n average, less than 20% of ocean vessels entering the Great Lakes in recent years contained declarable ballast water on board”).

81. *Id.*

82. See GREAT LAKES COMM’N, COMPARISON OF H.R. 2830 AND S. 1578 BALLAST WATER LEGISLATION (July 2007), available at <http://www.glc.org/advocacy/documents/08-05-16-HR2830-S1578-side-by-side.pdf> [hereinafter GLC FEDERAL BILL COMPARISON] (comparing legislation passed by the House of Representatives and under consideration in the Senate).

83. MOIRA L. MCCONNELL, GLOBAL BALLAST WATER MANAGEMENT PROGRAMME, GLOBAL BALLAST LEGISLATIVE REVIEW, GLO. BALLAST MONOGRAPH SERIES NO. 1, at 73 (2002), available at <http://globallast.imo.org/monograph1%20legislative%20review.pdf> (last visited Sept. 22, 2008).

84. The amendment authorized the Governor in Council to promulgate two new

amendment eventually led to Transport Canada's proposed ballast water regulations in 2005<sup>85</sup> that were intended to "harmonize[] to the maximum extent possible with current U.S. and international provisions . . . ."<sup>86</sup> Similar to current U.S. law, the Canadian regulations initially allowed for an exception to its BWM regulations for the safety of the ship.<sup>87</sup> The regulations became mandatory on June 8, 2006,<sup>88</sup> and a Transport Canada bulletin in January of 2007 clarified that the regulations also apply to ships declaring NOBOB status.<sup>89</sup>

### C. RECENT RESPONSES AT THE STATE AND PROVINCIAL GOVERNMENT LEVEL

The arrival of VHS has come at a time of increased state and provincial action.<sup>90</sup> The three most important actions are (1) state legislative efforts; (2) litigation-oriented efforts; and (3) unilateral action by a government entity.

#### 1. State legislative efforts

BWM laws were proposed as early as 1999.<sup>91</sup> The passage of the Canada Shipping Act appears to have curtailed Canadian provincial government action. For instance, one Ontario official notes that "[u]ntil such time that effective technology . . . is available, we believe the Ballast Water Management and

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BWM guidelines. Canada Shipping Act, R.S.C., ch. S-9, § 657.1 (1985) (amended 1998).

85. A Guide to Canada's Ballast Water Control and Management Regulations, TP No. 13617 E, *Preface* (Nov. 19, 2007), available at <http://www.tc.gc.ca/publications/EN/TP13617/PDF%5CHR/TP13617E.PDF>.

86. *Id.*

87. Ballast Water Control and Management Regulations (Canada Shipping Act) SOR/2006-129, subd. 13(1) [hereinafter 2005 Canada Shipping Act] (excepting from enforcement of ballast water regulations any ship experiencing exceptional circumstances that threaten the safety of the crew).

88. *Id.* subd. 15.

89. Transport Canada, Ship Safety Bulletin: Ballast Water Control and Management Regulations, No. TP3231 E (2007).

90. See, e.g., *Nw. Env'tl. Advocates*, 2006 WL 2669042 at \*1 (suing the EPA for not regulating ballast water discharges); see also *supra* note 17 and accompanying text.

91. Ontario proposed a 1999 ban preventing any ship from docking within the province if they failed to follow BWM guidelines. B. 15, 37th Leg., 1st Sess., 49 Elizabeth II (Ont. 2000), available at [http://www.ontla.on.ca/bills/bills-files/37\\_Parliament/Session1/b015rep.pdf](http://www.ontla.on.ca/bills/bills-files/37_Parliament/Session1/b015rep.pdf).

Control Regulations passed by Transport Canada in 2006 provide the best protection to date for the Canadian waters of the Great Lakes.”<sup>92</sup>

In the United States, ballast water regulations have recently been considered in six Great Lakes states—Indiana, Ohio, Pennsylvania, New York, Illinois, and Wisconsin.<sup>93</sup> Michigan and Minnesota have both enacted laws regulating ballast water discharge.<sup>94</sup>

Michigan was the first Great Lakes state to enact a ballast water management (BWM) proposal into law,<sup>95</sup> which was upheld as constitutional<sup>96</sup> on August 15, 2007.<sup>97</sup> Michigan’s law prohibits any discharge into state water “that is or may become injurious to . . . public health, safety, or welfare . . . to . . . fish, aquatic life, or plants or to their growth or propagation [or t]o the value of fish and game.”<sup>98</sup> Further, Michigan mandates that “the discharge into the waters of this state from an oceangoing vessel of any ballast water [without a permit] is prima facie evidence of a violation . . . .”<sup>99</sup> Michigan law now requires ocean-going vessels to obtain a permit before entering any of the state’s ports.<sup>100</sup> Vessels must certify they will not be

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92. Email from Beth Brownson, Senior Invasive Species Biologist, Ontario Ministry of Natural Resources, Fish & Wildlife Branch, to author (Oct. 23, 2007, 17:16 CST) (on file with author). Similarly, a Quebec official commented that “Quebec is not planning to develop its own legislation on ballast water treatment to stop the spread of aquatic invasive species.” Email from Isabelle Simard, Public Affairs, Quebec Ministry of Natural Resources, to author (Oct. 24, 2007, 11:10 CST) (on file with author).

93. See GREAT LAKES COMM’N, SUMMARY OF GREAT LAKES STATE BALLAST WATER LEGISLATION, at 1–2 (July 2008), available at <http://glc.org/advocacy/documents/08-07-18-GL-state-bw-leg-summary.pdf> [hereinafter GLC STATE LAWS SUMMARY] (listing legislative efforts by eight states in the Great Lakes and Pacific Northwest to regulate ballast water discharges).

94. *Id.*

95. Great Lakes Aquatic Nuisance Species Coalition Act., MICH. COMP. LAWS § 324.3112(6) (2005).

96. *Fednav, Ltd. v. Chester*, 505 F. Supp. 2d 381, 388–89 (E.D. Mich. 2007) (noting that plaintiffs alleged constitutional violations of the Due Process Clause, Commerce Clause, Supremacy Clause, and various other state and federal laws).

97. While there was widespread speculation Michigan’s law would be held unconstitutional under the dormant commerce clause doctrine, a federal district court upheld the law on August 15, 2007. *Id.* at 400 (dismissing lawsuit filed by a consortium of shipping companies seeking to invalidate Michigan’s ballast water law).

98. MICH. COMP. LAWS § 324.3109(1) (2005).

99. § 324.3109(5).

100. STEPHANIE SHOWALTER & TERRA BOWLING, SEA GRANT L. CTR., WHITE

discharging ballast water or that the discharge will occur by a method approved by its Department of Environmental Quality.<sup>101</sup>

Minnesota's ballast water law does not require actual treatment of ballast water, but instead requires a ballast water management plan intended to minimize the risk of spreading invasive species.<sup>102</sup> The law applies broadly to all ships that carry ballast water.<sup>103</sup>

Similar to Michigan's law, Wisconsin, Pennsylvania, and Ohio's proposed laws each apply only to ocean-going vessels.<sup>104</sup> Indiana's proposed law applies to any ship, whether ocean-going or intra-lake.<sup>105</sup> Michigan, Wisconsin, and Pennsylvania's proposals apply only to ships that intend to enter ports.<sup>106</sup> Indiana and Ohio, on the other hand, all have broader prohibitions that apply to vessels operating anywhere in the Great Lakes waters of the state.<sup>107</sup> Each of the proposed laws and Michigan's law mandate regional cooperation with other states, provinces and administrative organizations "as necessary to promote and ensure the development of rules, regulations, and standards for the control of invasive species that are broadly protective of the waters of the state and other natural resources."<sup>108</sup>

## 2. *Litigation-oriented efforts*

Some state governments appear to be relying on changes in the way the CWA is enforced in order to solve the ballast water problem. For instance, New York intervened and Minnesota filed an amicus curia brief in the successful

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PAPER: MICHIGAN'S NEW BALLAST WATER REGIME: NAVIGATING THE TREACHEROUS WATERS OF STATES' RIGHTS, FEDERAL PREEMPTION, AND INTERNATIONAL COMMERCE 2 (2006), available at <http://seagrant.umn.edu/downloads/ballast.pdf>.

101. Michigan allows four treatment methods: "(1) hypochlorite; (2) chlorine dioxide; (3) ultraviolet (UV) light radiation; and (4) deoxygenation." *Id.*

102. GLC STATE LAWS SUMMARY, *supra* note 93, at 1-2.

103. *Id.*

104. *See id.*

105. The Indiana bill "allows a vessel to operate in waters of Indiana only if ballast water and sediment in the vessel have been sterilized." Indiana S.B. No. 219, Synopsis (2007)

106. GLC STATE LAWS SUMMARY, *supra* note 93, at 1-2.

107. *Id.*

108. H.F. No. 3705 § 3, subd. 1, 2005-2006 Leg., 84th Sess. (Minn. 2006); *see* GLC STATE LAWS SUMMARY, *supra* note 93, at 1.

Northwest Environmental Advocates v. EPA litigation.<sup>109</sup> The State of Minnesota was also compelled to regulate ballast water discharges due to an April 23, 2008 state court ruling.<sup>110</sup>

### 3. *Unilateral government agency action*

A recent unilateral action of the Isle Royale National Park Superintendent banned ballast water discharge within 4.5 miles of the Lake Superior island.<sup>111</sup> The Superintendent acted due to fears that VHS could spread to the many sport-fish species on and around the island.<sup>112</sup>

State legislative and litigation battles highlight the absence of the federal governments' involvement in solving the ANS problem long ago. The federal statutory and administrative attempts to address the BWM problem have failed to slow the steady advance of ANS into the Great Lakes.<sup>113</sup>

## II. ANALYSIS

### A. THE CANADIAN AND U.S. FEDERAL GOVERNMENTS HAVE HISTORICALLY FAILED TO STOP AN OBVIOUS AND COSTLY PROBLEM

Given the steady stream of invasive species entering the Great Lakes since the zebra mussel infestation in 1989, the title to this section might seem fairly obvious.<sup>114</sup> It is important to recognize the failure of both the U.S. and Canadian

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109. Nw. Envtl. Advocates v. EPA, 537 F.3d 1006, 1027 (9th Cir. 2008).

110. See Complaint at 12–13, State of Minn. ex rel., Minn. Ctr. for Envtl. Advocacy v. Minn. Pollution Control Agency, No. 62-CV-07-2224 (Minn. Dist. Ct. Aug. 27, 2007) (seeking injunctive relief to force the regulation of ballast water by the State of Minnesota); *Ramsey County Judge Rules MPCA Must Regulate Ballast Water*, MINN. PUB. RADIO ONLINE, Apr. 23, 2008, <http://minnesota.publicradio.org/display/web/2008/04/23/ballastruling> [hereinafter *Ramsey County Judge*].

111. Tom Meersman, *Isle Royale Order Aims to Protect Fish, Lake from Virus*, STAR TRIB., Sept. 17, 2007, at B1 (describing Superintendent Phyllis Green's issuance of an emergency order preventing ballast water discharge within 4.5 miles of Isle Royale National Park in Lake Superior).

112. *Id.*

113. TWELFTH BIENNIAL REPORT, *supra* note 4, at 15 (noting a new ANS enters the Great Lakes every eight months).

114. See U.S. Dept. of Agriculture, <http://www.invasivespecies.org> (last visited Sept. 22, 2008) (listing the dozens of invasive species that have entered the United States in past decades).

governments to solve the ballast water problem. After watching their national governments fail to enact any meaningful ballast water legislation, states and provinces began to consider enacting their own laws.<sup>115</sup> The historic failure of the GLWQA, Coast Guard implemented regulations, and CWA provisions are each discussed below.

### 1. *The GLWQA*

The GLWQA has been a great success in facilitating improvements in the water quality of the Great Lakes,<sup>116</sup> however, its provisions regarding ballast water have outlived their usefulness.

As the IJC notes, only by holding both the United States and Canadian governments 'accountable' to definite and adequate standards for ballast water discharge can the ballast water problem be solved.<sup>117</sup> The IJC points out that there is a widening gap between the science which indicates a high priority problem with ballast water as a vector, and the existence of "unambiguous accountability [that] is fundamental to accelerating actions that will improve conditions in the Great Lakes."<sup>118</sup> Further, the United States and Canada view the regulations being implemented by their maritime enforcement agencies as the primary method to address the ANS problem.<sup>119</sup> Therefore, under the GLWQA, the role of the IJC is to continue studying and monitoring the steady invasion and progression of ANS, rather than directly acting to prevent its spread.<sup>120</sup>

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115. *See infra*, Part II.D.1.

116. INT'L JOINT COMM'N, THIRTEENTH BIENNIAL REPORT ON GREAT LAKES WATER QUALITY 5-6 (2006) [hereinafter THIRTEENTH BIENNIAL REPORT] (explaining the myriad of successful results the GLWQA has facilitated).

117. *Id.* at 7.

118. *Id.* at 3.

119. U.S. Response to Recommendations to the IJC's 11th Biennial Report on Great Lake Water Quality, U.S. Dept. of State & EPA, at 13 (May 2003), available at <http://www.epa.gov/glnpo/glwqa/ijc11th/report.html> (noting the U.S. government's response to the IJC report); GOVERNMENT OF CANADA, *supra* note 61, at ch. 3-1 (citing Transport Canada regulations as the Canadian solution to the ballast water problem).

120. Eric Reeves, Exotics and Public Policy in the Great Lakes: The Results of a Workshop at the Biennial Great Lakes Water Quality Forum, Milwaukee, WI, 23-26 September 1999, § 2.2 (1999), available at <http://www.ijc.org/rel/milwaukee/wrkshp/workshopsummary.pdf> [hereinafter Exotics Workshop 1999] (noting that the IJC has achieved "complete success" in studying ballast water, as its threat to the Great Lakes has been conclusively established).

Some leaders in the Great Lakes community have called for an amendment to the GLWQA granting the IJC enforcement authority over ANS in the Great Lakes.<sup>121</sup> Those calling for an amendment point out that the intent was to revise the GLWQA every six years, and that the agreement has not been amended for almost twenty years.<sup>122</sup> Others have argued that an amendment is unnecessary given the broad terms of the GLWQA that include restoring the “biological integrity” of the Great Lakes.<sup>123</sup> The IJC has called for a bi-national action plan for BWM laws under a new agreement to “restore balance to the Great Lakes.”<sup>124</sup> The IJC’s arguments certainly make sense within the context of its charge to maintain the “biological integrity” of the Great Lakes. This “biological integrity” will be significantly undercut if the Great Lakes continue turning into a “biological soup” filled with ANS.<sup>125</sup>

## 2. *The CWA*

Utilizing the CWA to regulate all ship-based pollution, including ballast water discharges, appears quite logical. Given the CWA’s purpose to prevent “discharge of any pollutant,” including “biological materials,” it seems difficult to argue a statutory interpretation under which ANS are exempt. Given the EPA’s thirty-five year history of CWA non-enforcement against ships and Congress’s subsequent passage of NISA and NANPCA, the CWA has never been utilized to combat the ANS problem. Some individuals have criticized the EPA for deferring to the Coast Guard to enforce the ship-based pollution provisions of NISA and NANPCA. Most of the criticism arises from the Coast Guard’s growing inability to implement BWM regulations because of its reorganization as part of the Department of Homeland Security and heightened border-protection mission.<sup>126</sup> Indeed, it is a fairly strange state of

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121. § 2.4.

122. THIRTEENTH BIENNIAL REPORT, *supra* note 116, at 17.

123. GLWQA, *supra* note 36; Exotics Workshop 1999, *supra* note 120, at § 2.5.

124. THIRTEENTH BIENNIAL REPORT, *supra* note 116, at viii.

125. Susan McGrath, *Attack of the Alien Invaders*, NAT’L GEOGRAPHIC MAG., Mar. 2005 at 92, 110 (noting that despite international efforts to pass ballast water regulations, “[i]n the meantime an ever changing biological soup of species is ballasted, deballasted, and reballasted every day in every major port in the world”).

126. Liwen A. Mah, Comment, *Sailing by Looking in the Rearview Mirror: EPA’s Unreasonable Deferral of Ballast-Water Regulation to a Now Ineffective Coast*

affairs when an organization more often associated with the military is charged with enforcing BWM regulations that are meant to protect the Great Lakes from billions of dollars of environmental ANS damage.<sup>127</sup>

### 3. *The Coast Guard and Transport Canada Implemented Regulations*

If there is to be a single place to lay blame for the failure to implement effective BWM laws, it is with the Canada's Transport Canada and the United State's Coast Guard implemented regulations. The regulations have been a series of uncoordinated, short-sighted attempts<sup>128</sup> to regulate the ballast water problem. To some extent, Canada has corrected these failures through recent amendments to its Shipping Act,<sup>129</sup> but the historical failures of both acts are important to consider. The absence of ballast water treatment technology requirements from Canada's regulations<sup>130</sup> indicates its inadequacy given the increasing pressure to require more than just saltwater exchange in the face of repeated ANS invasions.<sup>131</sup>

Besides the obvious problems with the Coast Guard and Transport Canada regulations—e.g., the long period where regulations were voluntary<sup>132</sup>—there is the glaring problem of NOBOBs. Canada has apparently removed the NOBOB exception,<sup>133</sup> but NOBOB ships are not subject to mandatory

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*Guard*, 31 *ECOLOGY L.Q.* 665, 673–74 (2004).

127. *Id.* Liwen Mah discusses this problem at length and notes the EPA is "unreasonably deferring" to the Coast Guard to protect U.S. waters from ANS, especially given the fact "the Coast Guard is no longer able to tackle the problem due to its focus on national security in the wake of the terrorist attacks of September 11, 2001." *Id.* at 665; *see also infra* notes 144–147 and accompanying text.

128. For instance, the U.S. government exempts ninety percent of the ships entering the Great Lakes because they self-declare NOBOB status. JOHENGEN, *supra* note 31, at iii. The funding for NISA implementation in the U.S. has also fallen to an abysmal \$1 million per year, which is astounding given the *billions* of dollars ANS cost the U.S. each year. *See Prather, supra* note 26, at 51.

129. 2005 Canada Shipping Act, *supra* note 87.

130. *See Brownson, supra* note 92 (noting ship-based BWM technologies are not currently viable).

131. TWELFTH BIENNIAL REPORT, *supra* note 4, at 15.

132. Canada's regulations became mandatory in 2006 and the U.S.'s regulations became mandatory in 2004. *See Mandatory Ballast Water Management Program for U.S. Waters*, 69 Fed. Reg. at 44955 (making the U.S.'s BWM regulations mandatory); 2005 Canada Shipping Act, *supra* note 87.

133. *See Ship Safety Bulletin, supra* note 89 (applying mandatory saltwater

guidelines in the United States<sup>134</sup> and still constitute ninety percent of ocean-going ships entering the Great Lakes.<sup>135</sup> The U.S. Coast Guard has only made the problem worse by failing to rely on any scientific data in making its decision to exempt NOBOB ships, but instead relying on “custom” and general assumptions that ballast tanks are empty when “the pumps los[e] suction.”<sup>136</sup> While the U.S. Coast Guard might argue the science is unclear or needs to be “further explored” regarding the effect of NOBOBs,<sup>137</sup> experts have been nearly certain the NOBOB loophole was a significant problem for over a decade.<sup>138</sup>

The exchange standards used for ballast water constitute another problem with the Coast Guard and Transport Canada regulatory scheme. For instance, the United States initially required a “salinity standard” that failed to provide any real standard for vessels coming from high-salinity waters, such as the Mediterranean Sea.<sup>139</sup> The U.S. Coast Guard corrected this problem by adopting a performance-based standard that required a ninety percent exchange of ballast water, representing a “reasonably complete” exchange.<sup>140</sup> Ignoring the fact that many considered even this number inadequate,<sup>141</sup> even a 100% exchange standard fails to provide a performance-based standard that analyzes what is actually in the ballast water.<sup>142</sup>

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exchange to NOBOBs).

134. See Mandatory Ballast Water Management Program for U.S. Waters, 69 Fed. Reg. at 44955 (stating mandatory regulations do not apply to NOBOBs) (hereinafter “Mandatory BWM Program”).

135. JOHENGEN, *supra* note 31, at iii.

136. REEVES, *supra* note 5, at 45 n.70.

137. Mandatory BWM Program, *supra* note 134, at 44955 (“We will continue to explore the issue of NOBOBs entering U.S. waters . . .”).

138. REEVES, *supra* note 5, at 1, 17 (reporting in a 1999 white paper that NOBOBs “typically have one to two hundred metric tonnes of unpumpable slop and sediment in the bottom of their tanks, which is later discharged . . . inside the Great Lakes” and noting a 1991 Canadian study confirming NOBOB ballast tanks contain large amounts of ballast water).

139. Sandra B. Zellmer, *Virtues of “Command & Control” Regulation: Barring Exotic Species from Aquatic Ecosystems*, 2000 U. ILL. L. REV. 1233, 1239 (2000) (noting ships arriving from highly saline ports in the Mediterranean Sea met the U.S. Coast Guard’s salinity standard before they even set sail).

140. REEVES, *supra* note 5, at 66–67.

141. *Id.* at 67 (noting individuals who said anything less than 95% exchange of ballast water volume was inadequate).

142. *Id.* at 56 (noting one study finding 33% of vessels in one study contained zooplankton that could survive in the Great Lakes, even when ships conducted mid-ocean exchange). For instance, a report commissioned by Congress noted that “organisms with a wide tolerance for differing salinities may survive ballast water

A final problem is the ability of the U.S. Coast Guard<sup>143</sup> to administer an environmentally focused program when its mission has shifted dramatically towards military goals since September 11, 2001.<sup>144</sup> Certainly as a matter of convenience and because of its ability to *enforce* maritime regulations, the U.S. Coast Guard is a rational, if not the only, choice to assign BWM enforcement.<sup>145</sup> But assigning *creation* of regulations for an incredibly important environmental task to a military and safety oriented agency seems quite illogical.<sup>146</sup>

#### B. THE FAILURE TO ENACT EFFECTIVE BWM TREATMENT LAWS IS GROSSLY INEFFICIENT AND COSTLY FOR THE UNITED STATES AND CANADA

The real tragedy of the failure of the United States and Canada to effectively regulate ballast water is that there is an incredible economic incentive to do so. Estimates have found the payoff from treating already introduced ANS incredibly high.<sup>147</sup> For example, the payoff for controlling sea lamprey populations offers a staggering thirty dollar savings for each dollar spent.<sup>148</sup> One cannot help but wonder what the savings would be if the ANS were never introduced in the first place.

Currently there are a number of different treatment

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exchange . . .” Buck, *supra* note 67, at 2.

143. While these arguments focus on the U.S. Coast Guard, presumably the same arguments apply to the Canadian Transport Canada regulations.

144. Mah, *supra* note 126, at 673–74 (noting the additional duties imposed on the U.S. Coast Guard since September 11, 2001 and the threat they pose to it in accomplishing its other preexisting missions given the lack of new funding).

145. GREAT LAKES BALLAST WATER WORKING GROUP, 2006 SUMMARY OF GREAT LAKES BALLAST WATER MANAGEMENT EXAMS 1 (2007), *available at* [http://www.greatlakes-seaway.com/en/pdf/Summ\\_Ballast\\_Exams\\_Report\\_2006.pdf](http://www.greatlakes-seaway.com/en/pdf/Summ_Ballast_Exams_Report_2006.pdf) [hereinafter BWWG SUMMARY] (explaining results of a bi-national program between the U.S. Coast Guard Ninth District, Transport Canada-Marine Safety, and the St. Lawrence Seaway Corporations).

146. See Mah, *supra* note 126, at 674–75.

147. See Sabrina J. Lovell & Susan F. Stone, *The Economic Impacts of Aquatic Invasive Species: A Review of the Literature* 54 (Nat'l Center for Envtl. Econ. Working Paper Series, Paper No. 05-02, 2005), *available at* [http://yosemite.epa.gov/EE/epa/eed.nsf/ffb05b5f4a2cf40985256d2d00740681/0ad7644c390503e385256f8900633987/\\$FILE/2005-02.pdf](http://yosemite.epa.gov/EE/epa/eed.nsf/ffb05b5f4a2cf40985256d2d00740681/0ad7644c390503e385256f8900633987/$FILE/2005-02.pdf) (examining a study finding that control of an ANS called ruffe would cost \$12 million over eleven years, but the savings would be \$105 to \$931 million).

148. Prather, *supra* note 26, at 46 (noting that the sea lamprey population control program saves \$30.25 for every \$1 spent).

methods available, with a wide variety of costs.<sup>149</sup> The effectiveness of many of these technologies aboard working Great Lakes ships have recently started the process of objective testing, but results will take time.<sup>150</sup> While there are a number of current studies<sup>151</sup> and competitions,<sup>152</sup> five of the most common BWM treatment methods are discussed below for the purpose of analyzing the economic impact of their implementation: (1) closing the NOBOB loophole; (2) using onshore ballast water treatment; (3) using chemical treatment; (4) using ship-based treatment; and (5) closing the Great Lakes to ocean-going ships.<sup>153</sup>

### 1. Closing the NOBOB loophole

The most obvious solution is for the United States to close the NOBOB loophole and make all vessels complete saltwater exchange before entering the Great Lakes system. The cost of this option would be fairly negligible in the ordinary circumstance,<sup>154</sup> such as when a ship is able to complete the exchange without jeopardizing safety. For instance, a Canadian government regulatory analysis found that to conduct a saltwater exchange achieving ninety-five percent exchange would cost \$3,686 Canadian dollars for ships with ballast tanks

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149. STATE WATER RES. CONTROL BD., CAL. ENVTL. PROT. AGENCY, EVALUATION OF BALLAST WATER TREATMENT TECHNOLOGY FOR CONTROL OF NONINDIGENOUS AQUATIC ORGANISMS 25 (2002), available at <http://www.calepa.ca.gov/Publications/Reports/Mandated/2002/BallastWater.pdf> [hereinafter CALIFORNIA EPA STUDY] (examining a number of ballast water treatment technologies and their respective costs and benefits).

150. Sharon Moen, *Freshwater Ballast Testing Facility Opens*, MINN. SEA GRANT, Aug. 2007, available at [http://www.seagrant.umn.edu/newsletter/2007/08/freshwater\\_ballast\\_testing\\_facility\\_opens.html](http://www.seagrant.umn.edu/newsletter/2007/08/freshwater_ballast_testing_facility_opens.html) [hereinafter Moen, *Testing Facility*] (noting the opening of a new testing facility in Superior, Wisconsin, to help ships test the effectiveness of new treatment technologies).

151. JOHNGEN, *supra* note 31 (studying NOBOBs as a vector for ANS).

152. Availability of Grant Funds for Fiscal Year 2006, 70 Fed. Reg. 37,766, 37,783 (June 30, 2005) (noting funding for new ballast water treatment technology competition).

153. These methods are in no way whatsoever intended to appear comprehensive, as there are dozens currently being considered and tested, and many of these options can be combined to increase effectiveness. CALIFORNIA EPA STUDY, *supra* note 149, at 1–4.

154. Regulatory Impact Analysis Statement, 140 C. Gaz pt.2 712, 716 (June 28, 2006), available at <http://canadagazette.gc.ca/partII/pdf/g2-14013.pdf> (noting that most ships already comply with voluntary regulations, so mandatory regulations impose no additional cost).

over 63,000 cubic meters and only \$182 Canadian dollars for ships with the smallest tanks of 3,115 cubic meters.<sup>155</sup> Another study estimates that making the United States' current saltwater exchange regulations mandatory for NOBOBs would cost ship-owners \$13.2 million annually over five years.<sup>156</sup>

The United States would save hundreds on the dollar if just a single species like the zebra mussel was prevented from entering the Great Lakes, given that the American estimate of \$66 million over five years to regulate NOBOBs is seventy-five times smaller than the cost of the zebra mussel infestation.<sup>157</sup> The evidence strongly weighs in favor of closing the NOBOB loophole regardless of whether other treatment technologies are cost effective, as the cost from zebra mussels alone approaches five billion dollars.<sup>158</sup> This is especially true since new studies indicate that saltwater exchange introduced immediately could potentially reduce ANS invasions.<sup>159</sup> Even if the NOBOB loophole is closed, there is still a significant risk of ANS invasion posed by an exception for ships declaring they are unable to exchange ballast water because of bad weather or other dangers.<sup>160</sup> The safety exception has the potential to swallow the rule, as even a small number of ships failing to conduct saltwater exchange may introduce another ANS to the Great Lakes. Therefore, to ensure all ships entering the Great Lakes have treated their ballast water in some way, ships declaring the safety exception should be required to utilize some additional treatment methods.

## 2. Onshore ballast water treatment

Onshore treatment of ballast water would occur near

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155. *Id.* at 716–17.

156. GREAT LAKES REGIONAL COLLABORATION, GREAT LAKES REGIONAL COLLABORATION STRATEGY: TO RESTORE AND PROTECT THE GREAT LAKES 19 (2005), available at [http://glrc.us/documents/strategy/GLRC\\_Strategy.pdf](http://glrc.us/documents/strategy/GLRC_Strategy.pdf) [hereinafter GLRC STRATEGY REPORT].

157. Lovell & Stone, *supra* note 147, at 43 (noting five studies have found zebra mussel costs to be roughly five billion dollars, which is roughly seventy-five times the cost of spending \$13.2 million annually over five years).

158. *Id.*

159. JOHENGEN, *supra* note 31, at ch. 6–3 (“Open-ocean flushing could provide an immediate method of potentially reducing [the risk of ANS invasions].”).

160. See 2005 Canada Shipping Act, *supra* note 87, subd. 13(1) (excepting from ballast water regulation enforcement any ship experiencing “exceptional circumstances” that threaten the safety of the crew).

Niagara Falls as ships enter the Welland Canal.<sup>161</sup> The proposal would require ships to be retrofitted in order to allow their ballast water to be pumped into pipes leading to onshore facilities, rather than the ships discharging directly into the water.<sup>162</sup> For example, the shipping industry is currently studying a plan to build an onshore treatment facility for ships entering the Great Lakes.<sup>163</sup> A study in California found the cost of retrofitting ships for onshore treatment is roughly \$400,000 per ship,<sup>164</sup> while the onshore facilities to accommodate saltwater ballast would cost \$9 to \$19 million.<sup>165</sup> This proposal is probably the most effective treatment method if one considers the fact that invasive species are very unlikely to infest the Great Lakes if they are never released into the lakes in the first place.<sup>166</sup> If all ocean-going ships are required to have their foreign ballast water fully off-loaded and treated, a great deal of the ballast water problem would be solved.<sup>167</sup>

The total cost of retrofitting the roughly 500 ocean-going ships entering the Great Lakes each year would be roughly \$200 million. An onshore treatment facility would cost no more than \$20 million to build. Together, the total cost of implementing an onshore-based ballast water treatment program would be \$220 million, however, \$220 million is just “a drop in the bucket when you’re talking about the Great Lakes ecosystem being at risk.”<sup>168</sup>

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161. Stephen Watson, *Zebra Mussel Threat Prompts Call to Close Welland Canal to Ships*, BUFFALO NEWS, Dec. 30, 2004, at B2 (noting study by shipping industry on building onshore treatment facility in Lake Erie). One serious criticism of this proposal is that ships could still enter Lake Erie, which is geographically before the Welland Canal, and discharge ballast water. This could be solved, however, by moving the treatment facility to the entry points into Lake Erie instead.

162. Buck, *supra* note 67, at 3.

163. Watson, *supra* note 161, at B2 (noting the shipping industry is studying the feasibility of an onshore treatment facility based in Lake Erie).

164. Buck, *supra* note 67, at 3.

165. CALIFORNIA EPA STUDY, *supra* note 149, at 25.

166. *Id.* at 24 (noting that unlike other treatment methods, the effectiveness of wastewater treatment plants has already been demonstrated and could be more easily monitored by environmental agencies). *But see id.* (noting the need for a mobile treatment system if a ship is required to offload ballast water before entering a port).

167. This assumes a system that is essentially a closed-loop.

168. Doug Haddix, *Destructive Stowaways; Loopholes and Gaps in U.S. Law Allow Ships to Dump Foreign Water and Its Contents—Tiny Creatures, Eggs and Other Forms of Life—at American Ports*, COLUMBUS DISPATCH, Oct. 28, 2003, at 01A (statement of Dennis Schornack, co-chairman of IJC referring to ocean-going ships originating from the Caspian and Black seas, which are where a large number of Great Lakes invasive species originate).

There would be a ten-fold savings realized by implementing such a program if just a single ANS like the zebra mussel is prevented.<sup>169</sup> Therefore, it is economically rational and prudent to adopt this treatment technology. One important drawback is that this option requires retrofitting ships with a technology that may not be useful in foreign ports without onshore facilities, however, onshore ballast water treatment does have the advantage of ensuring compliance with BWM laws before ships travel very far into the Great Lakes.

### 3. Chemical treatment

Chemical treatment of ballast water aims to sterilize the water and sediments of ballast tanks. A variety of chemicals, such as chlorine and hydrogen peroxide, have been used for years in wastewater treatment plants.<sup>170</sup> Because of chlorine's effectiveness in killing VHS, the National Park Service's Isle Royale Office and other agencies<sup>171</sup> have recently begun advocating its use to treat ballast water for ships travelling on Lake Superior. The treatment method has the advantage of avoiding up-front capital costs for ship owners,<sup>172</sup> but there are concerns about the persistence of such chemicals in the environment.<sup>173</sup> Further, there is concern about the possibility that some chemicals could corrode ballast tanks.<sup>174</sup> The cost to retrofit ships for chemical treatment would be roughly \$300,000<sup>175</sup> per vessel over the lifetime of the vessel.<sup>176</sup> The total cost to implement this BWM technology for roughly 500 vessels would be roughly \$150 million throughout the Great Lakes.

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169. Lovell & Stone, *supra* note 147, at 43.

170. CALIFORNIA EPA STUDY, *supra* note 149, at 32.

171. ISLE ROYALE NATIONAL PARK & GRAND PORTAGE BAND OF LAKE SUPERIOR CHIPPEWA, EMERGENCY PREVENTION AND RESPONSE PLAN FOR VIRAL HEMORRHAGIC SEPTICEMIA 74 (2008), available at <http://www.nps.gov/isro/upload/VHS%20Plan%20-%20Final%202008Mar14.pdf> (banning discharge of ballast water within 4.5 miles of Isle Royale and requiring use of bleach to kill VHS harbored in ballast water tanks).

172. CALIFORNIA EPA STUDY, *supra* note 149, at 34 (noting "capital cost could be negligible . . . because little or no new equipment would be needed").

173. *Id.* at 33.

174. Bob Kellerher, *Group Warns of Approaching Fish Disease*, MINN. PUB. RADIO ONLINE, Feb. 14, 2007, <http://minnesota.publicradio.org/display/web/2007/02/14/fishdisease/> (quoting U.S. Coast Guard official noting concerns chlorine might corrode ballast water tanks).

175. Buck, *supra* note 67, at 3.

176. *Id.* at 4.

Again, this figure pales in comparison to the \$5 billion spent combating zebra mussels.<sup>177</sup>

#### 4. *Ship-based mechanical treatment technology*

Another option requires each individual ship to be retrofitted with a mechanical filtration treatment device. These devices can utilize anything from filters that prevent uptake of sediments,<sup>178</sup> to “cyclonic” pumps that use centrifugal force to separate out larger particles.<sup>179</sup> Such a device would have the advantage of not requiring ships to dock at an onshore facility, but would require each ship to make expensive retrofits to their ships. The cost of mechanical treatment is estimated to be between \$200,000 and \$310,000 per ship.<sup>180</sup> Assuming a cost on the high-end of this estimate, the overall cost for the 500 ocean-going ships visiting the Great Lakes would be \$155 million. Again, this figure pales in comparison to the cost of the zebra mussel.

#### 5. *Closing the Great Lakes to ocean-going ships*

Finally, some have suggested closing off the Welland Canal, which allows ships to travel into Lake Erie to the other four Great Lakes.<sup>181</sup> While this option is obviously extreme, its suggestion indicates how far the failure of the federal governments has reduced public confidence in the governments’ abilities to solve the ballast water problem.<sup>182</sup> Implementing this proposal would be political suicide for any Great Lakes politician because it would cause additional lost revenue and jobs in a region already hurting from significant losses in the manufacturing and mining industries. Given the fact that industries worth \$438 billion<sup>183</sup> exist in the Great Lakes region, many of which rely on low-cost Great Lakes shipping, the cost of

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177. Lovell & Stone, *supra* note 147, at 43.

178. CALIFORNIA EPA STUDY, *supra* note 149, at 29–31.

179. *Id.*

180. Buck, *supra* note 67, at 3.

181. Watson, *supra* note 161, at B2 (noting a proposal by National Oceanic and Atmospheric Administration researcher Gary N. Fahnenstiel to close the Welland to all ship traffic).

182. *Id.* (quoting Fahnenstiel as characterizing his plan as “a call to arms”).

183. Noah Hall, *Toward a New Horizontal Federalism: Interstate Water Management in the Great Lakes Region*, 77 U. COLO. L. REV. 405, 415 (2006).

adopting such a measure would likely tower over the measurable benefits of preventing an ANS introduction.<sup>184</sup> Indeed, few would accept the possibility of jeopardizing an industry worth so much and that affects so many lives, especially given the fact the world economy today is so fluid and cost-sensitive.<sup>185</sup>

The cost of the treatment methods discussed above must be compared to the cost of not implementing additional ballast water treatment regulations. The costs of all but one radical BWM treatment option considered here are far outweighed by their benefits.<sup>186</sup> Importantly, one must consider that mandating one technology is probably undesirable, especially considering the rapidly advancing technologies.<sup>187</sup> The technologies are considered individually here to emphasize the economic benefits the federal governments could realize by acting faster to mandate some type of BWM treatment technology.

#### C. UNCOORDINATED STATE BALLAST LAWS ARE INEFFICIENT AND INEFFECTIVE, BUT SPUR THE FEDERAL GOVERNMENT TO ACTION

States and provinces around the Great Lakes appear to have recognized the costliness of the federal governments' failure to enact effective BWM regulations. In Canada, these failures led to a revision of the Canada Shipping Act, but in the United States these failures have led to the rise of six new independent state BWM law proposals and two enacted laws. Despite this action, even if every state passed BWM regulations today, it would be nearly impossible to accomplish state goals of "stemming the tide"<sup>188</sup> of invasive species found in ballast water. The ineffectiveness of uncoordinated state action is driven by two related problems: (1) the "weakest link" legislation serves to undermine the other U.S. Great Lake states and Canadian provinces and (2) the inefficiencies associated with state-based

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184. See Pimentel, *supra* note 6, at 1 (noting the cost of all land-based and aquatic invasive species in the U.S. is \$137 billion annually).

185. See generally, THOMAS L. FRIEDMAN, *THE WORLD IS FLAT* (Farrar, Straus & Giroux 2005) (arguing that changes in the global economy that mean products are produced in the country with the lowest production costs).

186. *Supra* Part II.A–D.

187. See Moen, *Testing Facility*, *supra* note 150.

188. Wade, *supra* note 25, at 1.

versus federally-based regulation.

1. *The problem of the weakest link*

The Great Lakes states and Canadian provinces are like a “ten-link chain” when they act independently of their respective federal governments. By its nature, the chain is only as strong as its weakest link. It takes only a single state or province to adopt a regulation that is less stringent or uses less effective treatment technology to allow an ANS to enter the Great Lakes system via ballast water. Once in the Great Lakes, an ANS can easily spread to the remaining lakes<sup>189</sup> via unregulated ballast water in intra-lake ships that are not covered by a majority of the state ballast water initiatives or federal regulations.<sup>190</sup>

While Ontario and Quebec currently follow the Transport Canada regulations, one Ontario official has suggested that the province’s support for the saltwater exchange regulations depends on the current status quo where there is no other viable treatment technology.<sup>191</sup> Quebec seems to have conceded its inability to police any BWM regulations it might pass.<sup>192</sup> Given Ontario’s efforts to pass provincial BWM legislation, it is reasonable to assume Ontario will follow U.S. states in passing its own legislation once new BWM technology becomes operational.<sup>193</sup>

There are four significant weakest link problems associated with the ongoing balkanization of BWM in the ten Great Lakes states and provinces: (1) uniformity of treatment methods and standards; (2) categories of ships subject to regulation; (3) unwilling state BWM enforcement; and (4) jurisdictional inconsistencies.

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189. See Ramanujan, *supra* note 13.

190. Only ocean-going ships are regulated in the majority of state proposals. See GLC STATE LAWS SUMMARY, *supra* note 93.

191. “We believe a regional solution—that is Great Lakes wide is preferable. Until such time that effective technology, that can be retrofitted for use on the wide variety of vessel types in transit, is available, we believe the Ballast Water Management and Control Regulations passed by Transport Canada in 2006 provide the best protection to date for the Canadian waters of the Great Lakes.” Brownson, *supra* note 92.

192. Simard, *supra* note 92 (noting Quebec lacks the physical ability to enforce BWM regulations).

193. An Act to Regulate the Discharge of Ballast Water in the Great Lakes, B. 15, 37th Leg., 1st Sess., 49 Elizabeth II (Ont. 2000).

## (i). Uniformity of treatment methods and standards

The uniformity of treatment methods and standards each state utilizes is unascertainable given the structure of the proposed BWM laws. The lack of uniformity arises because almost all legislatures, except Indiana's,<sup>194</sup> are proposing to empower their respective environmental enforcement agency to adopt standards for ballast water treatment standards.<sup>195</sup> Therefore, it is impossible to identify what acceptable treatment standards might look like before the laws are passed and regulations released by administrative agencies.<sup>196</sup> Leaving the promulgation of BWM standards to a state agency is fairly efficient for a busy legislature to quickly pass a law concerning an important issue. But it fails to give any degree of certainty that a state or provincial agency that is charged with hundreds of different tasks, and balancing a myriad of different interests,<sup>197</sup> will choose the same technologies that other states and provinces choose.

While mandating regional coordination with other states and organizations such as the IJC is a positive sign that future state ballast water treatment standards will be integrated, it provides no guarantee every state will agree on what treatment methods should eventually be adopted. The inconsistency could lead to a situation where one key state or province where the majority of ocean-going ships are headed, such as Ontario or Minnesota,<sup>198</sup> adopts a more stringent regime of approved

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194. Indiana appears to be the exception, as it expressly approves a number of treatment methods, including filtration, thermal methods, ultraviolet light, biocides, or "other techniques approved by the department." S.B. No. 219 § 1.6, Gen. Assemb., 2d Sess. (Ind. 2006).

195. Ohio's proposed law requires "the operator of the oceangoing vessel [to] utilize environmentally sound technology and methods, as identified in rules, that can be used to prevent the discharge of aquatic nuisance species." H.B. No. 298 § 1535.02(D) Gen. Assemb., Reg. Sess. (Ohio 2007).

196. Illinois' proposed law requires the Illinois EPA to "cooperate to the fullest extent practical with other Great Lakes basin states [and Canadian] provinces, the Great Lakes panel on aquatic nuisance species, the Great Lakes fishery commission, the international joint commission, and the Great Lakes Commission . . ." H.B. 4800 § 10(b), 95th Gen. Assemb. (Ill. 2008).

197. Eric Reeves, *Exotic Politics: An Analysis of the Law and Politics of Exotic Invasions of the Great Lakes*, 2 TOL J. GREAT LAKES' L. SCI. & POL'Y 125, 151-52 (2000) [hereinafter Reeves Exotic Politics] (discussing how the Coast Guard declined to increase ballast water testing standards after shipping industry protests).

198. REEVES, *supra* note 5, at 15-17 (noting that most ocean-going ships eventually visit the ports in Duluth, MN, and Thunder Bay, Ontario).

treatment technologies than other states or provinces. If the shipping industry hopes to comply with the Minnesota or Ontario law, it would have to adopt only the technologies approved by these governments.<sup>199</sup> Alternatively, Minnesota or Ontario could adopt very lax treatment standards allowing ocean-going ships to utilize less effective technologies and potentially infect Lake Superior, thereby leading the rest of the lakes to subsequently become infected. Such lax regulations by Minnesota and Ontario would reduce the effectiveness of other Great Lakes states' BWM laws.<sup>200</sup> Under either alternative, only one "link" in the chain needs to be broken for the entire system to fail. Importantly, Michigan's allowance of any of four treatment options is a positive sign these scenarios will not become reality.<sup>201</sup> The fact nine other state and provincial governments could have their own idea of the appropriate solution to the BWM problem, however, suggests it remains a possibility. Therefore, the only comprehensive way to effectively deal with the problem is through federal or international agreements.

(ii). Categories of ships subject to regulation

State BWM laws would not all apply to all of the same ships.<sup>202</sup> Ocean-going ships are regulated under Michigan, Wisconsin, Minnesota, Pennsylvania, and Ohio's laws, but Indiana's proposed law appears to apply to any vessel operating in the waters of Indiana.<sup>203</sup> This discrepancy means Indiana's broader prohibition on all ships travelling into Indiana waters with ballast water or sediment applies to ships exempt under

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199. Exotics Workshop 1999, *supra* note 120, at § 3.4 (citing need to avoid "one solution" technologies allowing use of only a single ballast water technology).

200. See Ramanujan, *supra* note 13.

201. Michigan allows four treatment methods: (1) hypochlorite; (2) chlorine dioxide; (3) ultraviolet light radiation; and (4) deoxygenation. Showalter & Bowling, *supra* note 100, at 2.

202. The weakness of this argument is that the proposed federal laws in Congress and current Canadian regulations also apply only to ocean-going ships. See GLC FEDERAL BILL COMPARISON, *supra* note 82. The proposed U.S. federal regulations apply to ships on a consistent basis and do not create incentives for ships to only do business in a given state based on its rules governing BWM treatment, as does Indiana's law.

203. S.B. No. 219, Gen. Assemb., 2d Sess. (Ind. 2006) (Defining ballast water as any water or sediment "taken on board a vessel outside Indiana to control or maintain trim . . .").

every other state's law or proposed law. While Indiana's broader law is good for its own waters, its effect is difficult to assess because ships may simply bypass its ports because of the permitting process. The bypassing of ports with stricter standards is feared by Michigan's harbor businesses after passage of its new BWM law.<sup>204</sup> It is yet to be seen if these fears are justified.<sup>205</sup>

(iii). Unwilling state BWM enforcement

States could be dragged unwillingly into enforcement of state ballast water laws, creating the same problem of enforcement reluctance that has plagued the U.S. Coast Guard and its implemented regulations.<sup>206</sup> A lawsuit filed in Minnesota is evidence of this possibility among Great Lakes states.<sup>207</sup> An environmental group successfully sued the MPCA and forced it to enforce CWA provisions against ship-based pollution, including ballast water discharges.<sup>208</sup>

A state unwillingly forced into implementing a BWM program, such as Minnesota,<sup>209</sup> would likely be a weak link in Great Lakes BWM regulation. A state that voluntarily seeks to regulate ballast water discharges would have a greater incentive to enforce its own law.<sup>210</sup> Further, agencies can appeal adverse decisions for years, as indicated by the fact the EPA was first challenged over its failure to enforce the CWA almost ten years before it was eventually forced to enact new regulations.<sup>211</sup>

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204. Moen, *Michigan BWM Law*, *supra* note 29 (noting maritime transportation expert Dale Bergeron "thinks the bill may cause ocean-going vessels to avoid Michigan ports . . .").

205. *Id.*

206. Reeves Exotic Politics, *supra* note 197, at 151–52 (discussing how the Coast Guard declined to increase ballast water testing standards after shipping industry protests).

207. See State of Minn. ex rel., *Minn. Ctr. for Env'tl. Advocacy v. Minn. Pollution Control Agency*, No. 62-CV-07-2224, Complaint at 3 (Minn. Dist. Ct. Aug. 27, 2007).

208. *Id.*

209. Though Minnesota did pass a BWM law in 2008, it only did so after judgment was rendered against the MPCA in state court. See *Ramsey County Judge*, *supra* note 110.

210. For instance, Michigan successfully fought to uphold its newly enacted BWM regulations in the face of a challenge by the shipping industry. *Fednav, Ltd. v. Chester*, 505 F. Supp. 2d 381, 381 (E.D. Mich. 2007).

211. Mandatory Ballast Water Management Program for U.S. Waters, 69 Fed. Reg. 44955 (July 28, 2004) (to be codified at 33 C.F.R. pt. 151).

(iv). Jurisdictional inconsistencies

The jurisdiction granted to state agencies in the current and proposed BWM laws are inconsistent and lead to unintended consequences. The issue exists because of inconsistencies in what triggers the state-based BWM permit process: (1) ships intending to enter one of a state's ports (Michigan, Wisconsin, and Pennsylvania) or (2) ships travelling across a state's jurisdictional waters (Indiana and Ohio).<sup>212</sup>

These jurisdictional inconsistencies could create a number of problems. For instance, ships could potentially discharge ballast water in Michigan, Wisconsin, or Pennsylvania en route to another state and legally discharge their ballast, leaving these states with no recourse against ships not entering their ports. Conversely, ships might be forced to alter their normal shipping routes around Minnesota, Indiana, and Ohio jurisdictional waters to avoid having to obtain a permit from these states.<sup>213</sup> The unintended results of these jurisdictional inconsistencies are likely to cause increased costs to the shipping industry, while not providing states the control over BWM they seek.<sup>214</sup> States requiring permits for entry into ports might point to the fact that ballast water is usually discharged during the course of loading or unloading a ship in port, however, this fails to resolve the inconsistency between each state's assertion of jurisdiction.

*2. Balkanization creates inefficiencies and fails to achieve protection from ANS*

The balkanization of Great Lakes BWM regulation will create two significant inefficiencies: (1) an inability to effectively pool resources and incentivize technological innovation and (2) an inability to take advantage of pooling resources for enforcement.

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212. See GLC STATE LAWS SUMMARY, *supra* note 93, at 1–2.

213. *Id.*

214. Great Lakes Commission, *Resolution: Federal Legislation (U.S.) to Protect the Great Lakes-St. Lawrence River from Ballast Water Discharges of Invasive Species* (May 15, 2007), available at <http://www.glc.org/about/resolutions/07/05ballast.html> [hereinafter GLC Resolution] (advocating a uniform federal BWM regulatory regime rather than a state based one).

(i). Pooling resources for technological innovation

States cannot effectively pool their resources to provide large enough incentives for the shipping industry to make the technological adjustments to remove ANS from their ballast water discharges.<sup>215</sup> Instead, states are relying on smaller “carrot” incentives to encourage industry innovation, but industry participation is limited given the smaller monetary awards.<sup>216</sup> States must instead rely on “sticks” to punish ships for violating BWM laws.<sup>217</sup>

(ii). Pooling resources for enforcement

A second inefficiency of balkanization is effective enforcement of state BWM laws. Rather than have one regulatory authority unified under the Canadian and U.S. federal governments,<sup>218</sup> state BWM laws will rely on each state’s respective environmental agency to enforce the provisions of its laws.<sup>219</sup> For state ballast water laws to be effectively enforced, each state would have to have its own agency capable of closely monitoring ballast water discharges from ships.<sup>220</sup> Instead of

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215. NAT’L. CTR. FOR ENVTL. ECON., *THE UNITED STATES EXPERIENCE WITH ECONOMIC INCENTIVES FOR ENVIRONMENTAL ECONOMICS* 1, 194 (2001), <http://yosemite.epa.gov/ee/Epa/erm.nsf/vwSER/4336170C9605CAF8852569D20076110F?OpenDocument> [hereinafter U.S. INCENTIVES] (describing the benefits of various state environmental subsidization programs).

216. See MICHIGAN DEPT. OF ENVTL. QUALITY, *LIST OF VESSELS REPORTED AS COMPLYING WITH THE REQUIREMENTS OF 1994 PA 451, SECTION 3103A OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT* (2007), [http://www.michigan.gov/deq/0,1607,7-135-3313\\_3677\\_8278-155135--,00.html](http://www.michigan.gov/deq/0,1607,7-135-3313_3677_8278-155135--,00.html) (providing a list of vessels that complied with best management practices for BWM and thus were eligible for state grants, loans, or awards).

217. Certainly state economic incentives for environmental regulation can be effective, but presumably less effective than a national program. See U.S. INCENTIVES, *supra* note 215, at 190.

218. BWWG SUMMARY, *supra* note 145, at 1.

219. Another significant problem with balkanization of Great Lakes BWM law is the economic impact of a jurisdiction by jurisdiction regulatory regime. For instance, some officials have noted that “[t]he avoidance of unilateral responses by individual states is critical to the success of any regulatory regime that applies to shipping.” Global Ballast Water Management Programme, *Legislation and Regulations*, <http://globallast.imo.org/index.asp?page=search.asp&menu=true> (last visited Sept. 22, 2008) [hereinafter Global Ballast Statement].

220. For instance, Michigan empowers its Department of Environmental Quality to regulate the issuance of BWM permits to ocean-going vessels seeking to enter Michigan ports. MICH. COMP. LAWS §§ 324.3100–22 (2005). Michigan is in a unique position as it has by far the most lakeshore of any Great Lakes state or province.

one agency able to pool resources and effectively deploy agents to natural “choke-points” of the Great Lakes, agents will be spread around the shores of the Great Lakes at busy ports.<sup>221</sup>

Quebec seems to have recognized this enforcement problem, as one official recently noted “[b]allast water is a federal jurisdiction [matter] and at the provincial level we do not have the physical means to inspect boats for the application of the legislation.”<sup>222</sup> Quebec’s concern over enforcement capability might not seem warranted in the United States, as the program of state-enforced CWA standards in the United States has been very effective over the past 35 years. But given the international nature of the modern shipping industry<sup>223</sup> and the problem of the weakest link,<sup>224</sup> state-enforced ballast water standards do not appear to be a viable option to stop invasive species from entering the Great Lakes.

A unified policy at the federal government level could bar entry to ships failing to use appropriate BWM technologies before they ever enter the Great Lakes system. The Coast Guard already has a large maritime presence given its various maritime duties<sup>225</sup> and the U.S. and Canadian governments already conduct joint inspections for BWM plans.<sup>226</sup> Given the fact the Coast Guard is already charged with inspecting ships entering the Great Lakes, its enforcement of BWM laws would not greatly increase the cost of enforcement. Utilizing national maritime forces would also prevent states from being charged with the arduous task of inspecting ships as they enter any of the dozens of ports around the Great Lakes. Further, a unified enforcement strategy at the entryway to the Great Lakes would also prevent ships from favoring states that are more lax in their enforcement or treatment standards.<sup>227</sup>

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Hall, *supra* note 183, at 428.

221. REEVES, *supra* note 5, at 45 n.68 (explaining how the narrow lock system channels ships through waters where Canada and the United States each have sole jurisdiction).

222. Simard, *supra* note 92.

223. REEVES, *supra* note 5, at 14 (noting that 400 to 600 foreign ships enter the Great Lakes each year).

224. See *supra* Part II.C.1.

225. See, e.g., U.S. Coast Guard Snapshot, [http://www.uscg.mil/top/about/doc/uscg\\_snapshot.pdf](http://www.uscg.mil/top/about/doc/uscg_snapshot.pdf) (last visited Oct. 22, 2008) (noting various maritime duties performed by the U.S. Coast Guard).

226. See BWWG SUMMARY, *supra* note 145, at 1.

227. See Moen, *Michigan BWM Law*, *supra* note 29 (discussing the risk that ships will avoid states with more stringent BWM regulations).

Although state and provincial governments have apparently made a policy judgment that they cannot afford to wait any longer for effective federal government action, their desperation should not be determinative for Great Lakes ballast water policy. The result of different state and provincial BWM laws could exacerbate the weakest link problem. The rise of state-based ballast water laws also puts Canada in an awkward position as its own unified policy is subjected to the influence of U.S. state-based regulations that may influence decisions of international ships traversing the Great Lakes.<sup>228</sup>

#### D. THE FEDERAL GOVERNMENTS MUST ACT QUICKLY AND SET HIGH STANDARDS FOR BALLAST WATER REGULATION

At the outset, it is important to note that state ballast water laws are a crucial factor in prompting the federal governments to effectively regulate ballast water.<sup>229</sup> Yet, if ballast water regulation were to stop with only these laws in force, it would fail because of numerous problems,<sup>230</sup> including the holes left in unregulated areas of the Great Lakes, varying ballast water standards, and differing views over how to enforce and punish offenders.<sup>231</sup> As the Great Lakes Commission stated in a resolution adopted on May 15, 2007, “the Commission strongly prefers federal ballast water treatment regulations that would be applied in a uniform and consistent fashion throughout the region, as compared to a jurisdiction-by-jurisdiction approach, provided that a federal program sufficiently protects the unique economic and ecological interests of the Great Lakes states.”<sup>232</sup>

There are two important considerations regarding BWM regulation: (1) The U.S. Great Lakes states and Canadian provinces must recognize that BWM regulation requires more than their piece-meal laws and (2) the United States must

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228. On the one hand, Canada must deal with the possibility of ANS introductions caused by the weakest link problem. Alternatively, Canada could benefit from international ships avoiding state BWM confusion by choosing to visit Canadian ports. *See id.*

229. *Id.* (noting that states must sometimes act unilaterally).

230. *Id.* (“[U]nilateral actions can have a significant impact on the success of multilateral negotiations [because] [s]hipping . . . requires harmonized standards . . .”).

231. *See generally* GLC STATE LAWS SUMMARY, *supra* note 93, at 1–2 (summarizing the various provisions of state ballast water laws).

232. *See* GLC Resolution, *supra* note 214.

quickly enact new and stringent BWM law.

1. *The U.S. Great Lakes states and Canada*

State and provincial BWM laws attempting to solve the ballast water problem cannot be an end in themselves.<sup>233</sup> Instead, balkanization must be a federal call to action setting a high bar for comprehensive and coordinated BWM laws.<sup>234</sup> Stringent and uniform federal government standards are more efficient for industry, can offer better protection from ANS, and provide the best chance at legitimately addressing BWM in the Great Lakes.<sup>235</sup> Without independently developing state actions, Congress would never have seriously considered a new BWM regime.<sup>236</sup>

Canada's passage of IMO standards in 2005<sup>237</sup> was a significant step forward for BWM in the Great Lakes. Recognizing the importance of a healthy Great Lakes ecosystem, Canada acted to stop the obvious problem of ballast water as a vector for ANS. However, the standards only provide for saltwater exchange for ocean-going ships entering the Great Lakes.<sup>238</sup> As noted by one Ontario government official, Transport Canada's regulations are only viable "until such time that effective [BWM] technology . . . is available."<sup>239</sup> Once new technologies become available, it is certainly possible Ontario and Quebec might decide it is necessary to enact provincial legislation that further complicates BWM in the Great Lakes.

Although Canada's standards may soon become obsolete if new BWM proposals being considered in the U.S. Congress are signed into law, the de facto bilateral enforcement represents a

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233. The GLC is composed of the eight Great Lakes states, Quebec, and Ontario, so its statement advocating for a unified federal response is especially supportive of avoiding the balkanization of Great Lakes BWM law. See About the Great Lakes Commission, <http://www.glc.org/about> (last visited Sept. 14, 2008).

234. ENVTL. LAW INST., REPORT FOR GREAT LAKES PROTECTION FUND: POTENTIAL FEDERAL PREEMPTION OF LAWS IN THE GREAT LAKES STATES 2 (D.C. Oct. 2006), <http://www.elistore.org-d16.06.pdf> [hereinafter ELI REPORT].

235. Global Ballast Statement, *supra* note 219 (noting the avoidance of a unilateral response is critical to the shipping industry).

236. See GLC FEDERAL BILL COMPARISON, *supra* note 82.

237. Ballast Water Control and Management Regulations SOR/2006-129, subdiv. 13 (Can).

238. *Id.*

239. Brownson, *supra* note 92.

significant step forward.<sup>240</sup> Further, Canada's standards are an incentive for the U.S. federal government to finally resolve the gaping hole in its BWM policy, i.e. its exemption for NOBOBs.<sup>241</sup> As one expert noted, "[t]he struggle with the many imperfections of NANPCA 90 and NISA 96 has added considerable clarity to what is needed in order to create an effective regime."<sup>242</sup>

## 2. *The U.S. Congress must enact a stringent new BWM law*

The new regulations being considered in the U.S. Congress are a significant step forward for BWM policy, but only if a bill is signed into law. Both the Senate and House legislation call for treatment standards that are roughly 100 times more stringent than the IMO standard<sup>243</sup> currently followed by Canada.<sup>244</sup> NOBOBs also fall under mandatory regulations "at least as strict as ballast water exchange requirements."<sup>245</sup> The timelines for installation of BWM treatment technology are a source of concern for many, but both bills call for swift installation of treatment technology.<sup>246</sup> Both bills provide a ten year grace period for vessels that install treatment technology, even if more effective treatment is developed within that period.<sup>247</sup>

The biggest source of contention<sup>248</sup> in the proposed bills is their preemptive effect. The Senate bill preempts state ballast

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240. See Brownson, *supra* note 92 ("It is important that the U.S. pass regulations similar to Canada's to ensure that NOBOB vessels do not contribute to the problem.").

241. See REEVES, *supra* note 5, at 45 n.68 (noting the existence of a "de facto binational [ballast water] regime" because ships are subject to the laws of both countries during the course of their travels through the lock system of the Great Lakes).

242. *Id.* at 37.

243. GLC FEDERAL BILL COMPARISON, *supra* note 82.

244. DAVID YARD, TRANSPORT CANADA, CANADA'S PROPOSED BALLAST WATER CONTROL AND MANAGEMENT REGULATIONS, at 11 (May 2006), [http://www.icais.org/pdf/2006ppt/-Yard\\_David.pdf](http://www.icais.org/pdf/2006ppt/-Yard_David.pdf) (noting the use of an IMO standard for treatment in Canadian regulations).

245. GLC FEDERAL BILL COMPARISON, *supra* note 82; S. 1578 § 1101(e)(12) ("[A NOBOB ship] shall conduct saltwater flushing of ballast water tanks.").

246. *Id.* (noting the Senate bill requires installation by 2013 and the House bill calls for installation by 2012).

247. *See id.*

248. See GLC Resolution, *supra* note 214 (approving federal preemption of state invasive species laws and CWA application to ballast water).

water laws, such as Michigan's, that set their own standards and issue their own permits and also preempts application of the CWA to BWM.<sup>249</sup> States are permitted to apply to regulate "high-risk" vessels, presumably ocean-going ships.<sup>250</sup> The House bill also allows state programs in effect on January 1, 2007, to remain in effect until January 1, 2012,<sup>251</sup> and provides for the same "high risk" identification program.<sup>252</sup> Unlike the Senate bill, the House bill does not preempt CWA regulation of ballast water, so would not affect current legal efforts to force the EPA to begin doing so by the fall of 2008.<sup>253</sup>

The House and Senate bills have been criticized by some for preempting a wide variety of state ballast water programs.<sup>254</sup> Congress should amend language in the bills or reports to indicate it only prohibits direct regulation of ship ballast water discharge. Some preemptive effect is desirable to achieve adequate protection for the Great Lakes, provided Congress sets the bar high enough for treatment standards to prevent the balkanization of Great Lake ballast water policy.<sup>255</sup>

The Canadian federal government took a necessary first step for the international community by amending its Shipping Act in 2005, however, Canada must not stop there. If the United States passes new ballast water standards that are 100 times more stringent than Canadian standards, effectively "leap-frogging" beyond Canadian requirements, Canada should follow suit and bring its own standards in line with the United States' to avoid confusion and bad incentives for the shipping industry.<sup>256</sup>

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249. GLC FEDERAL BILL COMPARISON, *supra* note 82.

250. *Id.*

251. This effectively provides an exception for Michigan, as only Michigan passed its law before 2005. GLC STATE LAWS SUMMARY, *supra* note 93, at 1.

252. H.R. REP. NO. 110-338, pt. 1, at 72 (Preempting "[s]tate and local governments from prescribing standards for ballast water treatment systems for vessels" but allowing states to "investigate and enforce the Federal standards" in the proposed law); GLC FEDERAL BILL COMPARISON, *supra* note 82 (noting the "high-risk" vessel program).

253. *Nw. Env'tl. Advocates v. EPA*, No. C 03-05760 SI, 2006 WL 2669042, at \*1 (N.D. Cal. Sept. 18, 2006).

254. *See, e.g., ELI REPORT*, *supra* note 234, at 5-8 (explaining effects on Illinois state law if new U.S. federal law is interpreted to broadly preempt state law, including preemption of the Great Lakes Basin Compact, public health laws, toxic waste laws, and state endangered species laws).

255. *Supra* Part II.C.

256. This is especially true since the design of the lock system entering the Great Lakes is such that "no vessel can enter the Great Lakes without passing

### III. CONCLUSION

The failure of BWM regulation to date is due to a myriad of factors, but at the most basic level, it is a failure of the Canadian and American people to demand action by their governments. As noted by one expert, “[a]lthough the invasion of the zebra mussel . . . via ballast water is likely to have much more severe long-term effects on the ecology of North America than the Exxon Valdez oil spill, it has obviously had nothing like the same impact on the public consciousness.”<sup>257</sup> In the end, both the Canadian and American democracies are accountable to their citizens, who must demand more if indeed the Great Lakes are “a common heritage of human kind.”<sup>258</sup>

The “[s]ignificant progress over the previous three decades to restore the Great Lakes has been interrupted and undermined by the present crisis of [ANS].”<sup>259</sup> The time is ripe for new federally based BWM regulations that address the NOBOB loophole and mandate BWM treatment technology as fast as possible.<sup>260</sup> The longer the federal governments wait to do this, the more state regulations will take hold and create inefficient and undesirable results.

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through both Canadian territorial waters . . . and U.S. territorial waters . . . before reaching [the Great Lakes].” REEVES, *supra* note 5, at 45 n.68. Given this reality, just as the U.S. must raise its standards to meet Canada’s new saltwater exchange requirement for NOBOBs, so too must Canada raise its treatment standards if the U.S. increases its own. Otherwise, ships are forced to comply with one country’s treatment standards making the other country’s rules become irrelevant.

257. REEVES, *supra* note 5, at 36.

258. Dan Tarlock, *The Great Lakes as an Environmental Heritage of Humankind: An International Law Perspective*, 40 U. MICH. J.L. REFORM 995 (2007).

259. GLRC STRATEGY REPORT, *supra* note 156, at 17.

260. While the scope of this Note is limited to ballast water, a comprehensive bill to stop introduction of ANS from all sources is needed. See GLC Resolution, *supra* note 214 (calling for comprehensive regulation of all ANS vectors, but noting ballast water regulation is the top priority in 2007).