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BALLAST WATER CONTROL: ISSUES & RECOMMENDATIONS FOR PROTECTING THE UNITED STATES' SHARED PACIFIC COASTLINE

I. INTRODUCTION

The biological diversity of sea-life is besieged by the effects of human activity.¹ Under the cover of the ocean, these changes are often concealed from view. However, our inability to readily see these alterations to the marine environment neither masks nor diminishes the insidiousness of this critical environmental problem. Humans have many ways of affecting the biological diversity, or biodiversity, of a marine ecosystem. And the encroachment of aquatic invasive or nonindigenous species,² commonly mediated by humans, is “one of the most important agents of . . . change to marine biodiversity at the genetic, species, and ecosystem levels.”³ Indeed, it has been noted that this invasion “constitutes one of the four greatest threats to the world’s oceans and their biodiversity.”⁴

“Biodiversity” describes the biological diversity of genetic, species, and ecological levels in a given ecosystem.⁵ The Convention on Biological

1. Cheryl Ann Butman & James T. Carlton, *Preface* to COMM’N ON GEOSCIENCES, ENV’T, & RESOURCES, UNDERSTANDING MARINE BIODIVERSITY, at ix (1995) [hereinafter UNDERSTANDING MARINE BIODIVERSITY], available at http://books.nap.edu/openbook.php?record_id=4923&page=24.

2. See *infra* notes 5–6 and accompanying text for a full explanation of the use of this term in this Note.

3. *Id.* The other most important critical issues identified are the activities of “fisheries operations, chemical pollution and eutrophication, alteration of physical habitat, and global climate change.” UNDERSTANDING MARINE BIODIVERSITY, *supra* note 1, at 25.

4. Erkki Leppäkoski, *Scientific Aspects on Biopollution*, in MARIA HELENA FONSECA DE SOUZA ROLIM, THE INTERNATIONAL LAW ON BALLAST WATER: PREVENTING BIOPOLLUTION 15, 16 (2008). The other great threats include those posed by land-based pollution sources, over-exploitation of living marine resources, and the destruction and physical modification of the marine habitat. *Id.* (citation omitted). See also Efthimios E. Mitropoulos, *Foreword* to MARIA HELENA FONSECA DE SOUZA ROLIM, THE INTERNATIONAL LAW ON BALLAST WATER: PREVENTING BIOPOLLUTION, at xii 2008 (noting the same threats to the ocean environment).

5. J.L. Harper & D.L. Hawksworth, *Preface*, in BIODIVERSITY—MEASUREMENT AND ESTIMATION 5, 6 (D.L. Hawksworth, ed., 1995). Genetic diversity refers to the diversity within a species, species diversity refers to the number of different species, and ecological diversity refers to the diversity of the community. *Id.* Harper and Hawksworth give a concise and informative overview of the definition of the term biodiversity. *Id.* at 5–11. They explain the etymology of the term as well as how biodiversity is assessed or measured in taxonomic, molecular, or phylogenetic levels. *Id.* The authors caution that biodiversity may mean “quite different things to different people,” *id.* at 6, but this should not deter a robust scientific discussion about biodiversity. So as not to become mired in a scientific debate about the term’s definition, this Note will rely on the broad definition offered by the Convention on Biological Diversity. See *infra* note 6.

Diversity⁶ and this Note both use the term biodiversity to mean “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”⁷ Edward O. Wilson, renowned scientist and tireless advocate for the conservation, protection, and study of biodiversity,⁸ illustrates the importance of biodiversity by noting that “[e]ach species possesses a unique combination of genetic traits that fits it more or less precisely to a particular part of the environment.”⁹

The general threat to biodiversity brought on by the introduction of nonindigenous species is the displacement of one or more native species. Globalization and trade have contributed widely to this displacement. For example, Columbus’s landing in 1492 had an especially startling force in the Caribbean and the Americas: the settlers and their living cargo caused changes to entire landscapes, creating fields of new grass species where once there were forests.¹⁰ Indeed, the result of these biological changes has led some biologists to refer to the post-Columbus years as the “Homogenocene” era, a reference to the homogenization of ecosystems “mixing unlike substances to create a uniform blend.” Indeed, “[w]ith the Columbian Exchange, places that were once ecologically distinct have

6. The Convention on Biological Diversity, entered into force on December 29, 1993, developed from a working group of the UN Environment Programme. CONVENTION ON BIOLOGICAL DIVERSITY, *History of the Convention*, <http://www.cbd.int/history/> (last visited Feb. 22, 2012). Three objectives motivated the Convention: “1. The conservation of biological diversity, 2. The sustainable use of the components of biological diversity, 3. The fair and equitable sharing of the benefits arising out of the utilization of genetic resources.” CONVENTION ON BIOLOGICAL DIVERSITY, *About the Convention*, <http://www.cbd.int/convention/about.shtml> (last visited Feb. 22, 2012). Signed by 168 of 193 parties, the United States is not included in that figure. CONVENTION ON BIOLOGICAL DIVERSITY, *List of Parties*, <http://www.cbd.int/convention/parties/list/> (last visited Feb. 22, 2012). Though signed by President Clinton in June 1993, the Convention was never ratified by the Senate. For a thorough review of the United States’ legal concerns with ratification of the Convention, see William J. Snape, III, *Joining the Convention on Biological Diversity: A Legal and Scientific Overview of Why the United States Must Wake Up*, 10 SUSTAINABLE DEV. LAW & POL’Y 11 (Spring 2010).

7. Convention on Biological Diversity art. 2, Dec. 29, 1993, 1760 U.N.T.S. 79.

8. Mr. Wilson, the Pellegrino University Professor *Emeritus* at Harvard University and Pulitzer Prize-winning author, has championed the diversity of life for much of his distinguished career. See Saul Hansell, *Award Honorees Describe How They Hope to Improve the World*, N.Y. TIMES, Mar. 9, 2007, at C4, available at <http://www.nytimes.com/2007/03/09/technology/09ted.html?ref=edwardowilson> (last visited Feb. 22, 2012); E.O. WILSON BIODIVERSITY FOUNDATION, http://www.eowilson.org/index.php?option=com_content&task=view&id=43&Itemid=69 (last visited Feb. 23, 2012).

9. EDWARD O. WILSON, *THE CREATION: AN APPEAL TO SAVE LIFE ON EARTH* 5 (2006).

10. CHARLES C. MANN, 1493: UNCOVERING THE NEW WORLD COLUMBUS CREATED 4–38 (2011). In this chapter, Mann, who refers to Christopher Columbus by his given name, Cristóbal Colón, describes the effects of the invasion of particular species. *Id.* at 9–11. Tracing the introductions of certain plant and animal species to the early 1500s, Mann sketches a disturbing picture of how the island of Hispaniola is markedly different today from pre-European voyages to the island. *Id.* at 9–11.

become more alike.”¹¹ This occurrence may have multiple effects, including irreparably altering the food chain, significantly changing the ecosystem’s functions and capabilities, causing outbreaks of disease, endangering food supplies, and causing severe economic damage.¹²

Currently fueling the threat to marine biodiversity is ballast water discharge, which acts as a conduit for the introduction of aquatic invasive species (“AIS”).¹³ Indeed, AIS contamination has already costs thousands of human lives and billions of dollars.¹⁴

This Note discusses the problems associated with the lack of international standards to control such introduction of invasive species by ballast water discharge. Part II explains the basics of ballast water discharge and illustrates the scope of the problem by highlighting the severe consequences to both economies and public health caused by nonindigenous species. Part III explains the basic ballast water control methods and surveys the response to these problems by both the United States and the International Maritime Organization (“IMO”), a UN specialized agency. Part IV offers some proposals for how the United States might approach a trilateral solution and why such a solution may be favorable to waiting for an international solution. Finally, this Note concludes in Part V by summarizing the issues presented and their associated recommendations.

11. *Id.* at 17.

12. *See* Snape, *supra* note 6, at 6; *see also* discussion *infra* Part III. The Convention on Biological Diversity notes that

determined action to value and protect biodiversity will benefit people in many ways, including through better health, greater food security and less poverty. It will also help to slow climate change by enabling ecosystems to store and absorb more carbon; and it will help people adapt to climate change by adding resilience to ecosystems and making them less vulnerable. Better protection of biodiversity is therefore a prudent and cost-effective investment in risk reduction for the global community.

Conference of the Parties to the Convention on Biological Diversity, annex ¶ 9, Oct. 29, 2010, UNEP/CBD/COP/DEC/X/2, *available at* <http://www.cbd.int/doc/decisions/cop-10/cop-10-dec-02-en.pdf>. Despite this recognition, “the underlying drivers of biodiversity loss have not been significantly reduced. While there is now some understanding of the linkages between biodiversity, ecosystem services and human well-being, the value of biodiversity is still not reflected in broader policies and incentive structures.” *Id.* annex ¶ 5. *See also* Robert L. Glicksman, *The CEC’s Biodiversity Conservation Agenda*, in *GREENING NAFTA: THE NORTH AMERICAN COMMISSION FOR ENVIRONMENTAL COOPERATION 75* (David L. Markell & John H. Knox eds., 2003).

13. UNDERSTANDING MARINE BIODIVERSITY, *supra* note 1, at 25 (noting that human activities which result in damaging or affecting the ocean’s biological diversity is a “critical environmental issue”).

14. *See infra* notes 37 and 48–49 and accompanying text.

II. BALLAST WATER DISCHARGE: WHAT IT IS AND HOW IT IS CONTROLLED

Ballast water threats to biodiversity will continue as global trade by ship grows. This part defines ballast water discharge and discusses the significant impact it has had to world economics and to global public health.

A. *Defining Ballast Water Discharge*

Ballast water is an essential component of maintaining a ship's stability while in transit.¹⁵ Special tanks within a ship will either take up or discharge water known as ballast water to compensate for fluctuations in the ship's cargo load. This mechanism keeps the ship at an even keel whether transporting a full cargo load or traveling empty.¹⁶ The amount of ballast water a ship takes on has an inverse relationship to the weight of its cargo: the more cargo, the less ballast; the less cargo, the more ballast. The changes in ship cargo range from a full load to an empty condition.¹⁷ Because additional weight results in additional fuel costs, ship owners will minimize their use of ballast water as much as possible while maintaining the overall safety and efficiency of the journey.¹⁸

The amount of ballast water a ship needs usually depends on the type of cargo it carries. For example, a crude oil tanker will generally have a full cargo load only until its destination port. Designed strictly for transporting crude oil, the ship must return to its originating port with empty oil tanks because it delivered its cargo; however, the ship will fill its empty ballast water tanks to compensate for the empty oil tanks.¹⁹ In contrast, a container ship transporting various goods might make a transcontinental journey with a full cargo load, then unload some of the cargo at one port destination, proceeding to its next destination with the

15. Other purposes of ballast water include increasing the depth of submergence of the ship in water, changing the trim, and maintaining "stress loads within acceptable limits." MARINE BD. COMM'N ON ENG'G AND TECHNICAL SYS. NAT'L RES.COUNCIL, *STEMMING THE TIDE: CONTROLLING INTRODUCTIONS OF NONINDIGENOUS SPECIES BY SHIPS' BALLAST WATER*, vii (1996) [hereinafter *STEMMING THE TIDE*]. A ship's trim refers to the balance it keeps by distributing the load such that the ship maintains an even keel as measured by her fore and aft line. Vol. XVI, *OXFORD ENGLISH DICTIONARY* 533–34 (2d ed. 1989), available at <http://dictionary.oed.com/> (defining trim).

16. *STEMMING THE TIDE*, *supra* note 15, at 22.

17. *Id.* at 23.

18. *Id.* at 24. The amount and timing of a load of ballast water is directed by ship officers based on multiple factors, such as the individual vessel's operating needs and compliance with national and international regulations. *Id.* at 24–25.

19. *Id.*

load's remainder.²⁰ The ship would take on and release some ballast water to compensate for the changing level of cargo.²¹

During a voyage, the fluctuations in ship cargo result in a changing need for ballast from port to port. Consequently, ballast water exchanges among different ports during a voyage as ships take on ballast water in one port to compensate for unloaded cargo and subsequently discharge it in another port.²² This continuous exchange sets the stage for the transportation of AIS.²³ Considering the global nature of shipping, this "movement of ballast water by ships appears to be the largest single vector for [AIS] transfer today."²⁴ Many of the species in ballast water survive the long trips from their home ports, remaining viable and capable of invasion upon release into their new port.²⁵ The significant impact of ballast water should be controlled to minimize AIS transfer.

20. *Id.*

21. *Id.*

22. Although some ballast water is taken on and discharged solely at the local port for loading and unloading operations, *id.* at 24, this is less of a concern as a vector of AIS as compared to ballast that is taken on in one port and discharged in another port. Typically, this ballast water replaces cargo and is necessary to stabilize a ship for her return voyage. Vessels that require such ballast water include dry bulk carriers, ore carriers, tankers, liquefied-gas carriers, and oil-bulk-ore carriers. *Id.* Notably, even ballast water which is taken on and discharged at the same local port can still be a factor in the distribution of AIS. *Id.*

23. Aquatic invasive, or nonindigenous, species are known by several monikers, including, *inter alia*: "nonindigenous marine organisms," James T. Carlton & Jonathan B. Geller, *Ecological Roulette: The Global Transport of Nonindigenous Marine Organisms*, 261 *SCI.* 78, 78 (1993); "alien species," Bella S. Galil, *A Sea Under Siege—Alien Species in the Mediterranean*, 2 *BIOLOGICAL INVASIONS* 177, 177 (2000); "introduced species," Marjorie J. Wonham & James T. Carlton, *Trends in Marine Biological Invasions at Local and Regional Scales: The Northeast Pacific Ocean as a Model System*, 7 *BIOLOGICAL INVASIONS* 369, 369 (2005); and "aquatic nuisance species," UNITED STATES FEDERAL AQUATIC NUISANCE SPECIES TASK FORCE, *ANS Taskforce*, <http://www.anstaskforce.gov/default.php> (last visited Jan. 16, 2011). The U.S. Federal Aquatic Nuisance Species Task Force defines an aquatic nuisance species as "aquatic and terrestrial organisms, introduced into new habitats throughout the United States and other areas of the world, that produce harmful impacts on aquatic natural resources in these ecosystems and on the human use of these resources." UNITED STATES FEDERAL AQUATIC NUISANCE SPECIES TASK FORCE, *ANS Taskforce*, <http://www.anstaskforce.gov/default.php> (last visited Jan. 16, 2011). While a "harmful" impact is required per this definition, not all invasive species cause harm. Indeed, scientific journal articles may just focus on gathering the empirical evidence showing an invasive species' presence without ascribing any harms or benefits to the species presence. For the purposes of this Note, AIS will refer to any nonindigenous species that is introduced to a habitat or ecosystem. While the Note will highlight examples of species which have caused harmful effects, it does not intend to limit the discussion to those alone.

24. Gregory M. Ruiz, James T. Carlton, Edwin D. Grosholz & Anson H. Hines, *Global Invasions of Marine and Estuarine Habitats by Non-Indigenous Species: Mechanisms, Extent, and Consequences*, 37 *AM. ZOOLOGIST* 621, 621 (1997).

25. *Id.* at 623.

B. Scale of the Issue

Understanding the scale of the shipping industry puts into perspective the scope of the problem. One of the biggest transportation methods for international merchandise is the shipping industry²⁶ with 7579 oceangoing vessels called on U.S. ports 62,747 times in 2010.²⁷ Eighty percent of world trade by volume is accomplished through maritime transportation.²⁸ Given this volume, ports and waterways are at particularly high risk of AIS establishments because the frequency of the trips by ships traveling through them results in “repeated releases of ballast water.”²⁹ These waters may come from neighboring ports or from across the globe. For example, more than thirty percent of ships arriving in the ports of the U.S. state of Washington arrived from Asian countries, while approximately forty percent arrived from other U.S. ports.³⁰

Further magnifying the problem, AIS introductions are not limited to shipping ports. Rather, even coastal sites not involved in shipping may experience an AIS introduction. Complexities associated with the temporal and physical necessities of ballast water uptake and discharge,³¹ along with

26. WORLD SHIPPING COUNCIL, LINER SHIPPING IN THE U.S. 2 (2009) available at http://www.worldshipping.org/liner_shippingus%20_2009_update.pdf. “Almost half of the approximately \$3 trillion in U.S. international merchandise trade is transported by ship.” *Id.* In 2007, the United States accounts for 11 percent of total world merchandise trade, making it the world’s largest trading nation. *Id.*

27. OFFICE OF POLICY AND PLANS, MARITIME ADMINISTRATION, U.S. DEP’T OF TRANSP., VESSEL CALLS SNAPSHOT, 2010 1 (2011), available at http://www.marad.dot.gov/documents/Vessel_Calls_at_US_Ports_Snapshot.pdf. Of the ships that made up these calls, 35% were tankers, 33% were containerships, 17% were dry bulk vessels, 9% were Ro-Ro vessels (i.e., roll-on/roll-off vessels, ro-ro containerships, and vehicle carriers), and 6% were general cargo ships. *Id.* at vii, 1. Notably, this figure only represents data of oceangoing vessels of 10,000 deadweight tonnage or greater. *Id.* at v. Deadweight tonnage (“DWT”) is a measurement of ship-carrying capacity. To illustrate size, tankers can be as large as 500,000 DWT, though most are between 250,000–350,000 DWT. Most dry bulk carriers, on the other hand, are between 100,000–150,000 DWT. Dr. Jean-Paul Rodrigue et al., *The Geography of Transport Systems*, HOFSTRA UNIVERSITY, DEPARTMENT OF GLOBAL STUDIES & GEOGRAPHY (2009), <http://people.hofstra.edu/geotrans>. For calls at U.S. ports in 2010, the average size of vessels was 53,592 DWT. OFFICE OF POLICY AND PLANS, MARITIME ADMINISTRATION, U.S. DEP’T OF TRANSP., VESSEL CALLS SNAPSHOT, 2010 2 (2011).

28. JEAN-PAUL RODRIGUE, CLAUDE COMTOIS & BRIAN SLACK, *THE GEOGRAPHY OF TRANSPORT SYSTEMS* 206 (2006) (citation omitted).

29. Leppäkoski, *supra* note 4, at 17.

30. PUGET SOUND ACTION TEAM, STATE OF WASHINGTON, BALLAST WATER MANAGEMENT IN WASHINGTON STATE: RECOMMENDATIONS FOR IMPROVEMENT 13 (2007) (providing shipping information from 2005 and also noting that the remaining twenty percent arrived from British Columbia ports).

31. Complexities include the threat to safety of the ship and her crew when sea-surface or weather conditions are less than ideal. SMITHSONIAN ENVTL. RES. CENTER, *Present Ballast Water Management Practices*, NATIONAL BALLAST INFORMATION CLEARINGHOUSE, <http://invasions.si.edu/nbic/managementpract.html> (last visited Mar. 11, 2012).

“[t]he movement and release patterns of ballast water[, assures] . . . that no coastal site, whether it receives direct shipping or not, is immune to ballast-mediated introductions”³² of organisms. In other words, the risks of AIS introductions are not a problem exclusive to the domain of major ports.³³ For example, ships merely traveling along the coastline may be close enough to shore at the time of off-shore uptake and release of ballast water to make the shore susceptible to “natural onshore advection,”³⁴ meaning that the ballast-discharged organisms ride the waves toward the shoreline, nestling into new homes in lagoons, bays, and other coastal locations.³⁵ Likewise, dispersal of AIS also occurs through natural ocean currents and the tide, carrying AIS from “larger port systems to remote sites all along a coast.”³⁶

32. MARINE BD. COMM’N ON ENG’G AND TECHNICAL SYS. NAT’L RES. COUNCIL, *supra* note 15, at 17.

33. *Id.*

34. *Id.*

35. *Id.*

36. *Id.* See also K. Wasson et al., *Biological Invasions of Estuaries Without International Shipping: the Importance of Intraregional Transport*, 102 BIOLOGICAL CONSERVATION 143 (Oct. 2001) (noting that a location does not have to be an international shipping port to be colonized by invaders); Roger L. Mann & Juliana M. Harding, *Salinity Tolerances of Larval Rapana Venosa: Implications for Dispersal and Establishment of an Invading Predatory Gastropod on the North American Atlantic Coast*, 204 BIOLOGICAL BULL. 96, 101–02 (Feb. 2003) (describing the dispersal potential for *Rapana* as an invasive gastropod originally found in Chesapeake Bay and discusses possible limiting factors to the species’ likelihood of establishing viable populations along the North American Atlantic coast, including food availability, mobility of species’ different life stages, water currents, and the species’ “physiological tolerances”). The authors conclude that various factors support a prediction that *Rapana* will establish populations, through “natural dispersal[,] in estuaries and coastal regions from Cape Cod to Cape Hatteras.” *Id.* Notably, the authors indicate that the time frame of the predicted natural dispersal may be “considerably reduced by dispersal . . . in ballast water during intra-coastal maritime trade.” *Id.* at 101. Mann has since confirmed that the “predictions for *Rapana* are holding true so far with respect to upstream distribution. [However, t]he invader has not spread as far as expected onto the continental shelf and along the coastline to the north.” E-mail from Roger L. Mann, Professor of Marine Sci., Dir. of Research & Advisory Serv., Va. Inst. of Marine Sci., to Rebecca M. Thibault, Student, Wash. Univ. in St. Louis Sch. of Law (Jan. 18, 2010, 07:45 EST) (on file with author). The concern of ballast-mediated transport of AIS is not limited to ships that come from foreign ports to domestic ports, but also extends to ships which travel between domestic ports that are heavily invaded and those ports that have not yet experienced serious invasions. See *Ballast Water Management: New International Standards and National Invasive Species Act Reauthorization: J. Hearing Before the Subcomms. on Coast Guard and Maritime Transportation and Water Resources and Environment of the H. Comm. on Transportation and Infrastructure*, 108th Cong. 7 (2004) (statement of Rep. Mike Thompson, Comm. on Transportation and Infrastructure), available at <http://purl.access.gpo.gov/GPO/LPS62382> (“I am just very concerned [about] . . . the short run ballast program. In . . . California . . . we probably have a greater threat on a short run situation where someone takes on ballasts in San Francisco where they have about 200 recognized invasive species, and bring those up to Humboldt Bay [in Northern California].”).

1. Economic Effects

The economic burdens imposed by AIS are not slight. Whether funding eradication efforts, prevention efforts, or simply just population control, “the annual cost to the United States of attempting to control aquatic invaders is about \$9 billion,”³⁷ an amount certain to rise.

Take, for example, the havoc a tiny mollusk, the zebra mussel *Dreissena polymorpha*, continues to wreak across the United States. In 2004, Congressional hearings, prompted by this tiny mollusk’s presence in the Great Lakes, considered the spread of AIS brought into the United States via ballast water. Representative John Duncan from Tennessee, a state whose rivers became contaminated with this AIS, did not exaggerate when he characterized the problem as “a very, very expensive [one] that . . . is very, very expensive to solve”³⁸ As one of the most closely monitored and well-documented introductions of an AIS, the prolifically breeding zebra mussel has successfully invaded the U.S. waters from the Great Lakes to Lake Mead in Nevada.³⁹ Transported to North America’s

37. Henry L. Henderson, *Invasion Response*, CHI. DAILY L. BULL., Sept. 4, 2007, at 6.

38. *Ballast Water Management: New International Standards and National Invasive Species Act Reauthorization: J. Hearing Before the Subcomms. on Coast Guard and Maritime Transportation and Water Resources and Environment of the H. Comm. on Transportation and Infrastructure*, 108th Cong. 3 (2004) (statement of Rep. John J. Duncan, Jr., Chairman, H. Subcomm. on Water Resources and Environment), available at <http://purl.access.gpo.gov/GPO/LPS62382>. Representative Duncan noted that “[t]his is a very, very expensive problem that we are dealing with. It is very, very expensive to solve it.” *Id.*

39. National Park Service, United States Dep’t of the Interior, *Live Zebra Mussels Found at Lake Mead; Resource Agencies Initiate Program to Assess Extent and Prevent Spread* (Jan. 10, 2007), available at <http://home.nps.gov/applications/release/Detail.cfm?ID=719> (“[Z]ebra mussels were first intercepted at Lake Mead . . . in May 2004”). Readers may also be familiar with the current threat to the Great Lakes posed by the Asian Carp’s advancement towards the Lakes through the Mississippi and Illinois Rivers. *The Problem*, ASIAN CARP REGIONAL COORDINATING COMMITTEE 1 (2011), <http://www.asiancarp.us/documents/AsianCarp-TheProblem.pdf>. The Regional Coordinating Committee is a committee represented by numerous state, federal, and regional agencies and officials concerned with the invasion of the Asian Carp. See *About Us*, ASIAN CARP REGIONAL COORDINATING COMMITTEE, <http://www.asiancarp.us/aboutus.htm> (last visited Mar. 12, 2012). The Asian Carp’s introduction to these river systems is not thought to be due to ballast water discharge, but through release of captive fish to the wild. *The Problem*, ASIAN CARP REGIONAL COORDINATING COMMITTEE 1 (2011), <http://www.asiancarp.us/documents/AsianCarp-TheProblem.pdf>. It is expected that if the Asian Carp reaches the Great Lakes, the invasion will have grave impacts on the region’s economy, food web, and safety of people. *Id.* For a different view, that this invasive species may actually benefit the economy, see David Lepeska, *Negative Image Aside, Asian Carp Are a Boon*, N.Y. TIMES, Aug. 12, 2011, at A19A. The American Sportfishing Association provides compelling economic data to support fervent concern over the impacts from a species like Asian Carp: in 2006, the Great Lakes region’s sport fisheries were valued at over \$7 billion. AMERICAN SPORTFISHING ASSOCIATION, *SPORTFISHING IN AMERICA—AN ECONOMIC ENGINE AND CONSERVATION POWERHOUSE 10* (Rev. Jan. 2008), available at http://www.asafishing.org/images/statistics/resources/SIA_2008.pdf (relying on data from the U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of

Lake St. Claire in a transatlantic freighter's ballast water,⁴⁰ the zebra mussel wasted no time in colonizing all five of the Great Lakes, as well as the Mississippi, Tennessee, Hudson and Ohio River Basins.⁴¹

The explosion of the zebra mussel's population caused the invasion and clogging of water intake pipes and water filtration systems for companies using the water and electric generating plants.⁴² In the Great Lakes alone, the prevention and remediation costs associated with the invasion of this one species has been pegged at \$100 million to \$400 million per year;⁴³ however, these figures must be considered in light of the damages that would be exacerbated with no prevention or remediation. The introduction of the zebra mussel to the Great Lakes region has an estimated cost of \$5 billion in additional prevention and remediation measures from 2000 to 2010 between the U.S. and Canadian water users.⁴⁴ The costs of AIS contamination, prevention, and remediation are prohibitive to industry and recreation users alike.

2. Public Health Concerns

AIS introductions also threaten human health. One tragic example of an AIS introduction is that of the 1991 cholera outbreak in South America.⁴⁵ An Asian strain of cholera was transported to Peru's coastal waters by ballast water.⁴⁶ Encouraged by a complex, but not atypical, series of climatic events,⁴⁷ the virus swiftly made its way up hundreds of

Commerce, U.S. Census Bureau, 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (citations omitted)).

40. David Pimentel, Rodolfo Zuniga & Doug Morrison, *Update on the Environmental and Economic Costs Associated with Alien-Invasive Species in the United States*, 52 *ECOLOGICAL ECON.* 273-88, 279 (2005).

41. U.S. GEOLOGICAL SURVEY, U.S. DEP'T OF THE INTERIOR, *ZEBRA MUSSELS CAUSE ECONOMIC AND ECOLOGICAL PROBLEMS IN THE GREAT LAKES* (2007), available at http://www.glsc.usgs.gov/main.php?content=research_invasive_zebramussel&title=Invasive+Invertebrates0&menu=research_invasive_invertebrates.

42. Pimentel et al., *supra* note 40, at 279.

43. Henderson, *supra* note 37. See also UNDERSTANDING MARINE BIODIVERSITY, *supra* note 1, at 33 (estimating the costs to be in the "hundreds of millions of dollars per year"); Pimentel et al., *supra* note 40 (estimating the cost of zebra mussel damage and control to be \$1 billion per year).

44. U.S. GEOLOGICAL SURVEY, *supra* note 41. See also Ruiz, et al., *supra* note 24, at 626 (predicting, at the time, the costs associated with zebra mussel control measures to be between \$1.8-3.4 billion by the year 2000).

45. Ruiz, et al., *supra* note 24, at 626.

46. Yvonne Baskin, *Winners and Losers in a Changing World*, 48 *BIOSCIENCE* 788, 792 (1998).

47. *Id.* A series of events are thought to be responsible for the proliferation of the disease. While one factor contributing to the outbreak was El Nino, human-related causes were likely contributors as well, such as increased nutrient flow and over-exploitation of algae-eating fisheries. *Id.* Without the

miles of coastline⁴⁸ and sickening 300,000 people and killing almost 3,000.⁴⁹

Another more common occurrence is the ballast water mediated introduction of the cysts of toxic dinoflagellate species to areas where they are not endemic. Better known as “red tide,” these species pose a “serious threat to public health and aquaculture.”⁵⁰ The blooms of red tide that result from the species’ proliferation can cause shellfish contamination, poisoning humans, as well as killing fish, birds, and other mammals.⁵¹

III. RESPONDING TO THE THREAT: BALLAST WATER CONTROL

“Ballast water control” is a phrase characterizing any number of ways to minimize the possibilities of the release of AIS. Some common methods of ballast water control are presently utilized: (1) the prohibition altogether of the release of water at any location other than the originating location of the foreign port, and (2) “ballast water exchange,”⁵² which is the process of releasing and accepting water so as to “exchange” it in prescribed areas

ship as a vector, however, the cholera, originally from India, would not have had the opportunity to cross seas in the first place.

48. *Id.* See also Rita R. Colwell, *Global Climate and Infectious Disease: The Cholera Paradigm*, 274 SCI. 2025, 2027 (1996) (noting that the outbreak spread about 2000 km from its original point in Lima. The author attributes this “near simultaneous appearance” of the disease not to ballast water discharge from a “single ship,” but more likely from the favorable environmental conditions encouraged by El Nino. *Id.*

49. *Id.* at 2028. See also Baskin, *supra* note 46, at 792. Some sources have found the figures to be much higher, estimating that the cholera epidemic sickened more than 731,000 people and caused over 6,300 deaths in its first two years. Ruiz et al., *supra* note 24, at 626.

50. Gustaaf M. Hallegraef & Christopher J. Bolch, *Transport of Toxic Dinoflagellate Cysts via Ships’ Ballast Water*, 22 MARINE POLLUTION BULL. 27, 27 (1991).

51. *Id.* Though not all toxic blooms are necessarily the result of ballast water discharge, the evidence does suggest that the appearance of some toxic dinoflagellates “may have involved the transport in ship’s ballast water.” *Id.*

52. Ballast water exchange is essentially a flushing method of exchanging mid-ocean water for water that was taken up in port, which is generally replete with coastal organisms. The theory behind it is that the coastal organisms will be discharged and cannot survive in the harsh mid-ocean environment. As the coastal organisms cannot survive in the open ocean, nor can the oceanic organisms survive in the coastal conditions they would encounter if released in port. GREGORY M. RUIZ ET AL., SMITHSONIAN ENV’T’L RESEARCH CTR., BALLAST WATER EXCHANGE: EFFICACY OF TREATING SHIPS’ BALLAST WATER TO REDUCE MARINE SPECIES TRANSFERS AND INVASION SUCCESS? 3 (2005). For those organisms that do not get flushed out, the exposure to the “high environmental stress [of] oceanic exchange.” Keun-Hyung Choi, *Risk Assessment of Ballast Water-Mediated Invasions of Phytoplankton: A Modeling Study*, 44(4) OCEAN SCI. J. 221, 224 (2009), is thought to lessen their chances of survival. For a description of the different types and mechanics of ballast water exchange, see RYAN ALBERT ET AL., AVAILABILITY AND EFFICACY OF BALLAST WATER TREATMENT TECHNOLOGY: BACKGROUND AND ISSUE PAPER 1–2 (June 2010), available at [http://yosemite.epa.gov/sab/sabproduct.nsf/fedrgstr_activites/9E6C799DF254393A8525762C004E60FF/\\$File/OW_Paper_Ballast_water_technology_issues_and_background_June_2010.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/fedrgstr_activites/9E6C799DF254393A8525762C004E60FF/$File/OW_Paper_Ballast_water_technology_issues_and_background_June_2010.pdf).

that are usually limited to waters more than 200 nautical miles from land and at least 2,000 meters deep for transoceanic voyages.⁵³ More aggressive types of control are those that set performance standards, thereby requiring ships to employ technologies which treat the water before its release.⁵⁴ The treated water is subject to a regulatory standard setting a limit on the number of living organisms that can be released with ballast water.⁵⁵

Some of these methods and mechanisms have more shortcomings than others. For example, the ballast water exchange method is a leading ballast water control,⁵⁶ but is often criticized because it does not fully accomplish the goal of limiting introductions of AIS.⁵⁷ Instead, it is seen as a “stopgap measure” until alternative technologies are successfully made available.⁵⁸

53. For coastal, as opposed to transoceanic voyages, where the ship travels more along a coastline and does not get far out into the ocean, the criteria for where the ship can exchange are typically closer to shore and in shallower water. PUGET SOUND ACTION TEAM, *supra* note 30, at 24–25.

54. *See, e.g., id.* at 3, 5. Such technology causes either the removal or killing of the organisms, and can be accomplished in various ways, including the use of chemical biocides, whose “impacts should be examined critically . . . to ensure that discharges of treated ballast water meet . . . water quality requirements,” *Id.* at iii. Other methods of treatment, which each come with consequences and benefits, are mechanical treatment, physical treatment (including ultraviolet radiation), and combined treatment. *Id.* at 23–25.

55. The typical standard limits the number of organisms of a particular size in a given volume of water. PUGET SOUND ACTION TEAM, *supra* note 30, at 24–28.

56. “For the vast majority of commercial vessels, ballast water exchange is the primary preventative management technique” to limit AIS introductions. N. DOBROSKI ET AL., CALIFORNIA STATE LANDS COMMISSION, ASSESSMENT OF THE EFFICACY, AVAILABILITY AND ENVIRONMENTAL IMPACTS OF BALLAST WATER TREATMENT SYSTEMS FOR USE IN CALIFORNIA WATERS 3 (2007).

57. Studies have reported various efficacy rates, from 67–86% in eliminating certain brackish-water-tolerant organisms, to 87% for certain harmful dinoflagellates and diatoms. Fangzhu Zhang & Mike Dickman, *Mid-Ocean Exchange of Container Vessel Ballast Water. 1: Seasonal Factors Affecting the Transport of Harmful Diatoms and Dinoflagellates*, 176 MARINE ECOLOGY PROGRESS SERIES 243–51, 250 (1999) (citing A.D. Locke, M. Reid, H.C. Van Leeuwen, W.G. Sprules & J.T. Carlton, *Ballast Water Exchange as a Means of Controlling Dispersal of Freshwater Organisms by Ships*, 50 CAN. J. OF FISHERIES AND AQUATIC SCI. 2086–93 (1993)). Ballast water exchange effectiveness has been documented to range from 50–99% in removing organisms dwelling in the tanks. CAL. STATE LANDS COMMISSION, 2010 ASSESSMENT OF THE EFFICACY, AVAILABILITY AND ENVIRONMENTAL IMPACTS OF BALLAST WATER TREATMENT SYSTEMS FOR USE IN CALIFORNIA WATERS 4, (2010), available at http://www.slc.ca.gov/spec_pub/mfd/ballast_water/Documents/2010_TechReportFinal_23Aug2010.pdf. In addition to the problems associated with efficacy, ballast water exchange “is not feasible for all vessels . . . , can have variable effectiveness, and may . . . not be feasible due to vessel safety concerns.” ALBERT ET AL., *supra* note 52, at 2 (providing background information for EPA’s Science Advisory Board).

58. Christopher Costello, John M. Drake & David M. Lodge, *Evaluating an Invasive Species Policy: Ballast Water Exchange in the Great Lakes*, 17(3) ECOLOGICAL APPLICATIONS 655–62, 655 (2007). The findings of these authors contradict the conclusions reached by many others regarding the efficacy of ballast water exchange. The authors developed a model to assess the efficacy of ballast water exchange requirements. They found that “[c]ontrary to other authors who take the recent increase in discoveries of [AIS] . . . as evidence that ballast water exchange is ineffective . . . the observed detection rate could just as plausibly be explained by [other factors],” *Id.* The authors

Some scientists have bluntly noted that a ballast water exchange “is unlikely to provide a consistent and effective method of managing ballast water”⁵⁹ because the release of nonindigenous species still occurs: organisms may remain in the sediment at the bottom of the tanks or may not be entirely flushed out under the exchange method.⁶⁰ Moreover, the qualitative and quantitative efficacy of an exchange depend on multiple factors, such as the taxa considered, the type of voyage, and the type of ballast water tanks.⁶¹ Such factors complicate an accurate analysis. Because of these issues with the ballast water exchange, the consensus of many coastal states that use their waters for recreational and economic activity favor a performance-based standard,⁶² which theoretically could achieve 100% efficacy.

A. *The U.S. Response*

The zebra mussel invasion of the Great Lakes served as an abrupt awakening for Americans about the devastating effects an aquatic invader might wreak upon a habitat and upon the accompanying industrial and recreational use of such habitat. Soon after the zebra mussel began its colonization of the Great Lakes,⁶³ Congress passed the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990⁶⁴ (“NANPCA”) to start to address the problem associated with aquatic invasions. Immediately focused on protecting the Great Lakes, NANPCA allowed for the promulgation of regulations “to prevent the introduction and spread of aquatic nuisance species into the Great Lakes through ballast water of vessels.”⁶⁵ NANPCA was set up to be replaced by the National Invasive

conclude that “[s]everal more years of data would be required to make a conclusive evaluation of ballast water exchange,” *Id.*

59. Tracy McCollin, Aileen M. Shanks & John Dunn, *Changes in Zooplankton Abundance and Diversity After Ballast Water Exchange in Regional Seas*, 56 MARINE POLLUTION BULL. 834 (2008).

60. See ALBERT ET AL., *supra* note 52, at 2.

61. Choi, *supra* note 52, at 224 (citing seven additional articles which consider ballast water exchange efficiency).

62. L. TAKATA ET AL., 2011 BIENNIAL REPORT ON THE CALIFORNIA MARINE INVASIVE SPECIES PROGRAM 6 (2011), available at http://www.sl.c.ca.gov/spec_pub/mfd/ballast_water/Documents/2011_BiennialRpt_Final.pdf (noting the limitations of ballast water exchange buttress the need for effective technology that treats the water and kills the organisms prior to their discharge into port waters).

63. U.S. GEOLOGICAL SURVEY, *supra* note 41.

64. 16 U.S.C. § 4711 (2007).

65. 16 U.S.C. § 4711(b)(1). Section 4711(b)(1) authorizes the Secretary of the department in which the Coast Guard operates, in consultation with the Aquatic Nuisance Species Task Force, as defined in 16 U.S.C. §§ 4702(12)-(13), to promulgate these regulations. 16 U.S.C. § 4711(b)(1).

Species Act of 1996 (“NISA”),⁶⁶ which would address AIS introductions on a national scale to protect all U.S. waters.⁶⁷

Under NANPCA and NISA, the U.S. Coast Guard was responsible for promulgating and policing the rules. At the direction of NISA, a joint program between USCG and the Smithsonian Environmental Research Center (“SERC”) resulted in the creation of the National Ballast Information Clearinghouse (the “Clearinghouse”).⁶⁸ This effort required ships arriving at U.S. ports to submit a ballast water reporting form to the Clearinghouse.⁶⁹ Notably, the Coast Guard, and not the EPA, was given control over regulating ballast water discharge because the EPA had exempted itself from regulating certain vessel discharges by not requiring National Pollutant Discharge Elimination System (“NPDES”) permits.⁷⁰ Included in this exemption was “any other discharge incidental to the normal operation of a vessel,”⁷¹ which included ballast water.⁷²

One of the EPA’s main reasons for excluding ballast water and other discharges was that, at the time, the EPA was facing

many, many other much higher priority situations[,] such as raw sewage being discharged, municipal plants having to be built, [and] very large paper mills or steel mills and the like discharging. At the time, we [the EPA] thought that . . . [v]essels were not important to the overall scheme of things.⁷³

Indeed, this comment was preceded by the EPA’s thinking almost two decades prior that “[t]his type of discharge generally causes little

66. 16 U.S.C. § 4711.

67. 16 U.S.C. § 4711(c)(1) (stating that “the Secretary shall issue voluntary guidelines to prevent the introduction and spread of nonindigenous species in waters of the United States by ballast water operations and other operations of vessels equipped with ballast water tanks” under normal rulemaking procedures). “Waters of the United States” effectively refers to the “navigable waters and the territorial sea of the United States.” 16 U.S.C. § 4702(16).

68. 16 U.S.C. § 4712(f)(1) (1996).

69. *Marine Invasions Research Lab: Ballast Water Management Regulatory Framework*, SMITHSONIAN ENVTL. RES. CENTER, http://www.serc.si.edu/labs/marine_invasions/vector_ecology/bw_regs.aspx (last visited Mar. 12, 2012).

70. Exclusions, 40 C.F.R. § 122.3 (2008). “The NPDES program requires permits for the discharge of ‘pollutants’ from any ‘point source’ into ‘waters of the United States.’ The terms ‘pollutant’, ‘point source’ and ‘waters of the United States’ are defined at § 122.2.” 40 C.F.R. § 122.1(b) (2008). The NPDES program is a result of the authority vested in the EPA through the Clean Water Act, 33 U.S.C. §§ 1251, *et seq.* 40 C.F.R. § 122.1(a).

71. 40 C.F.R. § 122.3(a). Other excluded discharges were “sewage from vessels, effluent from properly functioning marine engines, laundry, shower, and galley sink wastes.” *Id.*

72. 33 U.S.C. § 1322(a)(12)(A)(i) (2008) (providing that “[d]ischarge incidental to the normal operation of a vessel” includes ballast water from ships).

73. Craig Vogt, EPA, EPA Pub. Meeting #12227, Ocean Discharge Criteria 15 (Sept. 12, 2000, 1 p.m.).

pollution,”⁷⁴ and by not regulating it, the EPA would “reduce administrative costs drastically.”⁷⁵ As it was, such permitting requirements went to the Coast Guard instead of the EPA.

The Coast Guard’s responsibility for the national program began in 1998; it was self-policing and allowed ships to voluntarily comply with the ballast water management (“BWM”) plan.⁷⁶ Not surprisingly, compliance with the program was, according to the Coast Guard, “inadequate.”⁷⁷ In response, the BWM was made mandatory in July 2004 by imposing civil and criminal penalties for failing to comply with BWM regulations.⁷⁸ The new laws required the master of vessels to employ one of several listed BWM practices.⁷⁹ The rules had teeth by virtue of the penalties that could be imposed: a person is liable for a civil penalty up to \$27,500 for “[e]ach day of a continuing violation constitut[ing] a separate violation.”⁸⁰

However, even with these penalties and the policing by the Coast Guard, environmental groups were dissatisfied with the compliance and standards for ships entering U.S. waters.⁸¹ The Coast Guard showed “insufficient interest in pollution control generally, and ballast water management specifically.”⁸² Billions of dollars and thousands of deaths later, the EPA’s assertion that ballast water “discharge generally causes little pollution” proved very far from the truth.⁸³ This discontent led the Northwest Environmental Advocates, The Ocean Conservancy, Inc., and Waterkeepers of Northern California to petition the EPA, requesting a

74. National Pollutant Discharge Elimination System, 38 Fed. Reg. 13,528, (b)(13)(ii) (May 22, 1973).

75. *Id.*

76. *Ballast Water Management*, UNITED STATES COAST GUARD, <http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp> (last visited Jan. 16, 2011).

77. *Id.* See also Mandatory Ballast Water Management Program for U.S. Waters, 69 Fed. Reg. 44952 (July 28, 2004) (to be codified at 33 C.F.R. pt. 151) (identifying the ineffectiveness of voluntary reporting as a reason for requiring mandatory reporting).

78. 33 C.F.R. § 151.1518 (2004) (imposing civil penalties for failure to conduct ballast water management, and classifying a knowing violation of the regulations as a class C felony).

79. 33 C.F.R. § 151.1510(a)(1)-(3). The options include: carrying out ballast water exchange on the waters beyond the Exclusive Economic Zone (“EEZ”), 33 C.F.R. § 151.1510(a)(1); retaining the ballast water on board the vessel, sealing it in the tanks for the duration of the voyage, 33 C.F.R. § 151.1510(a)(2); or using an “alternatively sound method of [BWM] that has been submitted to, and approved by, the Commandant [of the USCG] prior to the vessel’s voyage,” 33 C.F.R. § 151.1510(a)(3).

80. 33 C.F.R. § 151.1518(a).

81. *Nw. Envtl. Advocates v. U.S. Envtl. Prot. Agency*, 537 F.3d 1006, 1026 (9th Cir. 2008).

82. Suzanne Bostrom, *Halting the Hitchhikers: Challenges and Opportunities for Controlling Ballast Water Discharges and Aquatic Invasive Species*, 30 ENVTL. L. 867, 908 (2009) (quoting Claudia Copeland, Cong. Research Serv., *Regulating Ballast Water Discharges: Current Legislative Issues*, at CRS-1 (2008)).

83. See *supra* notes 37, 48–49, and 74 and accompanying text.

repeal of the regulation which excluded ballast water discharge from vessels from EPA permitting and regulations.⁸⁴ A year and a half later, these parties sued the EPA for not responding to their petition.⁸⁵ The Ninth Circuit, on appeal, found that the EPA could not exempt itself from regulating ballast water discharges under the NPDES permitting process.⁸⁶

In response to this ruling, the EPA set forth rules to include regulation of ballast water discharge in its NPDES permits. Most of the standards and limits are based on the requirements that the Coast Guard already had in place.⁸⁷ Critically, the permits allow for the stricter regulations of individual U.S. states and tribes to supersede the EPA's standards if the EPA's standards are less strict.⁸⁸ Twenty-six states exercised this right to institute their own standards for the permits,⁸⁹ including California, which presently has one of the strictest standards in the nation.⁹⁰

84. 40 C.F.R. § 122.3 (2008). *See* *Nw. Envtl. Advocates v. U.S. Envtl. Prot. Agency*, 537 F.3d 1006 (9th Cir. 2008).

85. *See* *Nw. Envtl. Advocates v. U.S. Envtl. Prot. Agency*, 537 F.3d 1006 (9th Cir. 2008).

86. *Id.* at 1026.

87. U.S. ENVTL. PROTECTION AGENCY, 2008 FINAL ISSUANCE OF NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) VESSEL GENERAL PERMIT (VGP) FOR DISCHARGES INCIDENTAL TO THE NORMAL OPERATION OF VESSELS: FACT SHEET, 58 (Dec. 18, 2008). "EPA is including most of these Coast Guard requirements in this permit as technology-based effluent limits." *Id.* The permits also contained several requirements in addition to the USCG management practices. *Id.* These requirements, based on "numerous studies and reports by NOAA and others," *Id.* at 59, supported different technological standards of ballast water exchange for specific vessels engaged in specific types of voyages, and were rationalized because the management practices were "widely available, and are currently practicable and economically achievable for vessel owner/operators to implement." *Id.* at 58.

88. The Clean Water Act § 401(d) "provides that any certification under the [CWA] 'shall set forth any effluent limitations and other limitations and monitoring requirements' necessary to assure that any applicant for a federal license or permit will comply with any applicable CWA-based effluent limitations and other limitations . . . and with any other appropriate requirements of State and Tribal law. [These] provisions provided by States and Tribes . . . are enforceable conditions of [the NPDES] permit." *Industrial and Commercial Facilities Publications*, U.S. ENVTL. PROTECTION AGENCY: NAT'L POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES), http://cfpub.epa.gov/npdes/docs.cfm?program_id=14&view=allprog&sort=name#certification (last visited Feb. 8, 2012). Recent legislative action, however, would take away this right of states to regulate more stringently, allowing the standards to be set by the federal government only. *See* H.R. 2838, 112th Cong. (2011), *available at* <http://thomas.loc.gov/cgi-bin/bdquery/z?d112:h.r.2838>. This bill, prompted by some Great Lakes' states concerns over New York's impending and very strict ballast water performance standards, strips the states of their authority to regulate ballast water discharge; while it passed in the House, it has not yet been heard in the Senate. *Id.*

89. States which required additional permit conditions are California, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Utah, Vermont, and Wyoming. *See Program Status Reports*, ENVTL. PROTECTION AGENCY: NAT'L POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES), http://cfpub.epa.gov/npdes/docs.cfm?program_id=14&view=allprog&sort=name#certification (last visited Feb. 22, 2012).

90. CAL. CODE REGS. tit. 2, §§ 2293-2295 (specifying performance standards for the discharge of ballast water for vessels operating in California waters). *See also Performance Standards for Ballast*

B. International Response—The IMO Convention

In recognition of the global problem of ballast water mediated transport of AIS, the IMO has put forth the International Convention for the Control and Management of Ships' Ballast Water and Sediments ("Ballast Water Convention").⁹¹ The standards set by the Ballast Water Convention in Section D are less stringent than those required by California.⁹² By many accounts, these standards are not stringent enough;⁹³ the science now points to the need for much stricter limits on the allowable number of viable organisms per liter or milliliter of ballast water discharge.⁹⁴

The intent of the Ballast Water Convention is a positive step in the direction of limiting ballast water mediated AIS introductions; however,

Water Discharge, CAL. MARINE INVASIVE SPECIES PROGRAM, CAL. STATE LANDS COMMISSION (2009), http://www.slc.ca.gov/Spec_Pub/MFD/Ballast_Water/Documents/PerfStd_InfoSheet.pdf (last visited Jan. 16, 2011) (explaining that standards are set based on the number of organisms of a particular size that can be released in a given volume of discharged ballast water). The information sheet details the standard and describes California's long-term goal, which includes its "[f]inal discharge standard [of] . . . zero detectable living organisms for all organism size classes, beginning January 1, 2020." *Id.* at 1. As Bostrom, *supra* note 82, at 900, cites one industry official has noted that the stringency of California's and New York's conditions "in particular [have] 'almost put a whole ballast program on top of the [NPDES] permit.'" *Id.* at 900 n.282 (citing *Obama Position May Boost Nascent Senate Bid for CWA Ballast Bill*, INSIDE EPA (Inside Washington Publishers), Jan. 23, 2009, at 1, 8). H. LEE II ET AL., DENSITY MATTERS: REVIEW OF APPROACHES TO SETTING ORGANISM-BASED BALLAST WATER DISCHARGE STANDARDS 3, (2010) (EPA/600/R-10/031), available at <http://cfpub.epa.gov/npdes/search.cfm#publication> ("In response to concerns that the IMO standards were not sufficiently protective, a number of states, such as California and Wisconsin, have initiated or passed more stringent discharge limits for ballast water. . . . Additionally, California . . . [has] proposed alternative standards with the ultimate goal of "no detectable" discharges of organisms in ballast water. . . .").

91. Int'l Mar. Org. [IMO], *Adoption of the Final Act and Any Instruments, Recommendations and Resolutions Resulting From the Work of the Conference: International Convention for the Control and Management of Ships' Ballast Water and Sediments*, 2004, U.N. Doc. BWM/CONF/36 (Feb. 16, 2004) [hereinafter *Ballast Water Convention*]. The IMO is the "United Nations specialized agency with the responsibility for the safety and security of shipping and the prevention of maritime pollution by ships." *Introduction to IMO*, IMO, <http://www.imo.org/About/Pages/Default.aspx> (last visited Feb. 2, 2012). The *Ballast Water Convention* notes that the parties to it are

[resolved] to prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships' Ballast Water and Sediments, as well as to avoid unwanted side-effects from that control and to encourage developments in related knowledge and technology.

Id. at 2.

92. *Ballast Water Convention*, *supra* note 91, at 22. Performance standards are specified in Regulation D-2, and allow a greater number of organisms per volume of water than is allowed by California. The Convention provides for ballast water exchange and performance standards, applicable to a shipping vessel depending upon the ship's year of construction. *See id.* at Reg. B-3.

93. *See* Rona Kobell, *Coast Guard Wants to Toughen Ballast Water Controls*, 19(8) BAY J. (Nov. 2009), available at <http://www.bayjournal.com/article.cfm?article=3699>.

94. *See supra* note 57 and accompanying text.

its slow implementation and unimpressive standards buttress a call for other solutions. The Ballast Water Convention, adopted in February 2004, has not yet entered into force: it will not do so until twelve months after ratification by thirty countries, representing thirty-five percent of world merchant shipping tonnage.⁹⁵ Eight years after its adoption, technology has sufficiently improved to bypass the performance standards of the Ballast Water Convention and to meet the strictest performance standards promulgated.⁹⁶

IV. RECOMMENDATIONS FOR MEANINGFUL BALLAST WATER CONTROL

A. *Regional Coordination*

One solution to the problem of lenient international ballast water control is for regional, as opposed to international, coordination. The IMO acknowledges that inspections of ships can be “extremely effective, especially if organized on a regional basis.”⁹⁷ Using the authority granted to the port State,⁹⁸ port State control allows States to inspect the ships docked at their ports.⁹⁹ The State can verify that the ship’s condition and equipment are in compliance with the international, regional, or national

95. Ballast Water Convention, *supra* note 91, at 10. As of September 9, 2011, twenty-eight countries representing 25.43% of world tonnage are parties to the Ballast Water Convention. IMO, SUMMARY OF STATUS OF CONVENTION (Aug. 31, 2011), available at <http://www.imo.org/About/Conventions/StatusOfConventions/Documents/Summary%20of%20Status.xls>.

96. L. TAKATA ET AL., *supra* note 62, at 31–32 (noting the technological capabilities will likely be available at least for newly built ships; retrofitting ships with competent technology is not specifically addressed).

97. IMO, *Port State Control*, <http://www.imo.org/ourwork/safety/implementation/pages/portstatecontrol.aspx> (last visited Jan. 6, 2012) (emphasis added). The IMO has been exploring ways to encourage regional efforts. Port State Control organizations have been formed and Memoranda of Understanding (“MoUs”) have been signed, establishing agreements on Port State Control. *Id.* Through nine separate agreements, the scope of these MoUs cover “all the world’s oceans.” *Id.* For an example of one of the MoUs, including a list of the twenty-seven signatory countries, see Paris Memorandum of Understanding on Port State Control, 33rd amend. (July 1, 2011), [https://www.paris-mou.org/Content/PublishedMedia/0ecbaa48-3c98-4df3-bd26-dc44593b68a1/Paris%20MoU,%20incl%2033rd%20amendment%20\(final\).pdf](https://www.paris-mou.org/Content/PublishedMedia/0ecbaa48-3c98-4df3-bd26-dc44593b68a1/Paris%20MoU,%20incl%2033rd%20amendment%20(final).pdf).

98. “Many of IMO’s most important conventions contain provisions for ships to be inspected when they visit foreign ports to ensure that they meet IMO requirements.” *Id.* Note that “State,” as capitalized, indicates other countries, not states of the United States.

99. See MARIA HELENA FONSECA DE SOUZA ROLIM, *THE INTERNATIONAL LAW ON BALLAST WATER: PREVENTING BIOPOLLUTION* 43 (2008) (noting that customary international law of the sea has held only the ship’s flag State responsible for ensuring vessel compliance with international standards of marine environment protection (citation omitted)). However, port State control is not precluded by flag State jurisdiction, and may be a “more realistic method of ensuring higher levels of compliance.” *Id.* (citing PHILIPPE SANDS, *PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW* (Press Syndicate of the Univ. of Cambridge 2d ed. 2003)).

standards of the port at which it is docked.¹⁰⁰ The IMO favors a regional approach, which helps ensure an “efficient use of resources and information,”¹⁰¹ because it is likely that a ship calling on a port in one country will also make stops in other countries within the region.¹⁰² With regional coordination of such inspections, the likelihood of discovering ships that do not comply with the regulatory standards is increased, providing a “‘safety net’ to catch substandard ships.”¹⁰³ Of course, effective enforcement also depends on effective communication and cooperation between the States within the region.¹⁰⁴ Moreover, the benefits of coordinated regional inspections also extend to the ships: if inspections are coordinated among the region, the need for an inspection in each State is unnecessary, helping ships avoid delay.¹⁰⁵

Such a regional program could be successfully implemented in North America given the shared Pacific coastline between the United States, Mexico, and Canada. The wait for definitive action from the IMO should cease.¹⁰⁶ Indeed, previous experience awaiting the IMO’s recommendations and regulations of ballast water has proved futile.¹⁰⁷

100. *Id.*

101. U.N. Secretary-General, *Report of the Secretary-General on Oceans and the Law of the Sea Addendum*, ¶ 46, delivered to the General Assembly, U.N. Doc. A/61/63/Add.1 (Aug. 17, 2006).

102. IMO, *supra* note 97.

103. *Id.*

104. Some of the necessary elements to “harmonize” Port State Control activities are “a common understanding of and implementation of [port State control systems’] provisions; compatible port State control procedures, reporting systems and standard formats; transparency of information; cooperation and efficient exchange of information between [States].” U.N. Secretary-General, *Report of the Secretary-General on Oceans and the Law of the Sea Addendum*, ¶ 46, delivered to the General Assembly, U.N. Doc. A/61/63/Add.1 (Aug. 17, 2006). Regional agreements and strategy development are also promoted by the Global Invasive Species Programme (“GISP”), an international partnership that dedicates itself to “conserving biodiversity and sustain[ing] human livelihoods by minimizing the spread and impact of [invasive species],” which are “some of the greatest threats to biodiversity loss . . . and environmental degradation and change worldwide.” The Global Invasive Species Programme, available at <http://go.worldbank.org/TAG88LH6L0> (last visited Sept. 7, 2011). For a thorough reading of their suggestions regarding frameworks for controlling invasive species, see C. SHINE, A TOOLKIT FOR DEVELOPING LEGAL AND INSTITUTIONAL FRAMEWORKS FOR INVASIVE ALIEN SPECIES (2008), available at <http://www.gisp.org/publications/toolkit/index.asp>.

105. IMO, *supra* note 97.

106. Representative Ehlers (Michigan), at the hearings in 2004, expressed his support of U.S./domestic legislation to regulate ballast water treatment because “the IMO Convention will not adequately protect our waters.” *Ballast Water Management: New International Standards and National Invasive Species Act Reauthorization: J. Hearing Before the Subcomms. on Coast Guard and Mar. Transp. and Water Resources and Env’t of the H. Comm. on Transp. and Infrastructure*, 108th Cong. 6 (2004) (statement of Rep. Vernon J. Ehlers, Michigan, Member, H. Comm. on Transp. and Infrastructure), available at <http://purl.access.gpo.gov/GPO/LPS62382>.

107. *Ballast Water Management: New International Standards and National Invasive Species Act Reauthorization: J. Hearing Before the Subcomms. on Coast Guard and Mar. Transp. and Water Resources and Env’t of the H. Comm. on Transp. and Infrastructure*, 108th Cong. 3 (2004) (statement

In addition to promoting a cohesive and collaborative effort for the region, “[h]ow the United States decides to address these issues will have a tremendous impact both domestically and internationally because of the U.S.’s dominance in overseas trade as an importing and exporting nation.”¹⁰⁸ Decisive, collective action for a national and, eventually, regional standard will spur greater use of effective technologies to treat ballast water. An “absence of a standard,”¹⁰⁹ on the other hand, works as a deterrent to companies that produce these technologies: the companies lack an incentive to create products for sale if the shipping companies themselves see no benefit in investing in the technology.¹¹⁰

Indeed, practice has already demonstrated that the creation of a technology-based or performance-based standard can spur technological advancement and business opportunity. A recent ballast water treatment system to come onto the market not only “exceeds the IMO D2 performance standard . . . [but] also meet[s the] more stringent proposed U.S. Federal and State of California standards.”¹¹¹ If international or

of Rep. Bob Filner, California, Member, H. Committee on Transp. and Infrastructure), *available at* <http://purl.access.gpo.gov/GPO/LPS62382>. Representative Filner explained that the U.S. had, in 2004, “delayed consideration of legislation” to give the IMO the opportunity to create an international ballast water treatment plan. *Id.* Although a plan was set forth, it “failed to adequately protect the environment of the United States.” *Id.* Blame for this inadequacy was placed on the IMO’s deference to ship owners’ concerns of implementing only the cheapest treatment options. *Id.* (“I guess that is what happens when organizations only listen to ship owners. They, of course, want to do whatever is cheapest, even though it may not adequately deal with our problem.”). However, Representative Gilchrest (Maryland), following Representative Filner’s comments, attempted to clarify his position on the IMO, stating that the IMO “is one of the best entities in the United Nations. It is filled with engineers, and it is filled with professional people that discuss basically engineering designs, architectural designs, and safety. So there is almost no politics involved in the IMO . . . I am not saying there are politics involved in this particular consensus that they have come up with, the standards for ballast water. I do not think so.” *Id.* at 4 (statement of Rep. Wayne T. Gilchrest, Member, H. Comm. on Transp. and Infrastructure).

108. *Ballast Water Management: New International Standards and National Invasive Species Act Reauthorization: J. Hearing Before the Subcomms. on Coast Guard and Mar. Transp. and Water Resources and Env’t of the H. Comm. on Transp. and Infrastructure*, 108th Cong. 3 (2004) (statement of Rep. John J. Duncan, Jr., Chairman, H. Subcomm. on Water Res. and Env’t), *available at* <http://purl.access.gpo.gov/GPO/LPS62382>.

109. *Ballast Water Management: New International Standards and National Invasive Species Act Reauthorization: J. Hearing Before the Subcomms. on Coast Guard and Mar. Transp. and Water Resources and Env’t of the H. Comm. on Transp. and Infrastructure*, 108th Cong. 33 (2004) (testimony of Dr. Roger I. Mann, Acting Director for Research and Advisory Science, Virginia Institute of Marine Science, Gloucester Point, Virginia), *available at* <http://purl.access.gpo.gov/GPO/LPS62382> (describing this catch-22 that puts “[e]verybody . . . in a do-loop where nothing gets done.” *Id.*).

110. DOBROSKI et al., *supra* note 56, at 40 (“Shipping companies may be unwilling to spend million[s] of dollars purchasing and installing systems without knowledge that those systems meet federal and international requirements, and the demand for treatment technologies will likely remain sluggish until [NPDES] certification and legislative issues are settled.”).

111. *Hyde Ballast Water Management System Gets Type Approval*, MARINELOG, May 12, 2009,

regional standards are modeled on the efficacy of the technologies in performance-based standards, as opposed to only authorizing specifically named technologies, then more opportunities to achieve the goal of preventing, or at least minimizing, AIS introductions will exist.

Further supporting the coordination of international and regional standards, the shipping industry itself is a proponent of “uniformity in operating procedures and training standards in accordance with a framework grounded in international law.”¹¹² Given the mobility of vessels across international jurisdictions, consistency and predictability of regulations enable the shipping industry to better comply with them.¹¹³ Lacking such uniformity, the regulatory framework would continue to change in a non-systematic way, likely resulting in a “complicated patchwork” of requirements and hindering “compliance and effectiveness.”¹¹⁴ A similar argument supports the need for a single national standard in the United States,¹¹⁵ which could further facilitate implementing a regional accord.

B. Mandatory Compliance and a “Polluter Pays” Principle

For a regional agreement to be successful, compliance must be mandatory for all States within the region. History undermines favoring voluntary compliance. Voluntary compliance “has been a failure because many ship owners [are] unwilling to participate.”¹¹⁶ If technology or

<http://www.marinelog.com/DOCS/NEWSMMIX/2009may00127.html>. *Id.* Tom Mackey of Hyde Marine, Inc. “hailed [its] development as a ‘major milestone for [the] company.’” The availability of a range of systems with an appropriate capacity (treatment of cu.m/hr) fulfills requirements for “all vessel types and sizes.” *Id.* For Regulation D-2, see also Ballast Water Convention, *supra* note 91.

112. FONSECA DE SOUZA ROLIM, *supra* note 99, at 47.

113. Bostrom, *supra* note 82, at 910.

114. FONSECA DE SOUZA ROLIM, *supra* note 99, at 47.

115. A shipping spokesman testifying at a Congressional hearing explained the industry’s preference for an international standard not governing those ships which travel only domestically:

[W]e strongly support the national program as the exclusive method of compliance for vessels trading in our waters. We believe the levels of control in the [IMO’s Ballast Water] Convention, the need for national and international consistency, and the ability to quickly develop new technology, buttresses the need for this single national standard.

Ballast Water Management: New International Standards and National Invasive Species Act Reauthorization: J. Hearing Before the Subcomms. on Coast Guard and Mar. Transp. and Water Resources and Env’t of the H. Comm. on Transp. and Infrastructure, 108th Cong. 21 (2004) (testimony of Joseph J. Cox, President, Chamber of Shipping of America, Washington, D.C., Representing the Shipping Industry Ballast Water Coalition), available at <http://purl.access.gpo.gov/GPO/LPS62382>.

116. *Ballast Water Management: New International Standards and National Invasive Species Act Reauthorization: J. Hearing Before the Subcomms. on Coast Guard and Mar. Transp. and Water Resources and Env’t of the H. Comm. on Transp. and Infrastructure*, 108th Cong. 3 (2004) (statement

performance-based standards are voluntary, ship owners are unlikely to comply because of the increased costs, such as lost time, profit, and competitiveness. The estimated cost of installing treatment technology, though variable, are between \$200,000 and \$300,000 per vessel to retrofit for mechanical treatment.¹¹⁷ Mandatory compliance is likely the only way to ensure ships install the required technology. Requiring ships to install such technology is a solution that employs a “polluter pays” principle into a model that offers a workable solution for this problem.¹¹⁸ The polluter pays principle requires that the one causing the damage to the “free” natural resource pays for the damage caused.¹¹⁹

While the costs of such technology may seem prohibitive to an individual ship owner, the costs of doing nothing have such a greater impact upon the broader population that the technology costs are

of Rep. Bob Filner, California, Member, H. Committee on Transp. and Infrastructure), *available at* <http://purl.access.gpo.gov/GPO/LPS62382>.

117. PUGET SOUND ACTION TEAM, *supra* note 30, at 39. The costs associated with treatment technology depend upon a variety of factors, including: whether the installation is to a new ship or is a retrofit; the vessel type served; the capacity of the equipment; the installation itself; the operating costs; and the servicing costs, among others. *Id.* at 20. Likewise, the range of the total costs is, on the lowest end, \$55,000, to over a million dollars. *Id.* at 20–21.

118. Although serious international environmental issues often do not fit within the polluter pays framework, but instead follow a “beneficiary pays” principle, *id.* at 26, there are reasons the polluter pays principle may work in this instance. Polluter pays is not ideal in situations where the international agreements “operate under a rule of voluntary assent,” wherein a country that does not want to pay will simply decline to adopt the treaty. Under a “beneficiary pays” principle, on the other hand, the beneficiaries of the environmental protections must convince other non-beneficiary States to comply. *Id.* (citing J. Baert Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 *YALE L.J.* 677, 752 (1999)). Ballast water control might require applying a blend of these two principles. As they are mobile, polluting ships from one country will come under another country’s jurisdiction; contrast this with a coal plant in China: while it emits pollutants that contribute to air pollution in other countries, those countries cannot necessarily assert jurisdiction over the plant to control its pollutants. Thus, the country with jurisdiction can assert a polluter pays principle, requiring ships traveling within its EEZ to comply with its rules. The benefit is that a ship, to avoid prosecution or fines, will employ the requisite technology of that country it calls on. A “beneficiary pays” principle comes into play when, for instance, the United States wants ships visiting Mexico to employ more stringent ballast water controls. If the ship that visits Mexico does not call on U.S. ports, there is no incentive to comply with U.S. standards. Thus, the United States may have to incentivize Mexico, or the shipping companies themselves, to ensure compliance with its stricter standard. The appropriate model depends on the practice of the shipping industry. If ships limit their port calls to the United States, then its implementation of more stringent ballast standards will not be the ideal way to prevent AIS introductions into U.S. waters because of the potential for natural dispersal of species introduced in Canada or Mexico. If, however, ships are likely to call on ports in any of the three countries, then they will comply with the strictest standard, which becomes the limiting factor.

119. Here, the proposed cost is simply that of outfitting a ship with the requisite technology. A much more aggressive cost is to charge ship owners for the costs associated with damages from AIS. However, one can imagine that establishing this cost would be near impossible, given the incredible range of potential variables at issue, such as identifying what AIS is introduced and where the AIS is introduced.

warranted. Lacking any type of regulation, neither individual ships nor the shipping industry as a whole is held responsible for the effects caused by the practice of reckless ballast water discharge. Once successfully establishing itself in an ecosystem, an AIS is “almost, if not entirely, impossible” to remove.¹²⁰ Oceans and waterways that retain their level of biodiversity, or at least maintain the current level of stability in a particular ecosystem, are properly considered a precious commodity not available for sale in a marketplace. As it stands under voluntary compliance, the value to a potential polluter of maintaining the water in this condition is low: it is essentially free for her to pollute. Following a polluter pays model ensures that currently unaccounted for externalities or damages caused by unregulated ballast water discharge are accounted for: the cost of outfitting ships with appropriate technology will “reflect the costs of environmental damage . . . [resulting in] an efficient allocation of resources.”¹²¹

In contrast, the actual cost burden upon ship owners may be minimal to none: the shipping industry could recover its investments by passing through the costs to consumers. Given the economies of scale this increase to consumers would likely be “well-tolerated.”¹²²

*C. Incorporation of Environmental Standards Into Trade Agreements:
North America’s CEC*

An attractive model for accomplishing a regional framework for tackling ballast water mediated AIS, as well as other environmental problems, is to tie the environmental control to a trade agreement. Looking to the North American Free Trade Agreement (“NAFTA”), one can see that such a coupling of trade and environmental agreements has been done in the past. The North American Agreement on Environmental Cooperation, formed as a side agreement to NAFTA,¹²³ established the Commission for Environmental Cooperation (“CEC”), a trinational

120. Wendy A. Jastremski, *A Proposed International Framework Convention on Bioinvasive Species*, in *TRANSBOUNDARY ENVIRONMENTAL NEGOTIATION: NEW APPROACHES TO GLOBAL COOPERATION* 361, 368 (Lawrence Susskind, William Moomaw & Kevin Gallagher eds., 2002).

121. *Id.*

122. Jastremski, *supra* note 120, at 371. The World Shipping Council highlights that the American consumer’s “annual cost of transporting all of America’s ocean-borne liner imports is less than \$150 for each . . . household.” WORLD SHIPPING COUNCIL, *supra* note 26, at 2. Consider, for instance, that the transportation cost of a pair of imported athletic shoes, which themselves can cost upwards of \$150, is less than 50 cents per pair. Annually, 350 million pairs of sneakers are imported. *Id.*

123. COMMISSION FOR ENVTL. COOPERATION, http://www.cec.org/Page.asp?PageID=1226&SiteNodeID=310&BL_ExpandID=154 (last visited Jan. 15, 2012).

organization of the United States, Canada, and Mexico.¹²⁴ The CEC was formed to “promote the effective enforcement of environmental law.”¹²⁵ Biodiversity was featured as a “key area for trilateral cooperation,”¹²⁶ which led to the creation of the Biodiversity Conservation Working Group, a group of high-level policymakers from the three countries.¹²⁷ The group identified the threat from invasive species as a priority action area,¹²⁸ especially in light of the fact that, “[w]ith increased trade comes an increase in the potential for . . . biological invasion”¹²⁹

Currently, ballast water control is not on the CEC’s radar;¹³⁰ however, the CEC has taken steps to address biodiversity, adopting the Strategic Plan for the Conservation of Biodiversity in North America¹³¹ and identifying some species at risk from AIS introductions. Of course, there are distinct limits of the CEC, including its lack of “authority to establish

124. *Id.*

125. *Id.*

126. RICHARD ORR & JEFFREY P. FISHER, TRINATIONAL RISK ASSESSMENT GUIDELINES FOR AQUATIC ALIEN INVASIVE SPECIES 3 (2009), available at http://www.cec.org/files/PDF/BIO_DIVERSITY/07-64-CEC%20invasives%20risk%20guidelines-summary_en.pdf (providing a summary report).

127. *Working Groups*, COMMISSION FOR ENVTL. COOPERATION, <http://www.cec.org/Page.asp?PageID=122&ContentID=3009&SiteNodeID=585> (last visited Jan. 15, 2012).

128. *Id.*

129. *Id.*

130. The CEC is not entirely neglecting the threat from invasive species. In 2009, a report was published documenting research and plans of action for dealing with two North American aquatic alien invasive species. *Trinational Risk Assessment Guidelines for Aquatic Alien Invasive Species*, COMMISSION FOR ENVTL. COOPERATION, (2009), http://www.cec.org/Storage/62/5516_07-64-CEC%20invasives%20risk%20guidelines-full-report_en.pdf (providing a full report). However, the species studied in this report—the Snakehead and Armored Catfish—are both *inland* fish.

131. Robert L. Glicksman, *The CEC’s Biodiversity Conservation Agenda*, in GREENING NAFTA: THE NORTH AMERICAN COMMISSION FOR ENVIRONMENTAL COOPERATION 75 (David L. Markell & John H. Knox eds., 2003). The plan for trilateral action to protect and promote biodiversity was reported in 2003. *Biodiversity: Strategic Plan for North American Cooperation in the Conservation of Biodiversity*, COMMISSION FOR ENVTL. COOPERATION (2003), available at http://www.cec.org/Storage/84/7949_Biodiversitystrategy.pdf. A framework model for protecting biodiversity followed in January 2004. *The North American Conservation Action Plan (NACAP) Framework*, COMMISSION FOR ENVTL. COOPERATION (2004), available at http://www.cec.org/Storage/53/4528_NACAP-FRAMEWORK_en.pdf (providing the main agreements and outcomes from the Ensenada trilateral workshop). This framework called for focusing the CEC’s efforts, and limited resources, based upon particular “species of common conservation concern.” *Id.* at 3. This effort supports programs to protect specific, high-concern species, such as the Humpback Whale and the Leatherback Turtle. See *North American Conservation Action Plan for the Humpback Whale*, COMMISSION FOR ENVTL. COOPERATION (2005), available at http://www.cec.org/Storage/59/5158_NACAP-Humpback-Whale_en.pdf; *North American Conservation Action Plan for the Leatherback Turtle*, COMMISSION FOR ENVTL. COOPERATION (2005), available at http://www.cec.org/Storage/59/5167_NACAP-Leatherback-Sea Turtle_en.pdf. The limits of focusing on a particular species, however, may take away from an ecosystem focus and ignore the many thousands of species that are not receiving active, adequate protection.

binding legal obligations on the governments of the three Parties or on private entities operating within them”¹³² Despite the limits on authority, if the parties to the trilateral agreement identify and address a common issue, such as ballast water control, the opportunity to create a “conceptual framework[] or starting point[] for the negotiation by the Parties”¹³³ will be more likely.¹³⁴

Finally, a trilateral relationship between the United States, Mexico, and Canada, could look to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (“London Convention and Protocol”) as a model.¹³⁵ For example, Article IX of the London Convention and Protocol¹³⁶ promotes the coordinated efforts for preventing, reducing, and eliminating causes of pollution by essentially sharing information and technical cooperation.¹³⁷ Such a framework could set the stage to not only create a “stronger international legal trigger to set

132. Glicksman, *supra* note 131, at 74.

133. *Id.*

134. It may be that, to protect a focus species, the action plan at issue will include protection measures that will benefit more than just that focus species. If ballast water control is something that needs to be accomplished to protect one such focus species, it may provide the catalyst needed to create a trilateral ballast water control plan.

135. Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Dec. 29, 1972, 26 U.S.T. 2403, 1046 U.N.T.S. I-15749 [hereinafter London Convention], available at <http://www.imo.org/OurWork/Environment/SpecialProgrammesAndInitiatives/Pages/London-Convention-and-Protocol.aspx>. The London Protocol is a 1996 agreement made to modernize the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. See IMO, GUIDANCE ON THE NATIONAL IMPLEMENTATION OF THE 1996 PROTOCOL TO THE LONDON CONVENTION 1972 (adopted 2001) (2010) [hereinafter IMO GUIDANCE], available at <http://www.imo.org/OurWork/Environment/SpecialProgrammesAndInitiatives/Pages/London-Convention-and-Protocol.aspx>. The United States is a signatory party to the London Convention as well as the 1996 Protocol; it ratified the original London Convention on June 23, 1977, however, it has not ratified the 1996 Protocol. See *London Convention and Protocol, Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and 1996 Protocol Thereto*, IMO, <http://www.imo.org/OurWork/Environment/SpecialProgrammesAndInitiatives/Pages/London-Convention-and-Protocol.aspx> (last visited Mar. 12, 2012). For a description of how countries may implement each article, see generally IMO GUIDANCE As one of the “first global conventions to protect the marine environment from human activities,” the goal of the London Convention is to “promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter.” *The London Convention and Protocol: Their Role and Contribution to Protection of the Marine Environment*, IMO, http://www.imo.org/includes/blastDataOnly.asp/data_id=21278&filename=LC-LPbrochure.pdf (last visited Mar. 12, 2012). Though not controlling for purposes of ballast water discharge, the goal of the London Convention to protect the ocean environment from detrimental human activity addresses similar problems and, perhaps, solutions that serve as a helpful corollary in coming up with a plan to prevent the transport of AIS through ballast water.

136. London Convention, *supra* note 135, art. IX.

137. *Id.*

needed activities in motion,”¹³⁸ but it could also act to help “attract additional states”¹³⁹ to a similar system of regulation.

V. CONCLUSION

Aquatic invasive species have made their presence known in waters around the world. Ballast water transport is a primary cause of AIS introductions to coastal ecosystems and the current international proposals are too little, too late. Within the United States, individual states are instead enacting their own strict standards to control ballast water mediated introductions. To protect the U.S. waters and to improve the chances of stricter performance standards occurring globally, the United States should first implement a national standard to which the most threatened states agree. Then, a North American trilateral solution should be sought to ensure that threats from shared coastlines are minimized. One recommended approach to accomplish a trilateral framework is to tie it to a trade agreement.

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138. Alan B. Sielen, *Treaty Review: The New International Rules on Ocean Dumping: Promise and Performance*, 21 *GEO. INT'L ENVTL. L. REV.* 495, 535 (2009).

139. *Id.*

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