

COMMENTS

Defending the Homeland: A Call to Action in the War Against Aquatic Invasive Species

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I. INTRODUCTION

The United States is under attack at this very moment by a band of enemies that respect no political boundaries and recognize no laws. They have been infiltrating our country and wreaking havoc for generations, yet our government’s response to this threat has primarily occurred within the past two decades. Who *are* these foes? They are aquatic invasive species (AIS).¹ On a global scale, both aquatic and terrestrial

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1. The term “aquatic invasive species” is interchangeable with “aquatic nuisance species.” See *Protecting Our Great Lakes: Ballast Water and the Impact of Invasive Species: Hearing Before the Subcomm. on Regulatory Affairs, H. Comm. on Government Reform*, 109th Cong. 26 (2005) [hereinafter *Protecting Our Great Lakes Hearing*] (statement of Mike Cox, Att’y Gen., State of Michigan), available at <http://bulk.resource.org/gpo.gov/hearings/109h/24893.pdf>.

invasive species are the second greatest cause of species endangerment and extinction after habitat alteration.² Their negative impact surpasses the combined effects of global warming, excessive harvesting, pollution, and disease.³ With both intentional and unintentional assistance from humans, AIS invade our nation's rivers, streams, lakes, and ponds, causing considerable environmental and economic damage.⁴ At the federal level, the statutory and regulatory response to this problem has grown in recent years. However, as this comment argues, this response is inadequate in several ways and is leading to a growth in efforts to combat AIS at the state level. It is further argued that given the particular nature of this problem, it is preferable for the federal government to take the lead on this issue over the states by strengthening its existing response through the modification and enhancement of its statutory and regulatory framework.

Part II of this Comment provides background information on the definition of AIS, the means of their introduction, and the environmental and economic consequences of specific examples of AIS. Part III explores the key statutory and regulatory components of the federal response to AIS. Part IV reviews the shortcomings and criticisms of the federal response. Part V analyzes the potential statutory and regulatory solutions to the inadequate federal response by delving into what has been and can be done at the state and federal levels. This Part also discusses the appropriateness of adopting a stronger federal role to combat AIS. Finally, Part VII concludes with observations on the practicality of achieving a more robust federal response to AIS in light of impediments that may stand in the way.

To maintain consistency, the former will be used throughout this Comment unless reference to a specific source requires otherwise.

2. *The Growing Problem of Invasive Species: Joint Oversight Hearing Before the Subcomm. on Fisheries Conservation, Wildlife and Oceans joint with the Subcomm. on National Parks, Recreation, and Public Lands, H. Comm. on Resources*, 108th Cong. 5 (2003) [hereinafter *The Growing Problem of Invasive Species Hearing*] (statement of Daniel Simberloff, Professor, University of Tennessee-Knoxville), available at <http://bulk.resource.org/gpo.gov/hearings/108h/86708.pdf>.

3. *Id.*

4. NAT'L INVASIVE SPECIES COUNCIL, MEETING THE INVASIVE SPECIES CHALLENGE: NATIONAL INVASIVE SPECIES MANAGEMENT PLAN 10 (2001), available at <http://www.invasive-speciesinfo.gov/docs/council/mpfinal.pdf>.

II. BACKGROUND: THE PROBLEM OF AQUATIC INVASIVE SPECIES

A. *Definition*

Considering their rather ominous-sounding name, it is important to understand what is actually meant by the term “aquatic invasive species,” how such species find their way into our waters, and what effect they have on the environment and economy. First, it should be noted that invasive species is a subcategory of a broader group of organisms often referred to as “nonnative,” “nonindigenous,” “exotic,” or “alien.” Each of these terms refers to an organism that lives in a habitat in which they have not historically resided.⁵ These foreign species are classified as “invasive” because their presence in the new environment “does or is likely to cause economic or environmental harm or harm to human health.”⁶ Thus, AIS are nonnative, water-residing organisms that either do cause or are likely to cause harm to the economy, the environment, or human health.

B. *Means of Introduction*

Before addressing the prevention of AIS introduction, it is important to understand how these organisms end up residing in a habitat that is foreign to them in the first place. AIS arrive in new habitats with both intentional and unintentional assistance from humans.⁷ Intentional AIS introductions are not necessarily nefarious.⁸ In fact, intentional introductions can occur when a particular species is initially introduced for its perceived or actual benefits.⁹ For example, intentional introductions may be desirable for aquaculture or seafood production purposes, with the risk resulting from unexpected consequences or improper control of such species.¹⁰ Other methods of AIS introduction include the ballast water of ships, recreational boating, live fishing bait, aquarium releases, canals, and semi-submersible oil platforms.¹¹

Ballast water is the primary means of AIS introduction and is a significant part of what is addressed by the statutory and regulatory

5. *Id.*

6. Exec. Order No. 13,112, 64 Fed. Reg. 6183 (Feb. 3, 1999).

7. NAT'L INVASIVE SPECIES COUNCIL, *supra* note 4.

8. *See id.*

9. *Id.*

10. *See The Growing Problem of Invasive Species Hearing, supra* note 2, at 74 (statement of John Connelly, President, National Fisheries Institute).

11. *Id.* at 31 (statement of Stephen B. Brandt, Director, Environmental Research Laboratory, National Oceanic and Atmospheric Administration).

regime.¹² Thus, it is worthwhile to gain a better understanding of this process. Whenever a ship travels from port to port, either without cargo or with anything less than a full capacity of cargo on board, it must take on ballast water before departing in order to make a transoceanic trip safely.¹³ Upon arrival at a new port, the ship discharges its ballast water as it takes on the weight of cargo, releasing foreign water, and with it any organisms and eggs that may be in the ballast water, into the waters of that port.¹⁴ Even ships that leave their original port with a full load of cargo (and thus no ballast water) retain some amount of residual water in their ballast tanks along with organisms and eggs that can be released into a foreign port during a later ballast discharge.¹⁵ Approximately 50,000 ships enter American ports from overseas each year, and any given ship may hold more than twenty-one million gallons of ballast water.¹⁶ It is clear the risk of AIS introduction through ballast water discharges is significant.

C. *Environmental and Economic Costs*

Once established in a new habitat, the nature and degree of environmental and economic harm AIS cause varies according to the particular species and the timing and adequacy of the response to combat them. Generally speaking, the environmental impact of AIS is likely to be severe because they can harm native species by competing for common food sources, preying on native species, bringing in new diseases, and changing the genetic makeup of similar species.¹⁷ Ultimately, AIS may be able to modify substantially the original ecosystem.¹⁸

Economically, the combined cost of dealing with aquatic and terrestrial invasive species in the United States is estimated at \$137 billion per year.¹⁹ Costs related to AIS damage and control measures within the Great Lakes Basin alone were estimated at \$5.7 billion in 2005.²⁰ In 2006, programs devoted to researching and controlling a

12. NAT'L INVASIVE SPECIES COUNCIL, *supra* note 4, at 30.

13. *Protecting Our Great Lakes Hearing*, *supra* note 1, at 43 (statement of Robin M. Nazzaro, Director, Natural Resources and Environment, Government Accountability Office).

14. *Id.* at 43-44.

15. *Id.*

16. NAT'L INVASIVE SPECIES COUNCIL, *supra* note 4, at 30.

17. *Id.* at 11.

18. *See id.*

19. *Id.*

20. ASIAN CARP WORKING GROUP, AQUATIC NUISANCE SPECIES TASK FORCE, MANAGEMENT AND CONTROL PLAN FOR BIGHEAD, BLACK, GRASS, AND SILVER CARPS IN THE

single species, the sea lamprey, cost more than \$21 million.²¹ To better understand the process of AIS introduction and their subsequent environmental and economic costs, it is helpful to examine a couple of specific examples: zebra mussels and Asian carp.

1. Zebra Mussels

The zebra mussel is a small shellfish that has its origins in the Black, Caspian, and Azov Seas near Russia.²² It was first introduced in the United States through the release of a ship's ballast water in Lake St. Clair (connecting Lake Huron and Lake Erie) in 1988.²³ By 1990, zebra mussels rapidly spread to all the Great Lakes and continued throughout the Mississippi, Tennessee, Hudson, and Ohio River basins within a decade.²⁴ Today, they are still spreading and have been found in the waters of twenty-four states.²⁵ They spread into new waters by floating with currents during their larval stage and by attaching themselves to barges and recreational boats (the latter, of course, can then be placed into an otherwise isolated body of water that would have been inaccessible to the zebra mussel but for the action of humans).²⁶

The environmental and economic costs of the zebra mussel are sizable. Where established, zebra mussels have a high population density and feed on particles in the water that serve as food for larval fish and other invertebrates, resulting in population reductions for some of these competitors.²⁷ Also, in some locations, zebra mussels have reduced the population of native unionid clams to near extinction by attaching themselves in large groups to the clams' shells.²⁸ This behavior by the zebra mussels prevents the clams from moving, feeding, or breeding.²⁹ Furthermore, while the zebra mussel consumption of particles in the water can cause waters to become clearer than they have been in the past,

UNITED STATES 4 (G. Conover et al. eds., 2007), http://anstaskforce.gov/Documents/Carps_Management_Plan.pdf.

21. *Id.*

22. A.J. Benson & D. Raikov, U.S. Geological Survey, U.S. Dep't of the Interior, *Dreissena Polymorpha*, <http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=5> (last visited Feb. 9, 2008).

23. Benson & Raikov, *supra* note 22; U.S. Geological Survey, U.S. Dep't of the Interior, *Zebra Mussels Cause Economic and Ecological Problems in the Great Lakes* (2000), http://www.gls.usgs.gov/_files/factsheets/2000_6%20Zebra%20Mussels.pdf.

24. Benson & Raikov, *supra* note 22; U.S. GEOLOGICAL SURVEY, *supra* note 23.

25. *See* Benson & Raikov, *supra* note 22.

26. *See id.*

27. U.S. GEOLOGICAL SURVEY, *supra* note 23.

28. *Id.*

29. *Id.*

this improved clarity has the effect of allowing in more sunlight and increasing underwater plant growth.³⁰ Additional underwater plant growth can cause problems with odor and taste for drinking water and make beaches less enjoyable for recreational swimming, among other things.³¹

Zebra mussels are also economically costly. Their behavior of attaching to objects in large colonies causes serious problems, such as reducing water intake in pipes for hydroelectric and nuclear power plants, public water supply plants, and other facilities.³² For example, a town in Michigan had no water for three days in 1989 due to a zebra mussel collection in its water intake pipes.³³ Also, they have been known to sink navigational buoys, to damage boat engine cooling systems, and to corrode steel and concrete structures in the water.³⁴ The estimated cost of addressing the zebra mussel problem in the Great Lakes region between 2000 and 2010 is about \$5 billion.³⁵ Unfortunately, no environmentally sound or practically feasible techniques have been developed to eradicate zebra mussels in large quantities.³⁶ Instead, individually affected parties must use chemicals, filters, and scraping to remove zebra mussel colonies.³⁷ Additionally, boaters, divers, fishermen, and others can take simple preventative measures to avoid the spread of zebra mussels to unaffected waters.³⁸

2. Asian Carps

Another example of AIS that is garnering increased attention is the Asian carp. Asian carps are actually four different types of carp (bighead, black, grass, and silver) that all originate in various waters of East Asian countries.³⁹ All four of these species were intentionally brought to the United States between 1963 and 1973.⁴⁰ Their intended purposes were to keep water clean in aquaculture ponds as a biological control agent, to improve water quality in sewage treatment lagoons, and/or to be potential food fish.⁴¹ State agencies and research institutes

30. *Id.*

31. *Id.*

32. Benson & Raikov, *supra* note 22.

33. U.S. GEOLOGICAL SURVEY, *supra* note 23.

34. Benson & Raikov, *supra* note 22.

35. U.S. GEOLOGICAL SURVEY, *supra* note 23.

36. *See id.*

37. *Id.*

38. *Id.*

39. ASIAN CARP WORKING GROUP, *supra* note 20, at v, 8, 14, 20, 29.

40. *Id.* at 9, 15, 21, 29.

41. *Id.*

are primary holders of the black carp, which has an unknown level of distribution in the wild.⁴² However, the other three Asian carps have spread throughout many of the major rivers and tributaries of the United States through intentional introductions or facility escapes.⁴³

While the long-term environmental impacts of Asian carps are not fully understood, there is reason to believe that they will have negative effects. The bighead and silver carps feed on the same food sources as many native mussels, larval fish, and adult fish.⁴⁴ This increased competition for food threatens the survivability of these native species.⁴⁵ Also, black carps mostly feed on mussels and snails, seventy percent of which are considered “extinct, endangered, threatened, or of special concern.”⁴⁶ Furthermore, grass carps are significant consumers of aquatic vegetation, which endangers species that require such vegetation for habitat as well as those that also feed on aquatic vegetation.⁴⁷ In locations where grass carps reside, there have been reports of considerable losses of snail and crayfish populations, both of which also feed on aquatic vegetation.⁴⁸ Additionally, grass carps consume land-based vegetation by burrowing into soil, leading to the erosion of banks and shorelines.⁴⁹

Moreover, there are signs of an economic impact from the Asian carp problem. Both the bighead and silver carps have not yet found any major commercial success in the United States, yet they are capable of jeopardizing commercial fishing throughout the Mississippi River basin by becoming an increasingly larger portion of the annual catch.⁵⁰ The combined weight of the bighead and silver carps harvested from the Mississippi and Illinois Rivers was less than 600kg per year between 1988 and 1992.⁵¹ However, by 2003 the annual harvest weight increased to 60,000 kg from the Mississippi River and 338,000 kg from the Illinois River.⁵² In 2002, the increased harvest of bighead and silver carps in the Illinois River was offset by a thirty-five percent decrease in the buffalo fish harvest.⁵³ Beyond commercial fishing, the unique jumping or flying

42. *Id.* at 15.

43. *Id.* at 9, 22, 30.

44. *Id.* at 13, 32.

45. *See id.*

46. *Id.* at 19.

47. *Id.* at 28.

48. *Id.*

49. *Id.*

50. *Id.* at 13, 33.

51. *Id.* at 13, 32.

52. *Id.*

53. *Id.* at 13, 33.

characteristic of the silver carp has led to many personal injuries and property damage.⁵⁴ Ultimately, Asian carps remain a threat that has not yet realized its fullest potential, and they serve as a challenge to our government's effectiveness at dealing with AIS in the years to come.

III. THE FEDERAL RESPONSE TO AQUATIC INVASIVE SPECIES

In light of the environmental and economic threat that AIS pose if allowed to enter U.S. waters, it is reasonable to expect the federal government to take some action in response, and it has done so. The federal statutory and regulatory framework to address AIS has largely, though not entirely, come to fruition within the past two decades. There are a few key components in the federal arsenal that are worth reviewing in closer detail: the Lacey Act, the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) (later amended by the National Invasive Species Act of 1996 (NISA)), and Executive Order 13112 (which created the National Invasive Species Council (NISC)).⁵⁵

A. *The Lacey Act*

First, under the Lacey Act, the Secretary of the Interior is vested with the authority to declare species of mammals, birds, fish, amphibians, and reptiles to be "injurious to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife or the wildlife resources of the United States."⁵⁶ When the Secretary designates a species as injurious, people are prohibited from importing them or their offspring or eggs into the United States or between individual states.⁵⁷ Exceptions to this prohibition are allowed for live specimens used for "zoological, educational, medical, and scientific purposes."⁵⁸ However, a party must first obtain a permit before importing or transporting an injurious species between states.⁵⁹ Permits are only granted after the U.S. Fish and Wildlife Service (USFWS) ensures a number of criteria are met.⁶⁰ The current list of prohibited injurious aquatic species under the

54. *Id.* at 33.

55. Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, Pub. L. No. 101-646, 104 Stat. 4761 (amended by National Invasive Species Act of 1996, 16 U.S.C. §§ 4701-4751 (2000)); Lacey Act, 18 U.S.C. § 42 (2000); Exec. Order No. 13,112, 64 Fed. Reg. 6183 (Feb. 3, 1999).

56. 18 U.S.C. § 42(a)(1).

57. *Id.*

58. *Id.* § 42(a)(3).

59. 50 C.F.R. § 16.22 (2000).

60. *Id.* Such criteria relate to the intended purpose of importation, the quality of the facility that is to receive the specimen(s), the level of knowledge and experience of the applicant

Lacey Act includes the zebra mussel, the black carp, and the silver carp, among others.⁶¹

The procedure for listing a species as injurious under the Lacey Act can be initiated by the USFWS or by petition from the public.⁶² Next, the process of evaluation occurs, which involves a review of the risks associated with the species and can vary in duration depending on available information.⁶³ Ultimately, if the USFWS determines a species is injurious based on the information it has acquired, it will issue a proposed rule and conduct a notice and comment proceeding lasting between thirty and sixty days before deciding whether to issue a final rule listing the species as injurious.⁶⁴ A violation of a prohibition established under the Lacey Act can result in a prison sentence of up to six months and a fine of \$5000 for an individual or \$10,000 for an organization.⁶⁵

B. Ballast Water Management

The next tool in the federal arsenal to combat AIS is the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) (later amended by the National Invasive Species Act (NISA)), which is the federal government's ballast water statute.⁶⁶ This statute was passed in 1990 to address the zebra mussel invasion in the Great Lakes and originally only directed the United States Coast Guard to apply ballast water regulations to ships entering the Great Lakes and later, the Hudson River.⁶⁷ Although originally voluntary, the regulations within NANPCA became mandatory within two years.⁶⁸ Under these regulations, all ships with ballast water on board that enter ports of the Great Lakes or the Hudson River from a location beyond the Exclusive

as it relates to the risk of the specimen(s), and whether the public will be able to view the specimen(s) if being placed in an aquarium. *Id.*

61. *Id.* § 16.13.

62. U.S. FISH & WILDLIFE SERV., U.S. DEP'T OF THE INTERIOR, INJURIOUS WILDLIFE: A SUMMARY OF THE INJURIOUS PROVISIONS OF THE LACEY ACT (2007), http://www.fws.gov/contaminants/ANS/pdf_files/InjuriousWildlifeFactSheet2007.pdf.

63. *Id.*

64. *Id.*

65. *Id.* The USFWS derives these penalties from 16 U.S.C. §§ 3371-3378, which are provisions of the Lacey Act that relate to matters other than injurious wildlife. *See id.*

66. Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, Pub. L. No. 101-646, 104 Stat. 4761 (amended by National Invasive Species Act of 1996, 16 U.S.C. §§ 4701-4751 (2000)).

67. *Protecting Our Great Lakes Hearing*, *supra* note 1, at 44-45 (statement of Robin M. Nazzaro, Director, Natural Resources and Environment, Government Accountability Office).

68. 16 U.S.C. §§ 4711(a)-(b).

Economic Zone (EEZ)⁶⁹ are required to perform one of three tasks.⁷⁰ They must conduct a complete ballast water exchange beyond the EEZ before entering those ports, retain their ballast water on board during their time inside the EEZ, or use another method of ballast water management approved by the Coast Guard.⁷¹ However, the Coast Guard has yet to approve any alternative methods of ballast water management beyond exchanging the water in the ocean.⁷² Thus, ships unable to carry out an exchange are required to keep their ballast water on board while inside the EEZ.⁷³

The purpose of exchanging ballast water beyond the EEZ is both to physically remove any organisms in the ballast water tanks and to increase the salinity level in the tanks to kill any living organisms that require fresh or brackish water to survive.⁷⁴ If a ship is unable to perform a ballast exchange at sea due to weather or other problems, it must contact a Coast Guard officer and determine a proper exchange site.⁷⁵ Failure to comply with reporting and ballast water exchange requirements can lead to a fine of up to \$27,500 and a felony conviction for knowing violations.⁷⁶

In 1996, Congress amended NANPCA with NISA to expand the ballast water regulations beyond their limited geography and to prevent the introduction of AIS into all waters of the United States.⁷⁷ As with NANPCA, regulations were voluntary at first but became mandatory in 2004 due to low compliance rates.⁷⁸ Under NISA, all ships with ballast water on board bound for the United States must perform a complete ballast water exchange outside the EEZ, retain their ballast water on board, or use an alternative method of ballast water management approved by the Coast Guard.⁷⁹ Ships unable to perform the ballast water exchange must either retain the ballast water while within the EEZ or discharge only as much as is “operationally necessary”—as long as the

69. The EEZ is the area of 200 nautical miles around the shores of the United States.

70. *Protecting Our Great Lakes Hearing, supra* note 1, at 45; 33 C.F.R. § 151.1510 (2000).

71. *Protecting Our Great Lakes Hearing, supra* note 1, at 45; 33 C.F.R. § 151.1510.

72. *Protecting Our Great Lakes Hearing, supra* note 1, at 46.

73. *Id.*

74. *Id.* at 45.

75. 33 C.F.R. § 151.1514.

76. *Id.* §§ 151.1516, 151.1518.

77. *See Protecting Our Great Lakes Hearing, supra* note 1, at 46.

78. *See* 16 U.S.C. §§ 4711(c), (e), (f) (2000); *Protecting Our Great Lakes Hearing, supra* note 1, at 47.

79. 33 C.F.R. § 151.2035.

ship is not within the Great Lakes or the Hudson River.⁸⁰ NISA also carries with it the same penalties as NANPCA for failure to comply with the ballast water exchange regulations or the reporting and recordkeeping requirements.⁸¹

C. *National Invasive Species Council*

A final component of the federal response to AIS is Executive Order 13112, which established the National Invasive Species Council (NISC) in 1999.⁸² The NISC members include the heads of the following agencies: State, Treasury, Defense, Interior, Agriculture, Commerce, Transportation, Health and Human Services, Homeland Security, National Aeronautics and Space Administration, the Environmental Protection Agency, the Office of the U.S. Trade Representative, and the U.S. Agency for International Development.⁸³ The NISC is tasked with ensuring that actions undertaken by each member agency and all other federal agencies will prevent or at least not promote the introduction and spread of invasive species.⁸⁴ Furthermore, these agencies are supposed to work with each other, with states, and with other relevant actors in developing and implementing responses to the invasive species problem.⁸⁵ This appears to be the first serious attempt to establish a framework to address the threat of invasive species throughout the entire federal government. To guide the federal government in this endeavor, the NISC also has the responsibility of issuing and biennially revising the National Invasive Species Management Plan (National Management Plan), in which it outlines the goals and duties of federal agencies in response to invasive species.⁸⁶ The first National Management Plan was released by the NISC in 2001 and set forth goals and proposed actions relating to prevention, early detection and rapid response, restoration, and other matters.⁸⁷

80. *Id.* § 151.2037. Ships operating within the Great Lakes or Hudson River cannot make “operationally necessary” discharges and must instead comply with the more stringent standard of retaining their ballast water on board if they are unable to perform a ballast water exchange, as noted previously.

81. 33 C.F.R. §§ 151.2007, 151.2041, 151.2045.

82. Exec. Order No. 13,112, 64 Fed. Reg. 6183 (Feb. 3, 1999).

83. Nat’l Invasive Species Info. Ctr., Invasive Species: Council Members, <http://www.invasivespeciesinfo.gov/council/agencies.shtml> (last visited Feb. 20, 2008).

84. *See* 64 Fed. Reg. 6183-6184.

85. *See id.* at 6185.

86. *See id.*

87. NAT’L INVASIVE SPECIES COUNCIL, *supra* note 4, at 26-49.

IV. SHORTCOMINGS OF THE FEDERAL RESPONSE

As noted above, there are a number of tools available at the federal level to address the problem of AIS on several fronts. The Lacey Act tries to prevent people from bringing known injurious species into the United States, NANPCA and NISA attempt to limit the introduction of AIS via ballast water, and the NISC attempts to push the federal government to undertake a variety of actions to address all aspects of the AIS problem. It is unquestionable that this existing statutory and regulatory regime is helpful, but it still presents a number of shortcomings.

First, the Lacey Act's ability to ban the import of injurious species is premised on the finding that such species are actually injurious to people or the environment. Presumably, the government cannot know that a species is injurious until it has *already* caused some degree of harm. Otherwise there would be no basis for a finding of injuriousness. This "reactive" rather than "proactive" nature of the Lacey Act has even been recognized by the USFWS itself in discussing how it fails to prevent the introduction and spread of AIS.⁸⁸ Thus, assuming a particular type of AIS is listed as injurious under the Lacey Act after having already established itself at some location in the country, it may still be able to cause a great deal of harm and continue spreading into more bodies of water regardless of such designation. In a best-case scenario, a finding of injuriousness under the Lacey Act may prevent the introduction of the particular AIS into unaffected waters or diminish the speed with which existing populations spread into additional areas by way of its deterrent effect on importers. In a worst-case scenario, the established AIS will spread throughout waters all across the country on their own or with the unintentional assistance of humans, making the Lacey Act designation have little effect.

Furthermore, even if a particular type of AIS is only in its early stages of causing environmental and economic harm in a small geographic area, the Lacey Act's procedure for finding a species to be injurious limits its effectiveness. The evaluation process that the USFWS undertakes before deciding whether to prohibit the importation of a species can take a long time, averaging around three and a half years,

88. See *National Aquatic Invasive Species Act of 2003: Hearing Before the Subcomm. on Fisheries, Wildlife, and Water, S. Comm. on Environment and Public Works*, 108th Cong. 78 (2003) [hereinafter *NAISA Hearing*] (statement of Matt Hogan, Assistant Director, U.S. Fish and Wildlife Service), available at <http://bulk.resource.org/gpo.gov/hearings/108s/92376.pdf>.

according to one study.⁸⁹ This time gap between an initial recognition of a potential threat and a final rule is a problem. It allows the continued importation of what ultimately may be designated an injurious species, exacerbating what is likely an already established presence in U.S. waters.

On the subject of the federal ballast water statutes and regulations, one problem noted before is that the Coast Guard has failed to approve any alternatives to ballast water exchange as a way to fulfill the requirement of the ballast water management program. There are several other methods for addressing the problem of AIS introductions via ballast water that do not involve exchanging the water at sea, yet the Coast Guard has failed to approve such measures.⁹⁰

Moreover, the ballast water regulations create an enormous loophole for a particular type of ship—those that have no ballast on board (NOBOB).⁹¹ Without closer examination, it would seem that a NOBOB ship would not be a means of AIS introduction. However, as noted in Part II.B, NOBOB ships are equipped with ballast water tanks that still have remaining sediment and unpumpable water in them after being emptied as much as possible by the pumps.⁹² Organisms can survive in this remaining water and then be discharged at a later time when the ballast water tanks are filled and emptied again.⁹³ Thus, if a NOBOB ship enters U.S. waters and is not required to carry out an exchange beforehand, it may release AIS if it later discharges ballast water while still in U.S. waters. This loophole is significant because eighty-five percent of all ships entering the Great Lakes are NOBOB ships.⁹⁴

Finally, there are shortcomings regarding the NISC and its attempts to establish a common effort to combat AIS throughout the federal government. One point of criticism of the NISC relates to its structure. As noted before, it is a committee that consists of the heads of thirteen federal agencies. All of these federal agencies have their own set of duties and responsibilities wholly unrelated to AIS; therefore, depending on an organization with dispersed power and a lack of singular leadership to deal with the problem of AIS could be inefficient and unsuccessful.

89. *Controlling Invasive Species: How Effective Is the Lacey Act?*, SCIENCE DAILY, Sept. 13, 2007, <http://www.sciencedaily.com/releases/2007/09/070910163257.htm>.

90. See discussion *infra* Part V.

91. See *NAISA Hearing*, *supra* note 88, at 85 (statement of G. Tracy Mehan III, Assistant Administrator for Water, U.S. Environmental Protection Agency).

92. *Id.*

93. *Id.*

94. *Id.*

In fact, although the NISC was formed in 1999 and issued its first National Management Plan in 2001, by September 2002, only twenty percent of the agency actions that were to be completed by that time in accordance with the plan had actually been implemented.⁹⁵ By July 2005, only twenty-eight percent of the plan's programs had been carried out.⁹⁶ Perhaps this slow implementation process is also why the NISC failed to comply with the requirement of Executive Order 13112 to issue a National Management Plan every two years, having only recently issued a draft of its second National Management Plan for 2008-2012.⁹⁷ The Government Accountability Office notes that the 2001 National Management Plan currently in force "lacks a clear long-term desired outcome and quantifiable measures of performance."⁹⁸ Finally, there is inadequate funding and staffing provided for the NISC to carry out the plan.⁹⁹ Given these weaknesses of the NISC efforts and the entire federal response to AIS, one may be left wondering what the potential solutions to the AIS problem going forward are going to be.

V. ANALYSIS: POTENTIAL SOLUTIONS

A. *Stronger State Role*

One approach to addressing the AIS problem in light of the shortcomings of the existing federal response is to strengthen the role of state governments in managing the threat. After all, states will generally be more familiar with the complexities of their own waters and have a greater interest in ensuring their protection than the federal government. In recognition of some of the inadequacies of the federal response to AIS, some states have chosen to take action in various ways.

One way for states to act is to put in place their own bans on the importation of certain AIS, much like the Lacey Act bans the importation of injurious species at the federal level. For example, consider the grass carp. Under the Lacey Act, the grass carp has not been found to be injurious and can still be imported into the United States.¹⁰⁰ However, a number of states have decided to ban the importation of the grass carp,

95. See *id.* at 54 (statement of Barry Hill, Director, Office of Natural Resources and Environment, General Accounting Office).

96. Christophe G. Courchesne, *Comprehensive Approach To Combat Invasive Species on the Horizon*, TRENDS: A.B.A. SEC. OF ENV'T, ENERGY, AND RESOURCES NEWSL., July-Aug. 2006, at 1, 1.

97. Notice of Availability: Draft of the 2008-2012 National Invasive Species Management Plan, Department of the Interior, 72 Fed. Reg. 73,875 (Dec. 28, 2007).

98. *NAISA Hearing*, *supra* note 88, at 13.

99. *Id.*

100. See 50 C.F.R. § 16.13 (2000).

including the Great Lakes states of Minnesota, Wisconsin, and Michigan, among other states throughout the country.¹⁰¹ This approach is one way for states to overcome the slow process of getting a species listed under the Lacey Act or to act when the USFWS has simply failed to act. However, the attempt by one state to prevent the introduction of grass carp can easily be thwarted if a neighboring state with connected bodies of water does not have such a prohibition in place. Such a reality favors a uniform federal approach to import prohibitions but with some modifications as noted below in the section on a stronger federal role.

Another way in which states have taken up the cause of fighting AIS is to address ballast water as a means of introduction. Two examples of states that have imposed more stringent regulations on ships than those implemented by the Coast Guard are California and Michigan. In California, all ships entering state waters with ballast water on board from another port within the “Pacific Coast Region” are required to complete a ballast water exchange before entering California waters, retain the ballast water on board, use an alternative method of ballast water treatment approved by the Coast Guard, discharge the ballast water in a preapproved reception facility, or, if none of the previous options are possible, perform an exchange in some other agreed-upon location.¹⁰² This rule essentially enlarges the scope of ballast water regulation to include ships that otherwise would not be captured by Coast Guard regulations.

Furthermore, California has issued regulations that will go into effect for ships built after January 1, 2009, to govern the content of the ballast water discharges based on the amount and size of living organisms in that water.¹⁰³ The state sets standards for the allowable size and quantity of live organisms in discharged water that are to be achieved by treating the ballast water on board before discharge using methods that have yet to be determined.¹⁰⁴ Finally, California has established that beginning January 1, 2020, all discharged water must be treated so that it contains “zero detectable living organisms for all organism size classes.”¹⁰⁵

In Michigan, the approach to ballast water management is also more rigorous than that of the Coast Guard under NANPCA and NISA.

101. ASIAN CARP WORKING GROUP, *supra* note 20, at 25-27.

102. CAL. CODE REGS. tit. 2, §§ 2280-2284 (2008). “Pacific Coast Region” is defined as “all coastal waters on the Pacific Coast of North America east of 154 degrees W longitude and north of 25 degrees N latitude, exclusive of the Gulf of California.” *Id.* § 2282(g).

103. *See id.* §§ 2291-2296.

104. *See id.* § 2293.

105. *Id.* § 2295.

Michigan requires all oceangoing ships that enter its waters to obtain a permit, which will only be granted if it can be shown the ship will not discharge AIS or if one of the state-approved methods of ballast water treatment is used.¹⁰⁶ The approved methods of ballast water treatment include: hypochlorite treatment, chlorine dioxide treatment, ultraviolet radiation preceded by suspended solids removal, and deoxygenation treatment.¹⁰⁷ It is noteworthy that ballast water exchange beyond the EEZ is not one of the approved methods for ships entering Michigan waters. Thus, ships that are otherwise in compliance with the requirements under NANPCA and NISA will have to do more if they wish to enter Michigan waters.

This additional burden on shippers gave rise to a recent lawsuit by a group of international shippers who claimed that the Michigan ballast water statute was invalid due to preemption by the federal statutes and regulations on ballast water.¹⁰⁸ The court upheld the Michigan ballast water statute, and the plaintiffs have appealed to the U.S. Court of Appeals for the Sixth Circuit.¹⁰⁹ Even if the district court's decision is affirmed, the underlying concern of the plaintiffs is still an issue that must be considered on its merits. That issue is the inconsistent and varying obligations imposed upon shippers that results when states are able to craft their own ballast water statutes in a manner such as Michigan. Ultimately, these efforts by Michigan and other states to thwart the introduction of AIS suggest state governments do recognize the seriousness of the AIS threat and are willing to take the lead on such matters if they feel the federal government's response is lacking.

Nevertheless, such measures create external burdens to international commerce and may ultimately not be as beneficial as the states intend them to be given the nature of the AIS threat. After all, AIS do not recognize state borders and can easily spread through connected waterways from a state with lax regulations to one with stringent importation and ballast water standards in place. This reality suggests the potential futility of a stronger state role and reinforces the need for a uniform federal approach to combat AIS, albeit modified and enhanced from its existing condition.

106. MICH. COMP. LAWS ANN. § 324.3112 (2008).

107. MICH. DEP'T OF ENVTL. QUALITY, BALLAST WATER CONTROL GENERAL PERMIT (2006), <http://www.deq.state.mi.us/documents/deq-water-npdes-generalpermit-MIG140000.pdf>.

108. *Fednav, Ltd. v. Chester*, 505 F. Supp. 2d 381, 388-89 (E.D. Mich. 2007).

109. *Id.* at 400; see U.S. Court of Appeals for the Sixth Circuit, Pending Cases—Eastern District of Michigan, http://www.ca6.uscourts.gov/case_reports/rptPendingDistrict_MIE.pdf (last visited Feb. 21, 2008).

B. Stronger Federal Role

Accordingly, another response to the shortcomings of the existing federal response to AIS would be to modify and enhance the already existing federal statutory and regulatory response so that it is better able to meet the challenges we face from AIS. This would entail changing the statutes and regulations in force to address the shortcomings noted earlier as well as adopting some new approaches to the AIS problem.

First, regarding the Lacey Act and its “reactive” nature, it has been suggested that such an approach to AIS is “doomed to failure” because it operates as a “‘black list’ approach,” and it is not possible for the government to monitor any and all incoming species such that this list could adequately capture all or most AIS.¹¹⁰ In other words, the Lacey Act approach “requires that an ecological disaster be in place before action is taken.”¹¹¹ So what could be done in the alternative to allow the USFWS to take a more “proactive” approach? One possibility would be to modify the Lacey Act such that it embraces the “precautionary principle” and shifts the burden to the importer to prove that the organisms they are importing are noninjurious.¹¹² While this method may seem radical and particularly difficult, it apparently is not an insurmountable task because it is precisely the system that is used in Australia and New Zealand.¹¹³ The United States can learn about dealing with AIS by examining how other countries deal with the problem.

Concerning the federal ballast water management regime, problem areas could be addressed with a modified and enhanced federal statutory and regulatory framework. First of all, on the issue of the NOBOB ship loophole, the ballast water regulations should be changed to address ships with “empty” ballast water tanks that nevertheless pose a risk of introducing AIS into U.S. waters. In recognition of this loophole, the Coast Guard issued a notice in 2005 stating that NOBOB vessels entering the Great Lakes should voluntarily conduct a ballast water exchange beyond the EEZ or use saltwater flushing to try to counter the risk that NOBOB ships pose.¹¹⁴ Then, in late 2007, the Saint Lawrence

110. *The Growing Problem of Invasive Species Hearing*, *supra* note 2, at 122 (statement of Fred Kraus, Department of Natural Science, Bishop Museum of Hawaii).

111. *Id.*

112. *Id.*

113. *Id.*

114. Ballast Water Management for Vessels Entering the Great Lakes That Declare No Ballast Onboard, Coast Guard, 70 Fed. Reg. 51,831, 51,836 (Aug. 31, 2005). Saltwater flushing differs from a complete ballast water exchange in that it involves filling the ballast water tanks with a smaller amount of water from the ocean, allowing it to mix with the residual material in the tank, and then discharging as much of the water as possible with the aim of leaving any remaining

Seaway Development Corporation, which manages the regulation of shipping practices in the St. Lawrence Seaway along with its Canadian counterpart, issued a notice of proposed rulemaking stating that it will require all foreign NOBOB ships (not U.S. or Canadian) to carry out a saltwater flushing outside the EEZ before entering the Seaway and to achieve a thirty parts per thousand salinity level in the tanks.¹¹⁵ These additional measures are undoubtedly helpful, but the Coast Guard could and should strengthen the existing ballast water regulations for NOBOB ships by making them mandatory and applicable to all ships that enter all U.S. waters.

Furthermore, the Coast Guard could make a better effort to adopt alternative measures for ballast water management beyond the exchange process, such as approving some of the treatment measures used in Michigan. Presumably a state with a strong concern about preventing AIS would not have adopted such techniques without having confidence in their efficacy. By combining these new treatment techniques with the adoption of the California strategy of requiring all ships to have their ballast water regulated, including those that have not operated outside the EEZ, the Coast Guard could reestablish its ballast water management program as one that is up to the challenge of preventing AIS introductions in an aggressive manner.

Another weakness in the realm of AIS introductions through shipping is something that has not been addressed by the ballast water statutes and regulations, primarily because it does not directly involve ballast water. This is the problem of hull fouling. Hull fouling is the process by which AIS are introduced into new waters by essentially riding along on the hull of a ship.¹¹⁶ Recall the zebra mussel has a habit of attaching to barge and boat hulls. This particular vulnerability could be addressed with the establishment of a Coast Guard program requiring ships to inspect and clear their hulls, with random inspections to ensure compliance.

Additionally, the federal government could strengthen its role in combating AIS if the NISC took its responsibilities more seriously and if it was better funded and staffed. Successfully implementing the goals of the NISC set forth in the National Management Plan, in conjunction with

residual water with a higher salinity level than the original fresh or brackish water that was in the tanks before. *Id.* at 51,835.

115. Notice of Proposed Rulemaking: Seaway Regulations and Rules, Saint Lawrence Seaway Development Corporation, Department of Transportation, 72 Fed. Reg. 74,247, 74,248 (Dec. 31, 2007).

116. See *NAISA Hearing*, *supra* note 88, at 85 (statement of G. Tracy Mehan III, Assistant Administrator for Water, U.S. Environmental Protection Agency).

states and other actors, ought to be a greater priority for the administration, because it ultimately means not only avoiding the larger economic costs in the future by preventing AIS establishment, but also achieving the added benefit of protecting the crucial aquatic environment.

A final step the federal government can take in addition to or, in some cases, instead of those above would be for Congress to pass the National Aquatic Invasive Species Act (NAISA) and for the President to sign it into law.¹¹⁷ This legislation would modify and enhance NANPCA and NISA in a number of helpful ways, including: (1) applying more stringent ballast water management practices for all ships entering U.S. waters, (2) adopting a more aggressive approach to finding ballast water treatment alternatives, (3) implementing a more thorough approach to importing organisms that includes a proactive risk assessment process, (4) deploying rapid response resources and capabilities throughout the country so that early detected outbreaks of AIS can be quickly eradicated and/or controlled, (5) supporting the development and use of underwater dispersal barriers such as those used in the Chicago Sanitary and Ship Canal, and (6) providing greater funding for all of these projects and more research efforts in the field of AIS.¹¹⁸

Ultimately, while states are likely to have the most intimate knowledge about their waters and the strongest interest in protecting them, the nature of the AIS problem is one that requires a uniform solution provided at the federal level. This federal leadership is needed primarily so that parties facing regulatory requirements have a consistent set of obligations throughout the United States and so that the ultimate goal of protecting the aquatic ecosystem will not be thwarted by those states that fail to take sufficient protective action.

VI. CONCLUSION

Over a decade ago, a group of 500 scientists and resource managers penned a letter to Vice President Al Gore to demand action on the invasive species problem, claiming the United States was losing in the war against AIS invasions and suffering tremendous environmental and economic damage.¹¹⁹ Given today's world, in which global trade and travel is the norm, there is no question that the United States will continue to be threatened by AIS and will need to remain steadfast in its

117. National Aquatic Invasive Species Act of 2007, S. 725, 110th Cong. (2007), *available at* <http://thomas.loc.gov/cgi-bin/bdquery/z?d110:s.00725>.

118. *See id.*

119. NAT'L INVASIVE SPECIES COUNCIL, *supra* note 4, at 13.

efforts to combat AIS deleterious consequences. It is quite possible that the war against AIS is one that will never be won in any traditional sense, given the nature of globalization. However, it is undeniable that the war against AIS is one that *might* be lost if we fail to maintain a constant vigilance or to act with sufficient purpose to manage effectively this threat and minimize its impacts. It is incumbent upon the federal government to act soon and rejuvenate its effort in combating AIS to avoid the tremendous environmental and economic costs that accompany this very real threat.