Carpe Lacum:
Asian Carp and the Great Lakes

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"The future depends on what you do today."
– Mahatma Gandhi

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I. INTRODUCTION

The Great Lakes are an invaluable resource for the United States and Canada. The Great Lakes contain roughly twenty percent of the world's fresh surface water and almost eighty-five percent of North America's fresh surface water.[1] Indeed, if we were to take this water and spread it evenly across the contiguous United States, it would be nearly ten feet deep.[2] There is a tendency to describe the Great Lakes as a non-renewable resource because less than one percent of the water in the Great Lakes is renewed every year. However, just one percent of the Great Lakes equals almost 60 trillion gallons of water.[3] Great Lakes commercial, tribal, and recreational fisheries are estimated to take in more than $7 billion annually.[4] The Great Lakes shoreline extends over 10,000 miles and includes nearly 35,000 islands.[5] Due to the tremendous recreational opportunities they provide, nearly 3.7 million registered recreational boats use the Great Lakes—one-third of the total registered recreational boats in the United States.[6] The statistics for the Canadian provinces of Ontario and Québec are similar. According to federal and industry estimates, there are upwards of two million Canadian-owned recreational boats on the Great Lakes and the St. Lawrence River.[7] Because of their huge size, beauty, and proximity to people, the lakes provide not only potable water for over forty million people, but also serve as a tremendous draw for tourism in the surrounding states and provinces.[8]

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1. Mark S. Squillace, *Rethinking the Great Lakes Compact* 3 (Mich. St. L. Rev., Working Paper No. 07-01, 2007).

2. Squillace, *supra* note 1, at 3.

3. *Id.* at n.11.

4. MICHAEL J. HANSEN, CHAIR, GREAT LAKES FISHERY COMM'N, THE ASIAN CARP THREAT TO THE GREAT LAKES (Feb. 9, 2010), *available at* http://www.glfc.org/fishmgmt/Hansen_testimony_aisancarp.pdf.

5. *About our Great Lakes: Great Lakes Basin Facts*, GREAT LAKES ENVTL. RES. LAB, NAT'L OCEANIC & ATMOSPHERIC ADMIN., http://www.glerl.noaa.gov/pr/ourlakes/facts.html (last visited Mar. 19, 2013); *How many islands are in the Great Lakes?*, MOTHER NATURE NETWORK (Aug. 20, 2010), http://www.mnn.com/local-reports/michigan/nature-conservancy/how-many-islands-are-in-the-great-lakes.

6. *Great Lakes Fish and Fishing, The history of fishing on the lakes*, TEACH.GLIN.NET, http://www.great-lakes.net/teach/envt/fish/fish_2.html (last visited Mar. 19, 2013).

7. GREAT LAKES COMM'N , RECREATIONAL BOATING AND THE GREAT LAKES-ST. LAWRENCE REGION 2 (2000), *available at* http://www.glc.org/advisor/00/recboating.pdf.

8. Squillace, *supra* note 1, at 3.

These figures show that by almost any measure, the Great Lakes represent an extraordinary resource for the United States and Canada; "[t]he Great Lakes are truly an unparalleled natural and recreational treasure and their management should reflect their incalculable value to society."[9]

Asian carp however, threaten the Great Lakes. The next Part describes the problem of Asian carp, with particular attention to the history of Asian carp in the United States, the ongoing efforts to combat Asian carp and other aquatic invasive species ("AIS"), and federal court rulings in Asian carp litigation. Part III describes the current laws and regulations through which invasive species are controlled in the United States and the inadequacies of those laws and regulations. Part IV argues that a cooperative horizontal federalism framework should be considered as a potential option in the ongoing debate over how to best manage shared resources, especially on a regional scale. Cooperative horizontal federalism gives states the flexibility they need to craft regionally-focused solutions in the realm of environmental protection and avoids potential Commerce Clause challenges via Congressional endorsement. It will ultimately be recommended that a revised Great Lakes-St. Lawrence River Basin Compact incorporate aspects of cooperative horizontal federalism.

II. BACKGROUND

Since 2011—at a cost of $20,000 a day—an electric fence has been submerged in the Chicago Area Waterway System ("CAWS") with the deluded hope of keeping at bay swarms of invasive bighead and silver carp (collectively, "Asian carp") trying to enter the Great Lakes.[10] Invasive species are non-native animals and plants, both aquatic and terrestrial, that enter new environments, become established, and spread, often to the detriment of native species.[11] The electric fence acts as a barrier between the Asian carp infested waters of the Mississippi and Illinois Rivers and the Great Lakes proper. However, the fence is not a permanent solution to the problem, and there is debate over whether or not it is even effective at keeping Asian carp out of the Great Lakes.[12] Regardless, the fence remains the last line of defense against the much-

9. *Id.*

10. Tina Lam, *The Truth About Asian Carp*, DETROIT FREE PRESS (July 17, 2011), http://www.freep.com/article/20110717/NEWS06/307170001.

11. HANSEN, *supra* note 4.

12. Lam, *supra* note 10.

maligned Asian carp headed toward the Great Lakes. If these invasive species are permitted to enter, they will greatly damage the multi-million dollar sport and fishing industries in the Great Lakes region.[13]

This state of affairs never had to happen. In the late 1990s scientists first began to notice that Asian carp were reproducing in southern rivers,[14] endangering native fish populations and spreading rapidly. Jerry Rasmussen, a former U.S. Fish and Wildlife Service biologist, has been warning about Asian carp since the late 1990s. According to Rasmussen, "[t]he plan is on the shelf. . . . We should absolutely be funding it, if we're serious."[15] If the U.S. government had heeded these early warnings and enacted comprehensive and accelerated policies, the Asian carp problem would not exist.

Federal agencies are now desperately scrambling to generate a response to the Asian carp, which are getting closer to establishing viable breeding populations in the Great Lakes, including: throwing millions of taxpayer dollars into research, killing Asian carp, and performing expensive testing in an attempt to detect carp DNA beyond the existing barriers.[16] For now, the Asian carp's arrival in the Great Lakes has been stalled.[17] It is possible that it could take years for a sustainable population to arrive in the Great Lakes.[18] In fact, the Great Lakes might even be an inhospitable habitat for Asian carp. Asian carp are planktivorous fish that need large quantities of plankton to survive, and plankton are not very prevalent in the open waters of the Great Lakes. However, they do exist in sufficient quantities for Asian carp to survive in the near-shore areas and tributaries of the lakes.[19]

As of 2011, Asian carp populations have been identified in over one-third of the central United States, from Louisiana to Minnesota, and they continue to push northward.[20] What is more concerning to some is that while the media and national attention has largely been focused on the Mississippi and Illinois Rivers as they lead into the CAWS and the electric barrier, Congress has yet to spend a single dollar on addressing the Asian carp issue in the South.[21] Meanwhile, Asian carp have steadily made their way up rivers such as the

13. *Id.*
14. *Id.*
15. *Id.*
16. *Id.*
17. *Id.*
18. *Id.*
19. *Id.*
20. *Id.*
21. *Id.*

> Wabash, White, and Tippecanoe rivers in Indiana; the Cumberland and Tennessee rivers in Tennessee; the Kansas and Verdigris rivers in Kansas; the Missouri River throughout Missouri, Iowa, Kansas, Nebraska and South Dakota; and more recently, the St. Croix River in Minnesota.[22]

Bighead carp alone have been collected from waters in twenty-six states and silver carp from sixteen states, making Asian carp one of the nation's most prevalent and expensive invasive species to combat.[23]

Over the last few years, more local commercial and sport fishermen have become concerned over the presence of Asian carp in Kentucky. Ron Brooks, Chief of Fisheries for the State of Kentucky, responded by making Asian carp a top priority.[24] Brooks has advocated for a nationally coordinated strategy, since the carp that take over rivers in the South could swim north in search of food.[25] He described the Asian carp as an enormous issue that must be solved through cooperative interstate efforts.[26] While it is certain that addressing the Asian carp issue will require broad national action on behalf of the government, this is more than a multi-state issue and has now become a multi-national issue with the Canadian province of Ontario advocating for action.[27]

A. The Asian Carp Problem

Asian carp spread rapidly, reproduce in large numbers, and can become the dominant species in an ecosystem.[28] Moreover, Asian carp are capable of becoming a permanent part of the Great Lakes ecosystem if they are allowed to enter and establish a breeding population.[29] Once Asian carp have established themselves, fishery managers stand little chance to control their effects.[30]

"Asian carp" is a generic name, meant to describe several species originating from the Asian continent. Bighead and silver carp are the

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22. *Id.*

23. *Id.*; *see also* David Pimentel et al., *Environmental and Economic Costs of Nonindigenous Species in the United States*, 50 BIOSCIENCE 53, 53 (2000).

24. Lam, *supra* note 10.

25. *Id.*

26. *Id.*

27. Ontario filed a motion in the U.S. Supreme Court, supporting the lawsuit initiated by the Great Lakes states to prevent the spread of Asian carp into the Great Lakes. *See* Mary Gazze, *Ontario takes Asian carp fight to U.S. Supreme Court*, CTV NEWS (Jan. 1, 2009), http://www.ctv.ca/CTVNews/Canada/20091231/carp_100101/.

28. HANSEN, *supra* note 4, at 2.

29. *Id.*

30. *Id.*

varieties of Asian carp that pose the greatest danger to the Great Lakes via the Illinois Waterway System.[31] The species were initially imported into the southern United States by the food industry to keep aquaculture facilities clean.[32] Bighead carp were first imported to the United States in 1972.[33] A year later, silver carp were introduced to the United States from China and eastern Siberia.[34] By 1980, both bighead and silver carp had escaped from these facilities and made their way to river systems in Arkansas, Louisiana, and Kentucky.[35] Flooding events in the 1980s and 1990s allowed these fish to greatly expand their territory[36] and range, thus providing ample spawning and rearing habitats, which nearly guaranteed high survival rates for offspring.[37]

Since Asian carp first escaped nearly thirty years ago, both bighead and silver carp have had an overwhelming presence in the Mississippi and Illinois River systems.[38] Bighead and silver carp primarily eat plankton (algae and other microscopic organisms).[39] Asian carp were brought to the United States to keep aquaculture facilities clean by eating unwanted plankton build-up.[40] Outside of these facilities, Asian carp thrived because plankton was abundant and they have no natural predators. Between 1991 and 2000, as the carp expanded further northward,[41] biologists noted an increase in bighead carp populations in the Illinois River near St. Louis, Missouri.[42] Biologists also reported dietary overlap among Asian carp and native fish in the Mississippi and Illinois Rivers, which suggests that Asian carp would likely compete with native fish for food.[43] In 1999, a fish kill investigation in the off-

31. *Id.*

32. *Id.* Many Asian carp are renowned plankton eaters. This might also be referred to as "filter-feeders" as the plankton are often accumulated at the bottom of fish tanks or water systems.

33. *Id.*

34. *Id.*

35. *Id.*

36. *Id.*

37. *Id.*

38. *Id.* at 3.

39. *Id.*

40. *Id.*

41. *Id.* Additionally, commercial harvest of bighead (a form of Asian carp) carp in the Mississippi River Basin increased from 5.5 to 55 tons between the years 1994 and 1997. *Id.*

42. *Id.*

43. *Id.* Since 2000, the dietary overlap between Asian carp and two other Illinois River fish, the gizzard shad and the bigmouth buffalo, led to significant declines in body condition of the native species. "Declines in gizzard shad and bigmouth condition were significantly correlated with increased commercial harvest of Asian carp and poorly

channel waters of a National Wildlife Refuge near St. Louis, Missouri, revealed that Asian carp made up ninety-seven percent of the total fish biomass, which indicates that, at least in that area, the fish community was almost entirely composed of Asian carp.[44] It was during this period that commercial fishermen began reporting that they were forced to abandon traditional fishing sites because they were unable to lift their nets as they had become "loaded" with Asian carp.[45] As recently as 2010, commercial fishers in the Illinois River reported regularly catching upwards of 25,000 pounds (11,000 kilograms) of bighead and silver carp *every day*.[46] These figures show just how infested some waterways have become with Asian carp.[47] Moreover, Asian carp are not a very profitable fish crop and are almost always less valuable than the fish they replace.[48]

Particularly troubling for biologists and policy makers alike is the fact that Asian carp can grow extremely large in size as they are capable of ingesting as much as forty percent of their total body weight in a single day.[49] Bighead and silver carp are voracious eaters of plankton, stripping the food web of a key source of food for many fish.[50] Silver carp in particular are extremely dangerous because of one of their unique characteristics.[51] Silver carp are easily startled by the sound of boat motors, causing them to leap as high as ten feet out of the water.[52] These "flying" fish, some more than twenty pounds in weight, act as dangerous projectiles, landing in boats, damaging property, and injuring people.[53] Biologists and others investigating the issue have had to adopt special

correlated with other abiotic and biotic factors (for example, temperature, chlorophyll *a*, and discharge) that may influence fish body condition." K.S. Irons, G. G. Sass, M. A. McClelland, & J. D. Stafford, *Reduced condition factor of two native fish species coincident with invasion of non-native Asian carps in the Illinois River, U.S.A. Is this evidence for competition and reduced fitness?*, 71 J. FISH BIOLOGY 258, 258 (2007).

44. HANSEN, *supra* note 4, at 3.

45. *Id.*

46. *Id.*

47. *See id.*

48. *Id.*

49. *Id.*

50. *Id.*

51. *Id.*

52. *Id.*

53. *Id.* One newspaper reported the story of a woman who, in 2004, was knocked unconscious by a flying silver carp while riding on her jet ski near Peoria, Illinois. *See* James Janega, *Asian carp taking over state waters*, CHI. TRIB., Nov. 2, 2003, *available at* http://articles.chicagotribune.com/2003-11-02/news/0311020419_1_carp-asian-fish-bighead.

protocols to avoid serious injury.[54] Duane Chapman of the U.S. Geological Survey said,

> [y]ou may imagine it would be quite novel for a 20-pound fish to jump into your boat, but being hit by a large Asian carp would be similar to being hit by a bowling ball. Even if the fish don't hit you, they can break fishing rods, windshields, electronics or anything else on your boat. As if adding insult, the carp will leave slime, blood and excrement on everything it touches.[55]

As amusing and anecdotal as it may sound, Asian carp put both the public's safety and property in jeopardy.

B. The Fight Against Invasive Species in the Great Lakes Basin

The fight against Asian carp has been "littered with good intentions, miscalculations and missed opportunities."[56] The truth is, the Great Lakes and the way of life they support are currently under attack from invasive species. As of 2010, the Great Lakes harbored more than 185 invasive species, many of which entered the lakes accidentally.[57] The rate of introduction of new species to the Great Lakes is not slowing, even in light of recently instituted invasive species control measures, like ballast water[58] exchange requirements.[59] By some estimations, a new species invades the Great Lakes water system every nine to twelve months.[60] More concerning is that some within the scientific community believe that more invasive species exist in the Great Lakes Basin than are currently identified.[61]

Invasive species, generally speaking, have many realizable pathways into new ecosystems. Ballast water is a major source, as are

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54. HANSEN, *supra* note 4, at 3.

55. *Id.*

56. *See* Lam, *supra* note 10.

57. HANSEN, *supra* note 4.

58. Ballast water is water from a port or other location that is taken onboard a ship and stored in tanks to add weight, thereby maintaining the ship's trim and stability. For example, ballast water is often taken onboard as cargo is unloaded, and discharged as cargo is loaded. Depending on where the ballast water is taken onboard, it may be freshwater, brackish, or saltwater, and might contain organisms that are not native to the port area where ballast water will be discharged.

See BALLAST WATER AND AQUATIC INVASIVE SPECIES, U.S. ENVTL. PROT. AGENCY (2005), *available at* http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1005A06.PDF.

59. HANSEN, *supra* note 4.

60. *Id.*

61. *Id.*

canals and waterways, trading of live organisms, recreational activities, and aquaculture.[62] The emergence of viral hemorrhagic septicemia, an invasive fish disease known to cause many fish deaths in several of the Great Lakes, has raised concern that invasive microorganisms and pathogens might present another risk to native species.[63]

As trade and the movement of goods between nations becomes more prevalent, more invasive species will find their way into the Great Lakes. The Saint Lawrence Seaway, for example, is a direct pathway for foreign ships into the heartland of the United States. Ocean-going ships passing through this seaway are responsible for more than one-third of all invasive species present in the Great Lakes.[64] The U.S. Fish and Wildlife service has reported that an average of more than 200 million fish, as well as tens of millions of reptiles, amphibians, birds, and mammals, are imported into the United States annually via the food and pet trade industry.[65] Some fish meant specifically for the pet trade are imported and then raised in aquaculture facilities, which are prone to flooding, allowing easy escape.[66]

Invasive species do not represent solely a local or regional issue, but rather a national and global issue. They frequently spread from region to region; thus, an invasive species introduced in one area of the country will typically spread to another.[67] To provide an example, *Dreissenid*, commonly called zebra mussels, first "entered the Great Lakes through ballast water from oceangoing ships in the mid-1980s."[68] Zebra mussels reproduce rapidly and tend to colonize hard substrates and surfaces (for example, rocky bottoms and water intake structures), leading them to have deleterious effects on ecosystems and cause economic damage by clogging intake pipes for water treatment plants, power plants, and boat engine cooling systems.[69] Snakehead fish, to provide another example, were initially imported for the aquarium market and food in the Northeast, the East, and the Mississippi River Basin. However,

62. *Id.* Aquaculture, according to Merriam-Webster's Dictionary, is defined as "the cultivation of aquatic organisms (as fish or shellfish) especially for food." *Aquaculture*, MERRIAM-WEBSTER, http://www.merriam-webster.com/dictionary/aquaculture (last visited Mar. 19, 2013).

63. HANSEN, *supra* note 4.

64. *Id.* at 2.

65. *Id.*

66. *Id.*

67. *Id.*

68. *Id.*

69. *Zebra Muscles in the Great Lakes Region*, GREAT LAKES INFO. NETWORK, http://www.great-lakes.net/envt/flora-fauna/invasive/zebra.html (last visited Mar. 19, 2013).

snakeheads have been found living in rivers in Alabama, California, Florida, Kentucky, Texas, and Washington, as well as in Lake Michigan.[70] Snakehead fish present a problem to ecosystems only insofar as they are voracious, top-level predators, meaning that they have no natural predators in much of North America.[71] As noted in Part II.A, Asian carp initially escaped from aquaculture enclosures in Arkansas, Louisiana, and Kentucky.[72] As they steadily make their way northward through the Mississippi and Illinois Rivers, they are becoming a major economic and ecological nuisance to the surrounding areas. Asian carp can now be found in Texas, the Ohio River Basin, the Columbia River Basin, and the Great Lakes Basin.[73] Solutions to the Asian carp problem must therefore be broad in scope and based on the assumption that invasive species *will* spread from state to state, region to region, and, ultimately, country to country.[74]

C. The Lay of the Lakes

While some doubt still remains as to whether or not Asian carp will thrive in the Great Lakes as they have in other ecosystems, there is potential for them to establish populations in coastal areas, and if they are able to do so, the damage will be irreversible. It is highly likely that the harm to the ecosystem, economy, property, and boaters that is occurring in the Mississippi and Illinois Rivers will occur in the Great Lakes Basin if these fish are allowed to enter and establish a viable breeding population.[75] Risk assessments conducted by officials within the U.S. Department of Interior and the Department of Fisheries and

70. HANSEN, *supra* note 4, at 2.

71. Robert Hilton, *The Northern Snakehead: An Invasive Fish Species*, PROQUEST/CSA, http://www.csa.com/discoveryguides/snakehead/overview.php (last visited Mar. 19, 2013).

72. HANSEN, *supra* note 4, at 2.

73. *Id.*

74. *Id.*

75. *Id.* at 3. For an exotic species like Asian carp to establish a viable breeding population in a new ecosystem it depends on many variables such as predator-prey interactions between the invasive species and those already in the ecosystem, food availability, habitat temperature, growth rates, predation, and spawning habitat availability. The primary factors limiting the range of Asian carp will be access to rivers of the required length, size, and water flow rate for successful spawning, as well as access to nursery habitat (shallow areas with slower-moving water) for offspring. Asian carp are filter feeders and need a lot of algae to sustain larger populations; they may not be able to survive in large numbers in deep, cold lakes. If Asian carp do get into the Great Lakes, they may adapt to the local food system and shorter rivers for spawning and develop other unforeseen detrimental behavior. *Id.* at 4.

Oceans of Canada give little reason to be optimistic.[76] The assessments indicate that the carp are almost certain to tolerate the Great Lakes Basin's climate, because it is well within their native climate range.[77] These temperature ranges would also support Asian carp populations in the vast majority of the United States and Canada.[78]

Risk assessments have also indicated that Asian carp would likely find an abundant and diverse supply of food in the Great Lakes.[79] Because bighead carp would primarily consume zooplankton and silver carp would feed heavily on phytoplankton, there would be direct competition for food sources among Asian carp and the many native species that already feed on such microorganisms.[80] Similarly concerning is that Asian carp are not particularly picky eaters, able to adapt to the available food sources. For instance, bighead carp in the Mississippi River have a more varied diet than they are known to typically eat in their natural habitat.[81]

In order to feed and spawn successfully, Asian carp require specific types of habitat. Generally, Asian carp require unimpeded waterways of roughly thirty miles in length to thrive.[82] Asian carp also flourish in areas with vegetated shoreline that have plentiful food sources.[83] And the Great Lakes Basin "contains numerous streams with suitable spawning habitat and large areas of vegetated shorelines, particularly large bays, wide river mouths, connecting channels, wetlands . . . and lentic areas (areas of still waters)."[84] So, while Asian carp might not be able to thrive

76. *Id.* at 3–4.

77. *Id.* at 4. Mean annual air temperatures generally range between -2°C and 22°C for bighead carp and -6°C and 24°C for silver carp. *Id.* Climate data from the Midwestern Regional Climate Center for the Great Lakes region reveal an annual mean air temperature of 47.9° F, or 8.83° C, between 1971 and 2000. *Historical Climate Data*, MIDWESTERN REG'L CLIMATE CTR., http://mcc.sws.uiuc.edu/climate_midwest/historical/temp/mi/203290_tsum.html (last visited Mar. 19, 2013) (data given is from the Grand Haven, Michigan climate monitoring station located on the coast of Lake Michigan). This temperature is well within the Asian carps' native climate range. HANSEN, *supra* note 4, at 4.

78. *Id.* at 4.

79. *Id.*

80. *Id.*

81. *Id.* In addition to zooplankton, bighead carp in the Mississippi River have been known to feed on algae and detritus, a nonliving particulate often consisting of dead animal parts and feces. The diversification of their feeding habits leaves little doubt that they could find food in the Great Lakes Basin Ecosystem. *Id*.

82. *Id.*

83. *Id.*

84. *Id.*

in the deep, cold, open waters of the Great Lakes proper, the Great Lakes' shorelines contain ample habitat for spawning and feeding.

Should Asian carp, particularly silver carp, establish a viable breeding population in the Great Lakes Basin, they will cause harm directly to people. As mentioned previously in Part I, the Great Lakes boast around five million registered watercraft. The operators and passengers of these watercraft would be directly exposed to the potential dangers of flying silver carp.

Citizens of the Great Lakes region should be deeply concerned about the prospect of Asian carp invading the Great Lakes Basin. Scientists have concluded that the probability of Asian carp surviving and thriving in the Great Lakes Basin is high.[85] If Asian carp ever become established in one of the Great Lakes, it is highly likely that they will spread throughout the entire Great Lakes Basin due to its natural and man-made connections as well as an abundance of suitable habitat.[86]

Historically, once an invasive species has entered an ecosystem and spread, it is unusual to find viable options to control the population of that species. With few exceptions, meaningful control mechanisms do not exist in the Great Lakes for unwelcome species, including Asian carp.[87]

Currently, scientists do not know the effect a pesticide would have on Asian carp, any weaknesses in their typical breeding behavior that could be exploited, or any natural predators that would help to reduce their populations.[88] Existing invasive species control programs may be sources of viable management techniques for Asian carp. For example, the control program for sea lamprey, an invasive species already established in the Great Lakes, has been successful for several reasons. First, there was a concentrated scientific effort to discover new control techniques.[89] Second, leadership responsibility is very clear: the Great Lakes Fishery Commission ("GLFC") is responsible.[90] Third, the

85. NICHOLAS E. MANDRAK & BECKY CUDMORE, GREAT LAKES LAB. FOR FISHERIES AND AQUATIC SCIENCES, RISK ASSESSMENT FOR ASIAN CARPS IN CANADA, at i (2004), *available at* www.dfo-mpo.gc.ca/csas/Csas/DocREC/2004/RES2004_103_E.pdf.

86. *Id.* at 45.

87. HANSEN, *supra* note 4, at 4. Sea lamprey, an invasive species already established in the Great Lakes, are unusual because they tend to concentrate in streams and are vulnerable to control methods during several stages of their life cycle. Another Great Lakes invasive species, the alewife, is preyed upon by native trout and salmon, thus allowing trout and salmon stocking and rehabilitation programs to find modest success as methods of control of alewife populations. *Id.*

88. *Id.* at 5.

89. *Id.*

90. *Id.*

governments of both Canada and the United States pledged resources to combat the issue.[91] No one particular feature of the sea lamprey control program is pivotal, but all are equally important.[92]

The Great Lakes Regional Collaboration's Aquatic Invasive Species Team has recommended the establishment of an "Integrated Pest Management Program" to refocus and guide the U.S. government's efforts.[93] This would likely take a similar form to the sea lamprey control program: scientific control techniques developed and implemented by regional leadership groups with bi-national support from Canada and the United States. Despite disagreements over the way forward in face of significant uncertainties, common themes emerge. A viable solution should include the development and implementation of control techniques as well as the establishment of accountability measures.

The GLFC has been working for over a decade to create control techniques to prevent the establishment of Asian carp in the Great Lakes.[94] Proposed solutions include the construction of an electric dispersal barrier, a moratorium on trade of live Asian carp, and lending support for localized control measures developed and implemented by agencies involved with the CAWS.[95] Likewise, the GLFC has supported efforts to construct a structure to prevent species transfer between rivers that parallel the CAWS, as well as efforts to plug holes (such as culverts and pipes) that might enable species migration.[96] The GLFC has taken the position that the only true solution to the Asian carp problem is to achieve what is known as "ecological separation," or altering the canal system in a way that makes it essentially impossible for a species of any kind to travel from the Mississippi River Basin to the Great Lakes Basin or vice versa.[97]

In 2008, the GLFC and the Great Lakes Fishery Trust co-commissioned a study to examine transportation patterns on relevant waterways, as well as the particular hydrological issues caused by the urbanization of the Chicago area (for example, the construction of three man-made waterways, diversion of water from Lake Michigan, and construction and operation of waste water treatment plants) in order to gather data and develop strategies for how to achieve ecological

91. *Id.*
92. *See id.*
93. *Id.*
94. *Id.*
95. *Id.*
96. *Id.*
97. *Id.*

separation.[98] In addition, the Water Resources Development Act of 2007 authorized the U.S. Army Corps of Engineers ("Corps") to conduct a full-scale engineering analysis to identify and propose methods of achieving ecological separation, which is still underway.[99] The GLFC has urged Congress to clearly articulate that the unqualified goal is to maintain ecological separation.[100] The GLFC has also encouraged Congress to provide the Corps with the necessary financial and legal backing to develop and implement a solution designed to achieve ecological separation.[101] The Great Lakes do not have time to wait—an effective response to the threat of invasive Asian carp needs to be developed and implemented quickly.[102]

D. Litigation

As stated above, Asian carp represent a significant risk of danger to the Mississippi River Basin and the Great Lakes Basin. The CAWS provides a hydrologic link between the Mississippi River Basin and the Great Lakes Basin via the Illinois River, and the ecological and economic threat posed by Asian carp migration into the Great Lakes has prompted litigation in the U.S. Supreme Court, the District Court for the Northern District of Illinois (East), and, more recently, in the Seventh Circuit Court of Appeals. This Subpart will briefly trace the development of Asian carp litigation in the United States.

On December 21, 2009, the state of Michigan filed suit in the U.S. Supreme Court against the state of Illinois, the Corps, and the Metropolitan Water Reclamation District of Greater Chicago to stop, or at least mitigate, the spread of Asian carp into the Great Lakes via the CAWS.[103] In the motion, Michigan sought an order that would direct Illinois, the Corps, and the Metropolitan Water Reclamation District of Greater Chicago to immediately close the shipping locks near Chicago and implement temporary emergency measures to prevent Asian carp from invading the Great Lakes.[104] Several other Great Lakes states

98. *See* JOEL BRAMMEIER ET AL., GREAT LAKES FISHERY COMM'N, PRELIMINARY FEASIBILITY OF ECOLOGICAL SEPARATION OF THE MISSISSIPPI RIVER AND THE GREAT LAKES TO PREVENT THE TRANSFER OF AQUATIC INVASIVE SPECIES, at i–iv (2008).

99. HANSEN, *supra* note 4, at 5–6.

100. *Id.* at 6.

101. *Id.*

102. *Id.*

103. The U.S. Supreme Court has "original and exclusive jurisdiction of all controversies between two or more States." 28 U.S.C. § 1251(a) (2006).

104. Michigan named the state of Illinois a party to this dispute because, according to Michigan, Illinois was ultimately responsible for the operation of the CAWS, which is

supported Michigan's request for preliminary injunctive relief.[105] However, the Solicitor General, on behalf of the United States, filed a memorandum opposing Michigan's request for a preliminary injunction.[106] Without comment, the Supreme Court issued an order on January 19, 2010 that summarily denied Michigan's request to close the shipping locks near Chicago.[107]

On February 4, 2010, Michigan's Attorney General filed a renewed motion, asking the Supreme Court to reconsider issuing a preliminary injunction for the closure of the Chicago-area locks based on new evidence that Asian carp may be present in Lake Michigan.[108] The Supreme Court, on March 22, 2010, denied Michigan's renewed motion for a preliminary injunction, again without comment.[109]

On August 24, 2011, the U.S. Court of Appeals for the Seventh Circuit upheld a district court order denying the request of Michigan, Minnesota, Ohio, Pennsylvania, and Wisconsin to issue a preliminary injunction ordering the Corps and Chicago's Municipal Water Reclamation District to close the locks on the CAWS to prevent the threat of the spread of Asian carp into Lake Michigan.[110] The court denied the motion, but left the door open for future legal action. The

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jointly operated by the Corps and Metropolitan Water Reclamation District of Greater Chicago. Motion for Preliminary Injunction at 27, Wisconsin v. Illinois, 278 U.S. 367 (2009). The parties' filings are publicly available. *Recent Filings in Original Nos. 1, 2, & 3*, SUPREME COURT OF THE U.S., http://www.supremecourt.gov/SpecMastRpt/RecentFilingsinOriginalNos_1_2_3.aspx (last visited Mar. 19, 2013).

105. Minnesota, New York, Ohio, Wisconsin, and the Canadian Province of Ontario filed amicus briefs in support of Michigan's request for a preliminary injunction. *See id.*

106. Neither Illinois nor the United States denied the threat posed to the Great Lakes by the spread of Asian carp in their respective responses to Michigan's request for a preliminary injunction, but rather argued that the requested relief was unnecessary in light of current efforts to prevent the spread of Asian carp into the Great Lakes through the CAWS. Memorandum for the United States in Opposition to Motion for Preliminary Injunction at 53, Wisconsin v. Illinois, 278 U.S. 367 (2010).

107. The Supreme Court declined to address the merits of Michigan's arguments and simply denied Michigan's motion for a preliminary injunction in a one-sentence order. Order Denying Motion for Preliminary Injunction, 558 U.S. at 3 (Jan. 19, 2010), *available at* http://www.supremecourtus.gov/orders/courtorders/011910zor.pdf.

108. Renewed Motion for Preliminary Injunction at 1, Wisconsin v. Illinois, 278 U.S. 367 (2010), *available at* http://www.supremecourt.gov/SpecMastRpt/1-Renewed%20Motion%20for%20PI.pdf.

109. Order Denying Michigan's Renewed Motion for Preliminary Injunction, 559 U.S. at 2 (March 22, 2010), *available at* http://www.supremecourt.gov/orders/courtorders/032210zor.pdf.

110. Michigan v. U.S. Army Corps of Eng'rs, 667 F.3d 765, 769, 800 (7th Cir. 2011).

court's decision resolved several legal issues in favor of the states and sent a strong message to the federal government about the threat Asian carp pose to the health of the Great Lakes Basin and to the interests of the hundreds of thousands of citizens of the eight U.S. states and two Canadian provinces that rely on it.[111]

In the district court, the states argued that the Corps and the Metropolitan Water Reclamation District of Greater Chicago created a public nuisance by allowing Asian carp to threaten the waters and fisheries of the Great Lakes—a public resource.[112] They also requested that the court review the actions of the Corps pursuant to the Administrative Procedure Act ("APA").[113] Further, the states moved the court for a preliminary injunction to force federal and local agencies to protect the Great Lakes with "the best available methods to block the passage of, capture, or kill bighead and silver carp."[114]

The Seventh Circuit held that the states could seek relief pursuant to the federal common law of nuisance to address the threat posed by Asian carp.[115] The court also held that the Corps could not claim sovereign immunity from this suit since it is waived for the purposes of claims for injunctive relief under section 702 of the APA.[116] However, the court left open the question of whether a state can bring a common law public nuisance claim against the federal government.[117] The court also rejected the argument of the federal government that the federal common law claims were "displaced" by various federal statutes addressing invasive species, concluding that "Congress has not passed any substantive statute that speaks directly to interstate nuisance" of invasive Asian carp.[118]

The Seventh Circuit decision was far more favorable to the states than the district court decision.[119] Breaking away from the earlier decision, which ignored the states' concerns about Asian carp entering the Great Lakes and establishing viable breeding populations, the

111. The U.S. states are Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin; the Canadian provinces are Ontario and Québec. *See The Great Lakes: Overview*, GREAT LAKES INFO. NETWORK, http://www.great-lakes.net/lakes/#overview (last visited Mar. 19, 2013).

112. Complaint for Injunctive and Declaratory Relief at *2 Michigan v. U.S. Army Corps of Eng'rs, No, 2010 WL 2893302 (N.D. Ill. 2010) (1:10-CV-04457).

113. *Id.*

114. Plaintiffs' Motion for Preliminary Injunction at *2 Michigan v. U.S. Army Corps of Eng'rs, No, 2010 WL 2959771 (N.D. Ill. 2010) (1:10-CV-04457).

115. Michigan v. U.S. Army Corps of Eng'rs, 667 F.3d 765, 772 (7th Cir. 2011).

116. *Id*. at 776.

117. *Id*.

118. *Id.* at 780.

119. *See id.*

Seventh Circuit viewed the evidence—which has become significantly more compelling since the district court decision—very differently. The court concluded that the plaintiffs had presented enough evidence "to establish a good or perhaps even a substantial likelihood" of injury.[120] There is "a non-trivial chance that the carp will invade Lake Michigan in numbers great enough to constitute a public nuisance. If the invasion comes to pass, there is little doubt that the harm to the plaintiff states would be irreparable."[121]

Despite the newly available evidence, the Seventh Circuit ultimately decided that the ongoing coordinated effort led by the federal government to address Asian carp is the best possible solution to the crisis.[122]

> In the end, however, the question whether the federal courts can offer meaningful equitable relief—either preliminary or permanent—to help abate a public nuisance in the face of agency action is factual in nature. It depends on the actual measures that the agencies have implemented already and those that they have committed to put in place going forward.[123]

Rather than granting the states an injunction to close the locks on the CAWS, the court opted to give the federal government a reasonable opportunity to address the problem in a cooperative manner.[124] However, the court left open the possibility that the emergence of new information regarding the threat of Asian carp and lack of action by the federal government could invite future action in court.[125] "[N]ew evidence might come to light which would require more drastic action, up to and including closing locks on Lake Michigan for a period of time."[126]

Writing in response to the earlier district court ruling, Thom Cmar of the National Resources Defense Council provided an analysis of the district court's decision to keep the locks open and discussed the need for a long-term solution for the CAWS.[127] As Cmar points out, the federal government's response so far leaves much to be desired:

120. *Id.* at 769.

121. *Id.*

122. *Id.* at 799.

123. *Id.* at 800.

124. *Id.*

125. *Id.*

126. *Id.*

127. Thom Cmar, *Asian Carp Decision Does Not Eliminate the Need for Action*, SWITCHBOARD: NATURAL RES. DEF. COUNCIL STAFF BLOG (Dec. 3, 2010), http://switchboard.nrdc.org/blogs/tcmar/asian_carp_decision_does_not_e.html.

> Judge Dow is correct that there are federal and state agencies working on this . . . most notably the Army Corps of Engineers. The problem is that the Army Corps is working on this far too slowly, and in the wrong way. Rather than lasering (sic) in on bold, effective action to prevent the Asian carp from establishing a population in Lake Michigan, the Corps is conducting a study that they think will take over 5 years and cost over $25 million—and even then, they have not committed to deciding on an option that will fully prevent Asian carp from moving through the CAWS, but only one that will "reduce the risk" of carp getting into the Lake. That's far from an adequate response, and if the White House or Congress doesn't step in and provide the Corps with some adult supervision, the Asian carp saga could end up back in court—this time on a legal issue that the Corps is less likely to win.[128]

Cmar makes an important point that also speaks to the inherent nature of dealing with species with the kinds of unique characteristics possessed by Asian carp: time is of the essence. Our laws and our mechanisms for addressing invasive species cannot be structured in such a way that we are forced to sit back and watch disaster unfold while our government simply studies the problem.

III. THE LAW OF THE LAKES: LESSONS LEARNED

The laws available for combating invasive species in the Great Lakes Basin are inadequate to confront the challenges facing the lakes today. This Part will trace the four main avenues by which federal politicians and states alike have attempted to address the invasive species problem, as well as the shortcomings of those approaches. Finally, it will discuss the desirable features of any proposed legislation, namely: adequate funding, strong administrative accountability and transparency, increased public awareness, monitoring, reporting, verification, and the inclusion of unintentional deposits of invasive species through ballast water or otherwise.

A. The Compact and the Agreement

The Great Lakes-St. Lawrence River Basin Water Resources Compact[129] ("Compact") and companion Great Lakes-St. Lawrence

128. *Id.*

129. Great Lakes-St. Lawrence River Basin Compact, Pub. L. No. 110-342, 122 Stat. 3739 (2008) [hereinafter the Great Lakes Compact].

River Basin Sustainable Water Resources Agreement[130] ("Agreement") are agreements between Canada and the United States that establish bi-national efforts to restore and protect the chemical, physical, and biological integrity of the waters of the Great Lakes Basin. The Agreement was revised to incorporate an ecosystem approach for "identifying, managing, and preventing environmental problems around the Great Lakes."[131] This was an important step toward recognizing the interconnectedness of all components of the environment and the need for a more integrated perspective for addressing environmental quality and human health issues. The Compact was created under the Boundary Waters Treaty of 1909, which mentions pollution as a problem the two countries will work to prevent.[132] The Boundary Waters Treaty of 1909 additionally set up the International Joint Commission ("IJC") as an independent, centralized, bi-national organization to help develop and administer its goals.[133] After the affected state legislatures approved the Compact, the U.S. Senate and House of Representatives followed suit. Former President George W. Bush signed the Compact on October 3, 2008, and it became law on December 8, 2008.[134] Because it has been ratified, the Compact is "the supreme Law of the Land."[135] This is very different from the Agreement, which is merely a non-binding, good faith agreement between the Parties.

The cooperative system created by the United States and Canada under the Compact could be considered a global model for peaceful management of natural resources across an international boundary. But we should not grow complacent. There are still many issues such as

130. Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement, Dec. 13, 2005, *available at* http://www.ijc.org/rel/agree/quality.html#art10 [hereinafter the Great Lakes Agreement].

131. *History of the Great Lakes Water Quality Agreement*, ENV'T CANADA, www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=647DC488-1 (last visited Mar. 19, 2013).

132. Boundary Waters Treaty, U.S.-Gr. Brit. (for Can.), art. IV, ¶ 2, Jan. 11, 1909, 36 Stat. 2448.

133. *See Who We Are*, INT'L JOINT COMM'N, (July 9, 2012), http://www.ijc.org/en/background/ijc_cmi_nature.htm.

134. Great Lakes Compact, *supra* note 129.

135. U.S. CONST. art. VI. Congress has long had the power under the Treaties Clause to enforce treaties as it does domestic legislation, but the primary theory of treaty enforcement today is that of "self-execution" meaning that treaty enforcement provisions are to be deduced from the nature of the treaties signed. This means that some treaties are written explicitly to be domestically enforceable, while others only establish obligations under international laws, which tend to be non-binding. *See* Restatement (Third) of the Foreign Relations Law of the United States § 111 (1987).

invasive species management that are not adequately addressed in the Compact.

The requirements of the Compact are easily divided into six parts. First, the Compact establishes inventory, registration, and reporting requirements for all water withdrawals out of the Great Lakes Basin in excess of 100,000 gallons per day, and for any out-of-basin diversions.[136] Second, it prohibits new or increased diversions out of the Basin, subject to limited exceptions with numerous restrictions[137] for "straddling communities," "straddling counties," and for intra-basin transfers.[138] A third provision concerns the obligation of each Party to create a program for the management and regulation of new or increased withdrawals within five years from the compact's effective date.[139] Fourth, Parties commit to periodic cumulative impact assessments at least once every five years to inform the further implementation of the Compact, but this provision does not have enforceable requirements.[140] Fifth, the Compact establishes a Council comprised of the Governors of each Party.[141] This Council has broad powers to conduct research, collect data, conduct investigations, and institute court actions.[142] The Council may also revise the standard of review and decision used for making individual water allocation decisions, and for determining exceptions to the prohibition on diversions.[143] Lastly, the Compact includes provisions for public participation and dispute resolution. Notably, it grants aggrieved persons the right to a hearing in accordance with state administrative laws and provides for judicial review of adverse administrative decisions.[144] There is also a "citizen suit" provision that authorizes actions against the Council or any Party to compel compliance with the Compact.[145]

Despite these provisions, the Compact and the Agreement were never created with the problem of invasive species in mind. Nothing in either document explicitly addressed how Parties are to deal with such issues. But all is not lost. Article X of the Agreement states that the Parties shall conduct a comprehensive review of the operation and effectiveness of the Agreement after every third biennial report of the

136. Great Lakes Compact, *supra* note 129, § 4.1.
137. *Id*. § 4.8.
138. *Id*. § 4.9.
139. *Id*. § 4.10.
140. *Id*. § 4.15.
141. *Id*. §§ 2.1–2.3.
142. *Id*. § 3.2.
143. *Id*. §§ 3.1, 3.2.
144. *Id*. § 7.3.
145. *Id*.

IJC.[146] As of September 7, 2012, the United States and Canada finished this review and signed a newly amended Great Lakes Water Quality Agreement, subject to domestic procedures for each Party to enter the revised Agreement into force.[147] The revised Agreement will facilitate action on threats to Great Lakes water quality; includes strengthened measures to anticipate and prevent ecological harm;[148] and contains new provisions to address issues such as habitat degradation,[149] climate change,[150] harmful algae,[151] toxic chemicals,[152] discharges from vessels,[153] and *invasive species management*.[154] In amending the Agreement, both governments sought input from stakeholders, before and throughout the negotiations,[155] and expanded opportunities for public participation on Great Lakes issues.[156] Yet, due to constitutional and political roadblocks, it is only a non-binding, good faith agreement between the United States and Canada with no enforceable provisions

146. Great Lakes Agreement, *supra* note 130, art. X.

147. *Great Lakes Water Quality Agreement*, U.S. ENVTL. PROT. AGENCY, www.epa.gov/glnpo/glwqa (last visited Mar. 19, 2013). Former U.S. Environmental Protection Agency Administrator Lisa P. Jackson said of the amended agreement, "The [Agreement] we signed today outlines the strong commitment the U.S. and Canada share to safeguard the largest freshwater system in the world. Our collaborative efforts stand to benefit millions of families on both sides of the border." Canada's Minister of the Environment Peter Kent buttressed this saying,

> Joint stewardship of the Great Lakes—a treasure natural resource, a critical source of drinking water, essential to transportation, and the foundation for billions of dollars in trade, agriculture, recreation, and other sectors—is a cornerstone of the Canada-United States relationship. . . . The [Agreement] supports our shared responsibility to restore and protect this critical resource, and builds on 40 years of binational success.

Julia P. Valentine, *United States and Canada Sign Amended Great Lakes Water Quality Agreement / Agreement will protect health of the largest freshwater system in the world*, U. S. ENVTL. PROT. AGENCY, http://yosemite.epa.gov/opa/admpress.nsf/bd4379a92ceceeac8525735900400c27/9e6415ec5260e5c885257a7200669766!OpenDocument (last visited Mar. 19, 2013).

148. Protocol Amending the 1978 Agreement Between the United States of America and Canada on Great Lakes Water Quality, U.S.-Can., Annex 1, 2, 10, Oct 16, 1983, T.I.A.S. No. 11551 [hereinafter Amended Agreement].

149. *Id.* annex 7.

150. *Id.* annex 9.

151. *Id.* annex 4.

152. *Id.* annex 3.

153. *Id.* annex 5.

154. *Id.* annex 6 (emphasis added).

155. *A Renewed Commitment to Action: The 2012 Great Lakes Water Quality Agreement*, ENV'T CANADA, http://www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=B274CBC1-1 (last visited Mar. 19, 2013).

156. Amended Agreement, *supra* note 148, art. 2, §4(k).

under U.S. law, unlike the Compact.[157] In contrast, courts have consistently enforced federally approved treaties against State breaches. The Supreme Court has done so at least fifty times.[158]

Even with its deficiencies, the importance of the amended Agreement going forward cannot be understated. It represents a very real opportunity for the United States and Canada to work together to tackle the problem of invasive Asian carp in the Great Lakes Basin, but lacks the enforceability of the Compact.[159] Annex 6 of the revised Agreement contains the relevant provisions on invasive species management.[160] It states that the Parties shall develop and implement programs and other measures to eliminate new introductions of AIS using a bi-national prevention-based approach informed by Risk Assessments.[161] Parties, subject to the respective laws and regulations of their Nations, and in "cooperation and consultation with State and Provincial Governments, Tribal Governments, First Nations, Métis, Municipal Governments, watershed management agencies, other local public agencies, and the Public" are tasked with implementing ballast water discharge programs designed to protect the Great Lakes Basin ecosystem from AIS.[162]

Additionally, the Parties are charged with preventing the introduction and spread of AIS by conducting proactive, bi-nationally coordinated Risk Assessments on various pathways and vectors.[163] Parties are to use these Risk Assessments to inform new regulations and

157. *Id.* The Compact Clause of the U.S. Constitution provides that "[n]o State shall, without the Consent of Congress . . . enter into any Agreement or Compact with another State, or with a foreign Power." U.S. CONST. art. 1, § 10, cl. 3. This section also states that "[n]o State shall enter into any Treaty, Alliance, or Confederation." *Id.* art. 1, § 10, cl. 1. In sum, the prohibition on states entering into a "Treaty, Alliance, or Confederation" is absolute, while the prohibition on states entering into an "Agreement or Compact," even with a foreign government, is limited only by Congress. As will be discussed later in this suppart, the Agreement provides that the United States and Canada may work together to establish enforcement capabilities within particular programs, but this is still very different from an agreement or compact that has the approval of the federal government.

158. *See* Tim Wu, *Treaties' Domains*, 93 VA. L. REV. 571, 583–84 n.31 (2007).

159. *See* U.S. CONST. art. I, § 10, cl. 3.

160. Amended Agreement, *supra* note 148, annex 6.

161. *Id.* Risk Assessments are defined as "a method of identifying threats and vulnerabilities by assessing the likelihood of introduction, survival, establishment, and spread of AIS, and by assessing the magnitude of any associated impacts" *Id.* annex 6(E).

162. *Id*. annex 6(B).

163. *Id.* "Pathways" are the broad corridors or routes by which AIS are transferred from one geographic area to another (such as transoceanic shipping); "vectors" are the sub-corridors or routes within Pathways that are the physical means by which AIS are transported from one geographic area to another (such as Ballast Water). *Id.* annex 6(E).

strategies to address AIS, coordinate on the implementation of such strategies, undertake public outreach and education efforts, establish effective barriers to prevent the spread of AIS while permitting the movement of other "ecosystem components (such as water and native species)" where economically feasible, and ensure that any inter-basin water transfer includes the consideration of potential AIS introductions.[164]

Notably, within two years of entry into force, Parties are encouraged to develop and implement an early detection and rapid response initiative.[165] This initiative is meant to develop a species watch list (similar to the Lacey Act "dirty list" approach discussed in Part III.B), identify priority locations for AIS surveillance (such as the CAWS), develop monitoring protocols for surveillance, establish information-sharing protocols, identify new AIS, and coordinate effective and timely domestic and, when necessary, bi-national response actions to prevent the establishment of newly detected AIS.[166] An early detection and rapid response initiative could be vital to preventing Asian carp from establishing a viable breeding population in the Great Lakes.

Annex 6 further recommends that the Parties, in a cooperative and consultative manner, conduct ecological assessments of the effectiveness of AIS prevention programs.[167] Parties are asked to develop and evaluate technologies and methods to increase the effectiveness of control and eradication efforts; to improve the ability of the Parties to achieve effective barriers that prevent the spread of AIS, while allowing the movement of other ecosystem components through canals and waterways; and to improve genetic techniques to detect potential AIS at low levels of abundance.[168] Parties are also directed to determine potential AIS habitat requirements and additional factors that would affect the establishment and spread of AIS; assess ecosystem impacts of both established and high-risk AIS (such as Asian carp) in order to better inform management regarding decisions for rapid response and control programs; assess the potential impact of climate change on the introduction and spread of AIS; and, finally, conduct Risk Assessments of specific species, pathways, and vectors as determined by the Parties.[169]

164. *Id*. annex 6(B)(2).
165. *Id*. annex 6(B)(3).
166. *Id*. annex 6(B)(3).
167. *Id*. annex 6(C).
168. *Id*.
169. *Id.*

Similarly, Annex 5 sets out standards for discharges from vessels that are potentially harmful to the quality of the waters of the Great Lakes.[170] This includes the establishment of various measures and reception facilities for the disposal of vessel wastes such as oil and hazard polluting substances, garbage, wastewater, sewage, and ballast water.[171] Since ballast water is the most likely means by which an AIS would enter the Great Lakes ecosystem from a vessel discharge, the Agreement recommends that Parties establish and implement measures that protect the Great Lakes from AIS discharges in ballast water and take into account the provisions of Annex 6, and where appropriate, other relevant standards.[172]

In spite of these lofty goals, the revised Agreement is fundamentally flawed because it contains no legally enforceable provisions. Granted, Article 4 directs the Parties to develop and implement measures setting out enforcement actions and other measures to ensure the effectiveness of programs for pollution abatement, control, and prevention; AIS programs; and conservation programs.[173] And Annex 5 mentions enforcement briefly in reference to the imposition of prohibitions and penalties related to the discharge of ballast water harmful to the water quality of the Great Lakes.[174] Nevertheless, these are guiding principles that have yet to be realized, and in the meantime, the revised Agreement lacks any explicit enforceability provisions. Perhaps this could be addressed through the enactment of domestic legislation. Otherwise, the Agreement is mostly advisory in nature and simply represents a good-faith commitment by the United States and Canada to work towards the objectives of the Agreement. This is not the kind of solution that the Great Lakes need. The immediate dangers presented by Asian carp mandate legally enforceable regimes that put the interests of the Great Lakes ecosystem ahead of politics, as illustrated by the efforts of the Great Lakes states to close the CAWS via court injunction.[175]

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170. *Id*. annex 5.

171. *Id*. annex 5(b).

172. *Id*. "Other relevant standards" include the International Convention for the Control and Management of Ship's Ballast Water and Sediments (2004). Parties are further guided to perform scientific and economic analyses on risks posed by the discharge of ballast water from vessels and ballast water management systems in light of the unique characteristics of the Great Lakes, and alternative technologies and approaches for protecting the Great Lakes from AIS in ballast water discharge. *Id*.

173. *Id*. art. 4(2).

174. *Id*. annex 5(A).

175. *See infra* Parts II.D., II.E.

B. The Lacey Act

The Lacey Act was passed in 1900 as the "first far-reaching federal wildlife protection law" in the United States.[176] It was the first federal effort to try to stem the tide of introduction and importation of exotic animals.[177] As currently amended, the Lacey Act prohibits "species of [animals] . . . or the offspring or eggs of any of [those animals] . . . which the Secretary of the Interior may prescribe by regulation to be injurious to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife."[178] Pursuant to the Lacey Act, additional regulations require the filing of an import declaration with the District Director of the U.S. Customs Service for any importation, transportation, and acquisition of all other wildlife.[179]

The Lacey Act notoriously uses a "dirty list" approach to managing which species are allowed to enter the country or to be moved through interstate commerce.[180] Under this approach, the Secretary of Interior lists species as injurious only when she discovers that a species is already causing harm to fish, wildlife, or other interests somewhere in the United States.[181] This means that although a species might make the "dirty list," it will have already done its damage. In addition, the Lacey Act is a particularly rigid law. In order for a new species to make the "dirty list," the Department of Interior must learn through experience that the targeted species presents harm to fish and other interests.[182] This can take up valuable time and resources where timing can be extremely critical to the successful removal or prevention of a harmful invasive species.

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176. Laura T. Gorjanc, *Combating Harmful Invasive Species Under the Lacey Act: Removing the Dormant Commerce Clause Barrier to State and Federal Cooperation*, 16 FORDHAM ENVTL. L. REV. 111, 115 (2004) (internal quotation marks omitted).

177. John L. Dentler, Comment, *Noah's Farce: The Regulation and Control of Exotic Fish and Wildlife*, 17 U. PUGET SOUND L. REV. 191, 210 (1993).

178. 18 U.S.C. § 42(a)(1) (2006).

179. 50 C.F.R. § 14.52 (West 2011).

180. Daniel P. Larsen, *Combatting the Exotic Species Invasion: The Role of Tort Liability*, 5 DUKE ENVTL. L. & POL'Y F. 21, 28 (1995); Dentler, *supra* note 177, at 210–11.

181. John A. Ruiter, Note, *Combating the Non-Native Species Invasion of the United States*, 2 DRAKE J. AGRIC. L. 259, 265 (1997).

182. Dentler, *supra* note 177, at 211. The experience required is limited to the experience on the ground in the area to be regulated. For example, "[t]he brown tree snake was added to the list of injurious wildlife after it was introduced to Guam where it became established, rapidly spread, devastated Guam's endemic bird populations, and threatened human health and safety." *Id*. at 211 n.110.

The Lacey Act also makes it unlawful for anyone to "import, export, transport, sell, receive, acquire, or purchase any fish or wildlife or plant taken, possessed, transported, or sold in violation of any law . . . of the United States or in violation of any Indian tribal law."[183] This highlights the narrow scope of the Act. While the Act may prevent intentional introductions, or introductions where the person did not exercise due care in carrying a prohibited species, it does not adequately prevent unintentional introductions of species.[184] In other words, it does not prevent the introduction of captive invasive species that have been introduced in a "nonnegligent, unintentional" way.[185]

The other half of the Lacey Act makes it unlawful to "import, export, transport, sell, receive, acquire, or purchase in interstate . . . commerce any fish or wildlife [or plant] taken, possessed, transported, or sold in violation of any law or regulation of any State."[186] This creates a federal supplement to aid states in enforcing their own laws about wildlife by elevating state law violations to a federal offense.[187] This has advantages: some states are much more susceptible to introductions of invasive species and may therefore be in a unique position to understand vectors of introduction as well as the particular threat those invaders might pose to local ecosystems. However, this also generates a Dormant Commerce Clause question because the Lacey Act permits state laws to regulate goods transported in interstate commerce and these laws might overburden interstate commerce.[188] The U.S. Constitution grants Congress the power to "regulate Commerce . . . among the several States."[189] The Constitution does not, on the other hand, grant exclusive legislation of commerce issues to Congress.[190] Still, courts will closely scrutinize state law if it directly or indirectly affects interstate commerce. The current Dormant Commerce Clause doctrine states that a state law is invalid if (a) it is facially discriminatory against out-of-state

183. 16 U.S.C. § 3372(a)(1) (2006).

184. Larsen, *supra* note 180, at 29.

185. Ruiter, *supra* note 181, at 266. "The Lacey Act should be more active to encourage importers to be pro-active in preventing 'nonnegligent, unintentional introductions of exotic species.' " *Id.*

186. 16 U.S.C. § 3372(a)(2)(A)–(B).

187. Gorjanc, *supra* note 176, at 122.

188. *Id.* at 124.

189. U.S. CONST. art. I, § 8, cl. 3.

190. *See* Cooley v. Bd. of Wardens, 53 U.S. 299, 319 (1851) ("[U]ntil Congress should find it necessary to exert its power, it should be left to the legislation of the States . . . [so long as] it is local and not national. . . .").

commerce;[191] (b) it is facially neutral, but has an impossibly protectionist purpose or effect;[192] or (c) it is facially neutral, but has a disproportionately adverse effect on interstate commerce.[193]

The U.S. Supreme Court directly addressed the Dormant Commerce Clause question concerning invasive species under the Lacey Act in *Maine v. Taylor*.[194] The law in question banned the importation of live baitfish into Maine.[195] The Court held that the legislation was facially discriminatory and therefore subject to strict scrutiny,[196] despite its potential applicability under the Lacey Act.[197] Therefore, every state law under the Lacey Act must also pass strict scrutiny. Additionally, once a law is considered to be facially discriminatory, the burden then falls on the state to prove that the law does not unduly burden interstate commerce.[198] In this case, the Court found that there was a legitimate state interest in prohibiting the importation of the live baitfish.[199] Out-of-state fish may transport parasites that local populations do not carry, and the water used to transport the baitfish may also contain other non-native species that could invade state waters.[200] Furthermore, the Court held that, while there was an "abstract possibility" of developing testing procedures to determine what threat the baitfish presented exactly,

191. *See* City of Phila. v. New Jersey, 437 U.S. 617, 628–29 (1978) (holding that a New Jersey law prohibiting the importation of most solid or liquid waste which originated or was collected outside the territorial limits of the state was facially discriminatory and therefore invalid).

192. *See* Hunt v. Wash. State Apple Adver. Comm'n, 432 U.S. 333, 350–51 (1977) (holding that North Carolina law unduly burdened Washington State by forcing it to adopt a second system of apple grading that added costs, thus giving North Carolina growers an unfair advantage within the state).

193. *See* Pike v. Bruce Church, Inc., 397 U.S. 137, 142 (1970) (setting forth a balancing test to determine if there is a disproportionate effect and stipulating that "[w]here the statute regulates even-handedly to effectuate a legitimate local public interest, and its effects on interstate commerce are only incidental, it will be upheld unless the burden imposed on such commerce is clearly excessive in relation to the putative local benefits").

194. Maine v. Taylor, 477 U.S. 131, 132 (1986).

195. *Id.*

196. *See id*. at 140 ("[T]he statute must serve a legitimate local purpose, and the purpose must be one that cannot be served as well by available nondiscriminatory means.").

197. *See id*. at 139 (refusing to lessen the intensity of the scrutiny under the Lacey Act when there was no clear congressional intent under the Act to do so).

198. *Id*. at 138.

199. *Id*. at 151.

200. *Id*. at 141.

without any assurance as to their effectiveness, the procedures were not a "nondiscriminatory alternative."[201]

Therefore, although state laws under the Lacey Act will be reviewed under strict scrutiny in the United States, the Court *does* consider protection from invasive species a legitimate state purpose.[202] Nevertheless, by putting the burden on the state to show that a law meets strict scrutiny, it is unclear whether another court might find prevention of invasive species as robust a purpose as the *Maine* Court did, or might instead find in favor of another nondiscriminatory alternative that is less effective. Even though the Lacey Act is an important piece of legislation in the prevention of invasive species, it still leaves much to be desired.

C. Executive Orders: Carter and Clinton

In 1977, President Carter issued an executive order that directly addressed the need to stop the introduction of invasive species into the United States.[203] This order was generally considered to be a failure and remained largely unimplemented.[204] It defined "exotic species" as plants and animals "not naturally occurring either presently or historically, in any ecosystem of the United States."[205] This definition was impossibly broad. It characterized exotic species as only those that were outside of the United States, simply ignoring the fact that invasive species transfer could occur between separate ecological systems within the United States. Additionally, the order did not include an implementation scheme, leaving agencies without direction as to how to proceed.[206]

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201. *Id*. at 147 (internal quotation marks omitted).

202. *See id*. at 148 ("[T]he constitutional principles underlying the commerce clause cannot be read as requiring the State of Maine to sit idly by and wait until potentially irreversible environmental damage has occurred . . . ." (alteration in original) (internal quotation marks omitted)).

203. Exec. Order No. 11,987, 3 C.F.R. 116–17 (1977) (superseded by Exec. Order No. 13,112, 3 C.F.R. 159 (1999)).

204. *E.g.*, Robert B. McKinstry, Jr. et al., *Legal Tools that Provide Direct Protection for Elements of Biodiversity*, 16 WIDENER L. REV. 909, 928–29 (2007); Marc. L. Miller, *The Paradox of U.S. Alien Species Law*, *in* HARMFUL INVASIVE SPECIES: LEGAL RESPONSES 125, 147 (Marc L. Miller & Robert N. Fabian eds., 2004); Matthew Shannon, *From Zebra Mussels to Coqui Frogs: Public Nuisance Liability as a Method To Combat the Introduction of Invasive Species*, 32 ENVIRONS ENVTL. L. & POL'Y J. 37, 48 (2008).

205. Exec. Order No. 11,987, 3 C.F.R. 116 (1977) (internal quotation marks omitted).

206. *See* Miller, *supra* note 204, at 147 (describing the shortcomings of Executive Order No. 11,987).

In 1999, President Clinton issued an executive order partially in response to Carter's ineffectual executive order.[207] Clinton's order replaced Carter's and created more effective policy. The stated purpose of the order was to prevent "the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species can cause."[208] The order defined invasive species in a scientific way, as "with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem."[209] Clinton's executive order also established the National Invasive Species Council, comprised of officers with significant responsibilities related to invasive species.[210] The council was tasked with issuing a National Invasive Species Management Plan within eighteen months of the formation of the council.[211] The final draft of the plan was "replete with specific goals for the council and for specific federal agencies, often with target dates attached."[212] These goals are certainly laudable, but reports have revealed that most of them have yet to be accomplished.[213] A 2002 report by the U.S. General Accounting Office stated that while the management plan calls for actions that are likely to help control invasive species, it lacks any clear long-term outcome and quantifiable performance criteria against which to evaluate the overall success of the plan.[214]

Specifically, the council completed less than twenty percent of the planned actions that were called for by September 2002, although they have started to work on others.[215] This lack of success has been attributed to "delays in establishing implementation teams that will be responsible for carrying out the planned actions, the low priority given to implementation by the council, and the lack of funding and shortage of

207. Exec. Order No. 13,112, 3 C.F.R. 159 (1999).

208. *Id*.

209. *Id*.

210. *Id*. at 161.

211. *Id*. at 162.

212. Miller, *supra* note 204, at 150.

213. *Id*. at 151. Miller also points out that the Management Plan was published two days before President Bush took office and that a "shift to an administration where the council included Secretary of the Interior Gail Norton as a co-chair and Secretary of Defense Donald Rumsfeld and Secretary of State Colin Powell . . . made any progress on this plan unlikely." *Id*. at 150–51.

214. U.S. GEN. ACCOUNTING OFFICE, GAO-03-1, INVASIVE SPECIES: CLEARER FOCUS AND GREATER COMMITMENT NEEDED TO EFFECTIVELY MANAGE THE PROBLEM 27 (2002), *available at* http://www.gao.gov/new.items/d031.pdf.

215. *Id*.

staff responsible for doing the work."[216] It could be the order's "hyperactive, overstructured (sic), action-item nature,"[217] its status as "low priority" for federal agencies,[218] or a combination of these issues. Increased accountability to specific individuals (as opposed to a committee of people), increased funding, and increased public awareness would make the order more successful.[219] In the meantime, alternatives should continue to be explored.

D. Nonindigenous Aquatic Nuisance Prevention and Control Act and the National Invasive Species Act

The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 ("NANPCA")[220] was created to control unintentional introductions of invasive species, primarily through ballast water.[221] NANPCA reflects an important shift to regulation of unintentional introductions. This focuses very narrowly on the unintentional introduction of aquatic invaders by ballast water release, a critical vector through which many non-native aquatic species infiltrate new waterways.[222] Additionally, the creation of a Task Force responsible for reviewing and monitoring the success of the program is a necessary component of a successful invasive species strategy.[223] In its original

216. *Id*.

217. Miller, *supra* note 204, at 151.

218. Shannon, supra note 204, at 48.

219. *See* Miller, *supra* note 204, at 152 (asserting that "[i]f Congress is serious about invasive species . . . it will . . . place clearer responsibility on the president and specific cabinet agencies, require far more specific reports, and commit more substantial funds to the area").

220. 16 U.S.C. §§ 4701–51 (2006).

221. Ships take on and discharge ballast water to compensate for a ship's weight change with the loading and unloading of cargo. Amy Taylor Sevigny, *Nw. Envtl. Advocates v. U.S. Envtl. Prot. Agency*, 14 U. BALT. J. ENVTL. L. 213, 213 (2007). "More than 21 billion gallons of ballast water are discharged into the United State's [sic] waterways each year. As a result of dumping this ballast water . . . 'more than 10,000 marine species each day hitch rides around the globe in the ballast water of cargo ships.' " *Id*. (footnote omitted). Ballast water is thought to be responsible for the spread of many noxious invasive species, including the zebra mussel, which is a thumbnail sized organism from the Ukraine that spreads rapidly and causes millions of dollars worth of damage to infrastructure by clogging pipes and attaching to boats. Daniel A. Applegate, *The New Cold War: The Battle To Prevent Eurasian Invaders from Destroying the Great Lakes*, 57 CASE W. RES. L. REV. 391, 392–93 (2007).

222. *E.g.*, *id.*

223. *See* Miller, *supra* note 204, at 149 (discussing how the creation of the Invasive Species Management Council was a necessary component to the potential success of Executive Order 13,112).

incarnation, NANPCA focused on preventing further spread of invasive species in the Great Lakes region and the Hudson Valley watershed through ballast water.[224] Ships are required to minimize AIS introduction by exchanging their ballast water away from ports.[225] Violations of these regulations can result in a civil penalty of up to $25,000 per day or criminal prosecution.[226] The statute also creates an Aquatic Nuisance Species Task Force, which must "develop and implement a program for waters of the United States to prevent introduction and dispersal of aquatic nuisance species; to monitor, control and study such species; and to disseminate related information."[227] The statute directs the Task Force to constantly monitor for new invasive species and new pathways of unintentional introduction.[228] Furthermore, "the Task Force or any other affected agency or entity may recommend that the Task Force initiate the control effort."[229] If the Task Force determines that control of an AIS is warranted,[230] then the Task Force will promulgate a new control regulation for that vector of invasive species.[231]

NANPCA was reauthorized and amended by the National Invasive Species Act of 1996 ("NISA").[232] The jurisdiction of the Act was expanded by the implementation of a national program which ships may elect to participate in and which restricts the release of ballast water within any port of the United States.[233] The Act also called for a one-

224. Shannon, *supra* note 204, at 44.

225. 16 U.S.C. § 4711(b)(2)(B).

226. *Id.* §§ 4711(g)(1)–(2).

227. *Id.* § 4722(a).

228. *Id.* § 4722(d).

229. *Id.* § 4722(e)(2).

230. In order to determine if control is warranted, the Task Force must analyze the following five factors: (1) the need for control (including the projected consequences of no control and less than full control); (2) the technical and biological feasibility and cost-effectiveness of alternative control strategies; (3) whether the benefits of control, including costs avoided, exceed the costs of the program; (4) the risk of harm to non-target organisms and ecosystems, public health, and welfare; and (5) other considerations the Task Force determines appropriate. *Id*.

231. To promulgate the regulation, the Task Force must publish notice of its proposed program and solicit comments in the Federal Register, in major newspapers in the region affected, and in principal trade publications of the industries affected. It can promulgate the rule within 180 days of notice, after consultation with affected governmental and other appropriate entities, and after taking into consideration other comments received. *Id*. § 4722(e)(3).

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

233. 16 U.S.C. § 4711(c).

time demonstration of current ballast-water technologies[234] "identified as promising" by the National Research Council Marine Board of the National Academy of Science.[235]

IV. FEDERALISM AND INTERSTATE COMPACTS

Traditionally, the lawmakers working for the protection of water resources have capitalized on certain components of the constitutional federalism framework.[236] "Federalism is a system where particular distributions of authority between a nation and its sub-units are secured by definitive rights that the sub-units can assert against the central government."[237] In other words, federalism describes the balance of power between units of government. In the United States, this usually equates to the balance of power between the federal government and state governments, and it would apply similarly for Canada with its parliamentary government and provinces.[238] To refine this more, vertical federalism refers to the relationship between federal and state governments, while horizontal federalism refers to the relationship between states.[239]

Since its advent in the late 1960s and early 1970s, environmental policy in the United States has been designed within a vertical federalism framework.[240] More specifically, the main approach has been one of "cooperative vertical federalism," in which the federal government has set environmental standards for the states to administer and enforce.[241] This cooperative vertical federalism has been the framework for most environmental policies throughout U.S. history (including endangered species, hazardous waste, and pollution), but water resource management has been the exception.[242] Interstate management of water resources has

234. *Id*. § 4714(b)(1).

235. *Id*. § 4714(b)(4).

236. Noah D. Hall, *Toward a New Horizontal Federalism: Interstate Water Management in the Great Lakes Region*, 77 U. COLO. L. REV. 405, 409–10 (2006).

237. Edward Rubin, *Rational States?*, 83 VA. L. REV. 1433, 1434 (1997).

238. *See* GEOFFREY R. STONE ET AL., CONSTITUTIONAL LAW 1 (4th ed., 2001); *see also* BORA LASKIN & ALBERT S. ABEL, LASKIN'S CANADIAN CONSTITUTIONAL LAW: CASES, TEXT, AND NOTES ON DISTRIBUTION OF LEGISLATIVE POWER 1 (4th ed., 1975). For the purposes of this Note, provinces and states will be similarly referred to as "states."

239. Hall, *supra* note 236, at 409.

240. *See generally* Robert V. Percival, *Environmental Federalism: Historical Roots and Contemporary Models*, 54 MD. L. REV. 1141 (1995).

241. Hall, *supra* note 236, at 409.

242. *Id.* at 410.

typically been addressed through horizontal federalism by utilizing numerous mechanisms to resolve disputes between the states and to facilitate interstate cooperation.[243] The reasons for this are fairly simple: water resources often cross (and even define) state borders, and conflicts over such water resources are often most efficiently settled between the states, since they know more about their own waters and boundaries.[244]

The application of cooperative horizontal federalism to water law co-opts features from traditional environmental federalism (cooperative vertical federalism) and existing interstate water resource management compacts.[245] Similar to cooperative vertical federalism, cooperative horizontal federalism creates common minimum standards to be enforced and administered by all of the parties to a compact.[246] Unlike cooperative vertical federalism, these standards do not need to be handed down by the federal government but rather can be agreed upon by all relevant parties.[247] This allows for states to serve the function typically held by the federal government of setting and enforcing standards.[248] This can be accomplished by employing the interstate compact mechanism we already see in interstate water management schemes.[249]

The U.S. federal government has generally left the allocation of water quantities and management of water resources to the states and will probably continue to do so,[250] while still taking a central role in preserving interstate water quality.[251] Absent an act of Congress, states are generally left to manage their water through common law and statutory mechanisms.[252] Disputes between states that the states are unable to resolve alone have been resolved through either equitable apportionment in the U.S. Supreme Court or an interstate compact.[253] Both of these options have been applied in the Great Lakes context,[254]

243. *Id.*

244. *Id.*

245. *Id.* at 411.

246. *Id.*

247. *Id.*

248. *Id.*

249. *Id.*

250. Robert H. Abrams, *Interstate Water Allocation: A Contemporary Primer for Eastern States*, 25 U. ARK. LITTLE ROCK L. REV. 155, 156 (2002).

251. *See generally* Federal Water Pollution Control Act, 33 U.S.C. §§ 1251–1376 (2006).

252. Abrams, *supra* note 250, at 156–157.

253. *Id.*

254. Hall, *supra* note 236, at 410.

but states frequently prefer interstate compacts to equitable apportionment.[255]

Interstate compacts such as the Great Lakes Compact remain powerful instruments of the law. Compacts act as "contracts" between states entered into by state legislation.[256] That is, they act as legally binding documents that must be "construed and applied in accordance with its terms."[257] A compact possesses the full force and supremacy of federal law.[258] This grants federal courts jurisdiction over causes of action arising from the compacts and acts as a mechanism for keeping states in compliance with their compact duties.[259]

Interstate water compacts have historically been one of two types: "western" or "eastern." Western water management compacts usually focus on allocating water rights to a shared water body among the compact's members.[260] Western compacts, *inter alia*, divide the water body into set allocations for each state; what each member state does with its allocation is outside of the scope of the compact.[261]

Eastern water management compacts take a different approach.[262] They create a centralized interstate management authority comprised of the party states and the federal government.[263] These authorities, called "compact commissions," are given broad regulatory powers to permit and manage individual withdrawals or diversions from all waters in their respective basins.[264] Compact commissions also set regional standards for discharges of pollutants into water bodies.[265] While this more centralized approach benefits from uniform management of a single

255. *See* Douglas L. Grant, *Interstate Water Allocation Compacts: When the Virtue of Permanence Becomes the Vice of Inflexibility*, 74 U. COLO. L. REV. 105 (2003). Nevertheless, it has been suggested that "congressional action is the only means by which interstate water conflicts can be managed in the twenty-first century." George William Sherk, *The Management of Interstate Water Conflicts in the Twenty-first Century: Is It Time to Call Uncle?*, 12 N.Y.U. ENVTL. L.J. 764, 827 (2005).

256. *See* Texas v. New Mexico, 482 U.S. 124, 128 (1987).

257. *Id.*

258. Culyer v. Adams, 449 U.S. 433, 438 (1981) (congressional consent "transforms an interstate compact . . . into a law of the United States").

259. *See* Texas v. New Mexico, 482 U.S. at 128 (allowing prospective equitable relief as well as a legal remedy for past breaches).

260. *See, e.g.*, Colorado River Compact, 70 CONG. REC. 324 (1928); Rio Grande Compact, 53 Stat. 785 (1939).

261. Hall, *supra* note 236, at 411.

262. *See, e.g.*, Delaware River Basin Compact, 75 Stat. 688 (1961); Susquehanna River Basin Compact, 84 Stat. 1509 (1970).

263. Hall, *supra* note 236, at 412.

264. *Id.*

265. *Id.*

resource, it tends to require a fairly significant relinquishment of state autonomy.[266]

Curiously, the Great Lakes states considered and rejected both the eastern and western models.[267] Upon further examination, however, it becomes clear why they would have chosen to do so. The western approach is premised on scarcity and either current or anticipated over-allocation of the water in a given water body.[268] The water in the Great Lakes is not "scarce or over-allocated."[269] Without scarcity or over-allocation, a capped allocation system is hardly appropriate.[270] On the other hand, the eastern model has clear benefits for both ecosystem protection and comprehensive management of the water resource. However, the politics of the region make such an approach impracticable.[271] "[T]here is little political support for surrendering state autonomy to a centralized management authority."[272] For instance, Michigan sits almost entirely within the Great Lakes Basin,[273] meaning that any centralized management authority would have control of almost all water use in the state. The other members of the compact—Michigan's rivals in business development and growth—could also influence the controlling authority. Since water use is so critical to the economic development of the state, it is difficult to see Michigan giving broad regulatory powers to its neighbors and competitors.

The IJC released its 15th Biennial Report on Great Lakes Water Quality in 2011, and in September 2012, Canada and the United States amended the Great Lakes Agreement for the first time since 1987. The IJC identified the spread of invasive species as one of its primary concerns.[274] The revision is an important message about the nature of invasive species management: invasive species management is almost invariably a multi-state or multi-national issue and any viable approaches must therefore be cooperative in nature. Yet the amended Agreement does not represent a real solution, because, unlike an interstate compact,

266. *Id.*

267. *Id.*

268. *Id.*

269. *Id.*

270. *Id.*

271. *Id.* at 413.

272. *Id.*

273. *See* J. David Prince, *State Control of Great Lakes Water Diversion*, 16 WM. MITCHELL L. REV. 107, 122 (1990) (map of Great Lakes Basin dividing line).

274. *See* INT'L JOINT COMM'N, 15TH BIENNIAL REPORT ON GREAT LAKES WATER QUALITY 2 (2011), *available at* http://www.ijc.org/rel/boards/watershed/15biennial_report_web-final.pdf.

the Agreement does not carry the full force and supremacy of law; rather, it is a non-binding, good faith agreement.

The IJC has identified several key requirements for any future invasive species control program and these match up exceedingly well with the amended Agreement. First, it would require the implementation of bi-nationally tailored protocols for rapid response both before invasive species are detected in the Great Lakes and, if needed, after the invasive species has entered the Great Lakes.[275] This would take the form of some sort of hotline or network that would incorporate the United States and Canada, allowing both countries to easily initiate the response mechanism when an invasive species is identified. A monitoring, reporting, and verification ("MRV") system designed to detect invasive species before they enter the Great Lakes and then control or remove them after they have entered would likely supplement this. Second, research efforts must become better aligned with rapid response needs.[276] As mentioned in Part II.C, very little is known about how to combat Asian carp; specifically, scientists are currently unaware of any point during an Asian carp's life-cycle that it is particularly vulnerable to control mechanisms such as pesticides or egg destruction. Third, there needs to be a "technology transfer" process to convert research findings into practical applications, like electric barriers and DNA testing.[277] Fourth, scientific advice needs to be available on-site for those working on the ground so that informed decisions can be made.[278] People on the ground will likely require new and specialized training for dealing with invasive species, as well as some sort of manual or guiding resource when there is an issue. The IJC itself could likely serve as the centralized information authority. Fifth, there must be early detection and monitoring systems that are responsive to emerging challenges and technological availability.[279] What form these systems will take is unclear. Technology is always evolving and becoming more advanced, but the world we live in is starting to change as well. The IJC has also recommended the formation of an Incident Command System ("ICS")—an organizational structure used successfully to manage major emergencies in such other areas as human and animal disease, forest pathogens and insects, invasive plants, fire management, and oil and hazardous material spills.[280] The ICS is essentially another word for a

275. *Id.*
276. *Id.*
277. *Id.*
278. *Id.*
279. *Id.*
280. *Id.*

rapid response system, but carries with it different connotations. The implementation of an ICS probably would not need to be as extensive for Asian carp because, while they do pose some human health risk, the main danger they pose is to the Great Lakes ecosystem and those that depend on it for their livelihood. For policy reasons, it is encouraging that the IJC recommendations and the amended Agreement largely match up, but the day is not won. A new Great Lakes Compact is the only legally sufficient way forward.

V. CONCLUSION

If implemented properly, a revised Great Lakes Compact could serve as a vehicle for a new cooperative, horizontal federalism framework for the management of natural resources and the environment. Cooperative horizontal federalism provides an alternative to the western and eastern models. It seeks to establish a middle ground premised on a sustainable approach to water resource management, as opposed to allocation or control.[281] A Great Lakes model for cooperative horizontal federalism would impose common minimum standards for in-basin water use and special provisions to protect against invasive species, based on the concept of living within the means of the watershed, as well as the major recommendations from the IJC and the amended Agreement.[282] The theory behind such an approach is that through individual and state (or province) compliance with the common minimum standards, collective and regional sustainability will result.[283] States and provinces would retain the ability to manage in-basin uses, but would also be able to collectively review and veto diversions that threaten the lakes.[284] States would also benefit from access to regional resources, such as information sharing, and the political pressures of regional enforcement.[285]

With regards to invasive species, the revised Great Lakes Agreement provides an excellent road map for a revised compact. Within this new framework, the Great Lakes states and the Canadian provinces of Ontario and Québec would, with individual federal governmental support, bind themselves to a revised compact. With congressional approval of a revised compact, concern over Commerce Clause

281. Hall, *supra* note 236, at 413.

282. *Id.*

283. *Id.*

284. *Id.*

285. *Id.*

limitations can be disregarded, since the federal government can sanction any impacts on interstate commerce. This revised compact would retain many of the successful features of the current Compact, including the IJC Board, MRV, and the citizen suit provision; but would also contain an additional section designed specifically to address invasive species management utilizing the aforementioned IJC recommendations in bi-national, prevention-based efforts with the ultimate goal of total ecological separation, as recommended by the GLCF.

Through the IJC, the member states would adhere to MRV requirements designed to promote cooperative invasive species management. Additionally, the IJC would expand in scope and power so that an independent MRV agency within the IJC, buoyed by the resources of its member states, could perform on-site testing and develop control techniques, but also act as a powerful source of support (for example, by facilitating information and technology exchange) to any member state seeking to address invasive species issues.

The primary flaw of cooperative horizontal federalism is the sheer amount of political will and collective action necessary for its implementation. For a compact to be enacted, it requires ratification from each state's legislature and an approval by the simple majority in both houses of Congress, which is permitted to modify the terms of the compact to protect national interests.[286] Additionally, the compact process requires that all negotiation and compromise be performed up front. No individual state can unilaterally modify the terms of the compact during the ratification process. Ultimately, success will require broad consensus and bipartisan political leadership with an eye toward the pitfalls of regional protectionism and congressional rejection. At the same time, this recommendation carries elements of a policy experiment. Can regional political pressures guarantee the protection of a shared natural resource? Can sustainability and management targets be achieved through standard setting for individual use? For now, the answers are not clear, but the importance of finding sustainable management solutions for the Great Lakes ecosystem has never been greater.

Cooperative horizontal federalism represents a viable third option within the current state-federal paradigm of environmental regulation. A revised Great Lakes Compact that incorporates the principles and objectives of the IJC report and the recently amended Great Lakes Agreement, while operating within a cooperative horizontal federalism framework, is an important opportunity for addressing invasive species management in the Great Lakes Basin despite lack of congressional will.

286. Great Lakes Compact, 82 Stat. 414 (1968).

The Great Lakes are an invaluable resource to the United States and Canada alike, and the rigor with which we protect them should reflect that truth. The creation and incorporation of an invasive species control mechanism within a newly revised Great Lakes Compact is of utmost importance. Without it, we are looking down the barrel of a loaded gun. As trade becomes more globalized, more and more invasive species will make their way into the Great Lakes. It is only by taking action now that we can guarantee a bright future for our Great Lakes.