

RETHINKING “IMMINENT HARM” AS IT RELATES TO ASIAN CARP IN LAKE MICHIGAN AND OTHER INVASIVE SPECIES

*Philip S. Traynor**

Lake Michigan and the other Great Lakes are at risk of a devastating invasion of non-native species of carp.¹ The fish have populated most of the Mississippi River Basin and have essentially taken over stretches of the Illinois River south of Chicago.² The carp breed prolifically, out-compete other fish for food, and pose dangers to boaters.³ Fortunately, infrastructure is already in place to stop the invasion, but the entities capable of separating the Great Lakes from the carp in the Illinois River have, thus far, refused to implement the policies necessary to hold the invasion at bay.⁴

On December 2, 2010, a judge for the Northern District of Illinois denied a request for a temporary injunction by a coalition of states bordering the Great Lakes.⁵ The coalition of states sought to force the United States Army Corps of Engineers (“Corps”) and the Metropolitan Water Reclamation District of Greater Chicago (“District”) to close all pathways between the Mississippi River basin and the Great Lakes basin. They hoped to prevent invasive species of Asian carp from populating Lake Michigan and the other Great Lakes.⁶

This article will examine the decision in *Michigan v. Army Corps of Engineers* where the court compared the treatment of invasive species with other environmental threats in the context of injunctive relief. Next, it will describe the harms caused by other invasive species including

* Real estate, land use and environmental law attorney, Florida State University College of Law, J.D.. University of Illinois, B.A..

¹*Asian Carp Control Strategy Framework*, U.S. Env'tl. Prot. Agency 3 (2010), asiancarp.us/documents/2014Framework.pdf.

² *Id.* at 4.

³ *Id.* at 24.

⁴ *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2011).

⁵ *Id.* at 747.

⁶ *Id.* at 756.

Didymo, Burmese pythons, and zebra mussels. In conclusion, it will offer a slightly modified test for the grant of injunctive relief in the case of dangerous invasive species.

I. BACKGROUND OF THE GREAT LAKES ASIAN CARP CONTROVERSY

A. Making the River Flow Backwards

A low ridge, approximately twelve feet above the surrounding terrain, naturally separates Lake Michigan and the Great Lakes Basin from the Des Plaines River and the Mississippi River Basin.⁷ Because of this ridge, the only historic flow between the Mississippi River Basin and the Great Lakes Basin was the Chicago River, which flowed slowly west to east, from the Des Plaines River to Lake Michigan. Prior to the 1850s, Chicago dumped its industrial waste and sewage into the Chicago River, which then lazily emptied into Lake Michigan.⁸ Then, as now, Lake Michigan was Chicago's source for drinking water.⁹ As expected, the discharge of sewage into the drinking water supply soon led to widespread incidents of disease, especially cholera.¹⁰

As early as 1848, the City of Chicago began efforts to reverse the flow of the Chicago River to carry the city's waste down the Mississippi instead of allowing it to accumulate in Lake Michigan.¹¹ Various entities, including the Corps, made early efforts to dredge the Chicago River. By 1900, the city had constructed a massive system of canals, locks, and dams that effectively reversed the river's flow. This caused the river to now flow from east to west, from Lake Michigan to the Des Plaines River, and then through the Illinois and the Mississippi Rivers.¹² The Chicago Sanitary and Ship Canal ("CSSC"), was built to replace the much smaller Illinois & Michigan Canal, and was primarily responsible for this impressive engineering accomplishment.¹³ Through the use of the locks

⁷ Myrna M. Killey, *Illinois' Ice Age Legacy*, ILLINOIS STATE GEOLOGICAL SURVEY GEOSCIENCE EDUC. SERIES 14 (1998).

⁸ M.N. Baker, *The Chicago Drainage Canal*, 64 THE OUTLOOK 357-360 (Alfred E. Smith & Francis Walton eds., 1900).

⁹ *Id.* at 357-359.

¹⁰ *Id.* at 275.

¹¹ *Id.* at 359.

¹² *The Chicago Canal Opened; Permanent Injunction Asked*, Jan. 1900, N. Y. TIMES, at 8.

¹³ Chris A. Shafer, *Great Lakes Diversions Revisited: Legal Constraints and Opportunities of State Regulation*, 17 T.M. COOLEY L. REV. 461, 472 (2000).

and dams, the District is now able to control the flow of the river, even reversing it at will during periods of flooding allowing water to quickly drain into Lake Michigan.¹⁴

The construction of the CSSC greatly expanded navigational opportunities between the Mississippi River Basin and Lake Michigan. Each year, approximately seven million tons of cargo valued at \$1.6 billion, nearly 20,000 recreational boats, and numerous Coast Guard

emergency vessels pass between the two bodies of water.¹⁵ Waterway transportation is the most cost-effective method for the transportation of goods in the region.¹⁶ Each year, millions of tons of critical cargo pass through the CSSC, including agricultural commodities, petroleum products, construction materials, and other necessary goods such as road salt used to deice Midwestern roads during the winter months.¹⁷ If shippers were to transport these goods over land for the entire length of the Mississippi River, the costs of transportation would likely be increased two- to three-fold.¹⁸

While the CSSC has certainly done much for the City of Chicago, it has also detrimentally created a direct pathway for invasive species such as Asian carp to enter Lake Michigan and the Great Lakes basin.

B. The Introduction of Asian Carp

While there are many species of carp in Asia, there are only four species commonly found in the wild in the United States. Only two of which are relevant to the purposes of this paper and the Great Lakes, the bighead carp (*Hypophthalmichthys nobilis*) and silver carp (*Hypophthalmichthys molitrix*).¹⁹ This article will refer to these two species collectively as “Asian carp.”

Asian carp were first introduced to North America in the southern United States. They were used to control snail populations in catfish farms, to improve water quality by feeding on algae, and to provide additional income for farmers when catfish prices were low.²⁰ These

¹⁴ *Michigan*, F.3d at 768.

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ U.S. Env'tl. Prot. Agency, *supra* note 2.

²⁰ Asian Carp Working Grp., *Management and Control Plan for Bighead, Black, Grass, and Silver Carps in the United States*, AQUATIC NUISANCE SPECIES TASK FORCE

introductions began in the 1970s, when aquaculturists considered the fish an environmentally friendly alternative to other control methods.²¹ Though it is difficult to pinpoint exactly when the fish entered the Mississippi River system, the most likely point seems to be the floods in the mid 1990s, which would have connected the isolated aquaculture and fishing ponds with the river system, and, subsequently, allowed the carp to begin their migration northward.²²

As the carp moved north, they have established populations in the Mississippi River and its tributaries. They feed mostly on algae rather than other fish.²³ While non-predatory behavior may sound like a good thing at first, algae forms the basis of the aquatic food chain, and its removal can be detrimental to a large number of other species.²⁴ In many rivers in Missouri, Illinois, and Iowa, Asian carp have largely displaced native fish because of the carp's prolific breeding habits and large appetites.²⁵

Human development has greatly changed the conditions of the Mississippi River Basin.²⁶ Major changes to the rivers include dredging of large shallow river sections to allow access by larger vessels, removal of numerous sand and gravel bars to aid in navigation, and construction of locks, dams, and levees to control flooding.²⁷ As a consequence of these changes to the rivers, large migratory inhabitants of the Mississippi River Basin such as the paddle fish and sturgeon, have largely disappeared as the gravel shallows these fish use for spawning have been removed.²⁸

Asian carp, however, are well suited to life in the modified waterways.²⁹ Asian carp are hearty fish that are well adapted to a wide range of water conditions and temperatures, which allows them to

15 (Nov. 2007)

https://www.anstaskforce.gov/Documents/Carps_Management_Plan.pdf.

²¹ U.S. Env'tl. Prot. Agency, *supra* note 2.

²² Robin Kundis Craig, *Asian Carp and the Great Lakes: When is Irreparable Harm "Likely" and "Imminent" Enough and What Science Do You Trust to Tell You?*, 476 FLA. ST. L. REV. at 3 (2010).

²³ U.S. Env'tl. Prot. Agency, *supra* note 2.

²⁴ Plaintiffs' Complaint for Injunctive and Declaratory Relief at 10. *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2010).

²⁵ Monica Davey, *Voracious Invader May Be Nearing Lake Michigan*, N.Y. TIMES A13 (Nov. 21, 2009).

²⁶ Asian Carp Working Grp., *supra* note 20.

²⁷ *Id.* at 3.

²⁸ *Id.*

²⁹ *Id.*

establish populations in waterways from New Orleans to northern Wisconsin.³⁰ The fish feed on the algae and plankton that form the basis for the aquatic food chain, and are necessary for many native fishes.³¹ Many commercial fisheries in the Midwest already see the impacts of this increased competition for food. In Iowa, commercial catches of native buffalo fish have decreased approximately thirty-five percent in the last decade, while Asian carp harvest increased 125 percent in the last three years. Asian carp now make up the majority of the catch.³² This rapid increase in populations is likely due to the ability of both bighead and silver carp to breed prolifically. Bighead carp reach sexual maturity at two to three years of age and females can lay 500,000 to 1,000,000 eggs per year.³³ Female silver carp reach sexual maturity at two to three years of age, but can lay up to five million eggs each year.³⁴ In *Michigan*, the court considered that:

Asian carp could have a devastating effect on the Great Lakes ecosystem and a significant economic impact on the \$7 billion fishery. Once in Lake Michigan, this invasive species could access many new tributaries connected to the Great Lakes. These fish aggressively compete with native commercial and sport fish for food. They are well suited to the water temperature, food supply, and lack of predators of the Great Lakes and could quickly become the dominant species. Once in the lake, it would be very difficult to control them.³⁵

Asian carp have the potential to displace native fish to such an extent that the seven billion dollar commercial and sport fishery on Lake Michigan could suffer significantly, similar to the commercial fisheries in Iowa and on the Illinois River.³⁶ Additionally, Asian carp have the potential to cause serious erosion problems and to adversely affect

³⁰ *Id.*

³¹ Plaintiffs’ Complaint for injunctive and Declaratory Relief at 10. *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2011).

³² Asian Carp Working Grp., *supra* note 20.

³³ *Id.* at 20.

³⁴ *Id.*

³⁵ Illinois Department of Natural Resources at 10, *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2011).

³⁶ *Asian Carp - Aquatic Invasive Species Issues, Program Accomplishments, and Program Needs*, United States Fish and Wildlife Service, NATIONAL INVASIVE SPECIES COUNCIL (2006), <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1008&context=natlinvasive>; Asian Carp Working Grp., *supra* note 20.

waterfowl breeding areas, and threaten the \$2.4 billion annually brought into the Great Lakes by sport hunters.³⁷

In addition to displacing native species, silver carp are a direct threat to human safety and property. When irritated, silver carp often jump several feet out of the water and can damage boats or seriously injure boaters.³⁸ In one well-publicized incident, a woman who was bowfishing was struck in the face by a silver carp she did not see.³⁹ The fish broke her jaw.⁴⁰

Because of these harmful traits of Asian carp, scientists and lawmakers generally agree in categorizing them as harmful invasive species. Asian carp meet the National Invasive Species Act definition of an aquatic nuisance species: “a nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural or recreational activities dependent on such waters,”⁴¹ and have been listed as “injurious wildlife” under the Lacey Act, which prohibits possession or trade in listed species.⁴²

Recently, researchers have detected Asian carp moving increasingly closer to the CSSC, and fear they may soon infiltrate the last of the barriers between the Des Plaines River and Lake Michigan.⁴³ This last line of defense consists of a series of three electrically-charged barriers designed to keep the carp, and any other fish, from crossing into Lake Michigan. The barriers are electrical cables that run along the river bed, perpendicular to the channel. Electrical currents are passed through the cables, creating an electric field that fish avoid.⁴⁴

II. MICHIGAN V. ARMY CORPS OF ENGINEERS

On July 19, 2010, Michigan, Minnesota, Ohio, Wisconsin, and Pennsylvania formed a coalition (“Coalition”) and brought suit against

³⁷ NATIONAL INVASIVE SPECIES COUNCIL, *at* 2.

³⁸ Asian Carp Working Grp., *supra* note 20, at 33.

³⁹ Joe Cermele, *Flying Carp and Broken Jaws*, FIELD & STREAM, (Aug. 21, 2009), <http://www.fieldandstream.com/blogs/fishing/2009/08/cermele-flying-carp-broken-jaws>.

⁴⁰ *Id.*

⁴¹ National Invasive Species Act, 16 U.S.C. A § 4702 (1996).

⁴² 18 U.S.C.A. § 42 (2010).

⁴³ WGN News <http://archive.chicagobreakingnews.com/2010/06/officials-asian-carp-found-in-chicago-waterway-system.html>.

⁴⁴ Asian Carp Working Grp., *supra* note 20, at 69.

the Corps and the District on a theory of public nuisance.⁴⁵ The Coalition also requested judicial review of agency actions regarding the management of the Chicago Area Waterway System (“CAWS”), which includes the CSSC and other rivers and tributaries in the area, including the Chicago River and Calumet River.⁴⁶ The District operates the equipment that controls the flows of water into the CAWS, while the Corps operates the locks and dams along the waterway that controls the flow of waters within the CAWS.⁴⁷

The Coalition requested that the Corps and the District create a permanent barrier between the Des Plaines River and Lake Michigan by bulkheading the locks and installing screens on all sluice gates that could potentially allow Asian carp to pass through.⁴⁸ The Coalition argued that a permanent, physical separation of the two water systems is necessary to prevent the spread of the Asian carp into the Great Lakes because the carp have already made it past the barriers.⁴⁹

A. eDNA and Other Testing Methods

In 2009, the Corps began a program of experimental testing to detect the presence of Asian carp DNA in the waters of the CAWS and Lake Michigan.⁵⁰ The process tested water samples from multiple locations for traces of environmental DNA or “eDNA.”⁵¹ According to Dr. David Lodge of the University of Notre Dame, who worked with the Corps, the tests provide an accurate representation of what species are present in a given area, with minimal chance of a false positive.⁵² Dr. Lodge’s team tested the samples for DNA the carp shed naturally through defecation and other processes.⁵³ Dr. Lodge states that a positive sample can indicate the presence of Asian carp in that area within about two days.⁵⁴

⁴⁵ *Michigan*, 667 F.3d, at 768.

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ *Id.* at 769.

⁴⁹ *Id.*

⁵⁰ *Id.* at 783.

⁵¹ *Michigan*, 667 F.3d at 783.

⁵² *Id.*

⁵³ Preliminary Injunction Hearing at 6, *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2011).

⁵⁴ *Id.* at 5.

Since 2009, samples taken from north end of the electronic barriers have tested positive for Asian carp DNA.⁵⁵ The Coalition has interpreted Dr. Lodge's results as proof of Asian carp living within the Great Lakes and that immediate action is necessary to prevent a breeding population from taking hold.⁵⁶ The Corps and the District, along with intervenors, argue that eDNA is an untested technology with a high risk of false positive results.⁵⁷ The Defendants claim that a positive result may indicate only the feces of a predator that has eaten an Asian carp, such as a bird or human, and that the technology is not yet well proven enough to assert that the sample came from an Asian carp, rather than another fish.⁵⁸

Despite the arguments of The Corps and the District, researchers found a few fish north of the electric barriers, including one bighead carp, caught in Lake Calumet on June 22, 2010.⁵⁹ Aside from eDNA testing, biologists are using commercial fishing, gill nets, rotenone (a fish poison), and electric shock surveys to determine if the carp are bypassing the barrier, and if so, how many.⁶⁰ The Plaintiffs allege the positive eDNA test results, combined with the bighead carp in Lake Calumet, proves the barriers are not effective, and the Asian carp are invading Lake Michigan.⁶¹ The Corps and District, however, argue the Lake Calumet fish was a fluke and had probably been there before the Corps installed the barriers, or that a person introduced the fish.⁶² The Corps contends that the barriers are working as designed and Asian carp will not establish a breeding population within the Great Lakes.⁶³

In support of this position, the District contends that a few isolated fish are very different from an established invasive species.⁶⁴ For a

⁵⁵ Plaintiffs' Complaint for Injunctive and Declaratory Relief at 10, *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2011).

⁵⁶ *Id.*

⁵⁷ Intervenor Wendella Sightseeing Company Inc. Post Hearing Memorandum at 26, *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2011).

⁵⁸ *Id.*

⁵⁹ Plaintiffs' Complaint for injunctive and Declaratory Relief at 7, *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2011).

⁶⁰ Asian Carp Working Grp., *supra* note 20, at 33.

⁶¹ Plaintiff's Complaint for Injunctive and declaratory Relief at 7, *Michigan v. Army Corps of Engineers*, 667 F.3d 765 765 (7th Cir. 2011).

⁶² Defendant Metropolitan Water Reclamation District of Greater Chicago's Post Hearing Brief in Opposition to Plaintiff's Motion for Preliminary Injunction at 7, *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2011).

⁶³ *Id.*

⁶⁴ *Id.*

species to establish a self-sustaining population, multiple, sizable introductions must enter the waterway.⁶⁵ For most invasions to be successful, the invaders must enter the new area many times and in high numbers.⁶⁶ If only one or two isolated carp were present in Lake Michigan, it is unlikely that the fish would find each other, breed, and establish a new population, rather, multiple introductions would be necessary.⁶⁷

B. Preliminary Injunctive Relief Denied

On December 2, 2010, the District Court of the Northern District of Illinois issued its ruling in *Michigan v. Army Corps of Engineers*, holding that the Plaintiff Coalition had not met the burden necessary for a grant of preliminary injunctive relief.⁶⁸ According to the court:

Like all forms of injunctive relief, a preliminary injunction is ‘an extraordinary remedy that should not be granted unless the movant, by a clear showing, carries the burden of persuasion.’⁶⁹ A party seeking a preliminary injunction must demonstrate as a threshold matter that (1) its case has some likelihood of succeeding on the merits; (2) no adequate remedy at law exists; and (3) it will suffer irreparable harm if preliminary relief is denied.⁷⁰ ... The Supreme Court recently clarified that, at a minimum, the moving party must “demonstrate that irreparable harm is likely in the absence of an injunction,” and that the mere “possibility” of irreparable harm will not suffice.⁷¹

The court stated that if the Plaintiff meets the above burden, the court must perform a balancing test between the harms to the Plaintiff and the

⁶⁵ Julianne Kurdila, *The Introduction of Exotic Species Into the United States: There Goes the Neighborhood!*, 16 B.C. ENVTL. AFF. L. REV./NVT. L. REV. 95, 103 (1988); *Michigan*, 667 F.3d 765 (7th Cir. 2011) (declaration of Dr. David M. Lodge).

⁶⁶ *Michigan v. Army Corps of Engineers*, 667 F.3d 765 (7th Cir. 2011).

⁶⁷ *Id.*

⁶⁸ *Michigan*, 667 F.3d at 800.

⁶⁹ *Id.* (citing *Mazurek v. Armstrong*, 520 U.S. 968, (1997) (emphasis in original); see also *Goodman v. Ill. Dep’t of Financial & Professional Reg.*, 430 F.3d 432, 437 (7th Cir. 2005) (same)).

⁷⁰ *Michigan*, No. 10-CV-4457.

⁷¹ *Id.* at 769 (citing *Winter v. Natural Resources Defense Council*, 129 S.Ct. 365, 375-76 (2008) (emphasis in original)).

Defendants.⁷² The court explained that the test for injunctive relief uses a sliding scale approach, meaning that the greater likelihood of success on the merits for the Plaintiff, the less the irreparable harm test must weigh in favor of the Plaintiff.⁷³ Presumably anticipating this sliding scale test, the Plaintiffs focused their argument on the irreparable harms that the Great Lakes would suffer if Asian carp invade, including the loss of biodiversity, degradation of fishing and hunting industries, and dangers to boaters.⁷⁴ The Defendants, on the other hand, attacked the likelihood of the Plaintiff's arguments having success on the merits, arguing that a nuisance claim requires a showing of an imminent, permanent harm, rather than speculation that such a harm will occur in the future.⁷⁵

Although the court found that the potential harms to the Great Lakes and to Plaintiffs were great⁷⁶, the Defendants ultimately prevailed because the court found those harms to be exactly that: potential.⁷⁷ The court acknowledged that:

Asian carp pose the greatest immediate threat to the Great Lakes ecosystem.... Bighead and silver carp could colonize all of the Great Lakes and sustain high-density populations. High densities would likely result in declines in abundance of many native fishes.⁷⁸

...

They are well suited to the water temperature, food supply, and lack of predators of the Great Lakes and could quickly become the dominant species. Once in the lake, it would be very difficult to control them.⁷⁹

The court did not place great weight on the eDNA evidence Dr. Lodge presented, and did not appear convinced that Asian carp could bypass the electric barriers.⁸⁰ Since the court did not find that the fish were bypassing the barriers and were present in Lake Michigan, it held that Plaintiffs had "a very modest likelihood of success" on the merits of

⁷² *Id.* at 797.

⁷³ *Id.*

⁷⁴ *Id.*; see generally Part I.B.

⁷⁵ *Id.*

⁷⁶ *Michigan*, 667 F.3d at 785.

⁷⁷ *Id.*

⁷⁸ *Id.* at 4.

⁷⁹ *Id.*

⁸⁰ *Id.* at 784.

their claim.⁸¹ If more fish were present above the barrier, the court reasoned, the Plaintiffs would have a greater likelihood of success on the merits.⁸² Given the gravity of the harm, the court likely would have granted the injunction.⁸³

The glaring problem with applying this approach to injunctive relief to invasive species is that by the time the threat is great enough for the court to grant an injunction, it is already likely too late to repeal the invading force.⁸⁴

III. WHEN IS HARM IMMINENT IN THE INVASIVE SPECIES CONTEXT?

The requirement that a Plaintiff show actual or imminent harm-for a court to grant injunctive relief works well in many areas of law. It would be a nightmare, for example, if a Plaintiff were able to seek injunctive relief for every harm he feels might potentially arise when a utility proposes to build a new nuclear power plant. America is a litigious society and people are afraid of catastrophic scenarios, regardless of their likelihood.⁸⁵ If the courts did not require plaintiffs to show an imminent harm, it is foreseeable that a landowner could prohibit anyone from building anywhere near his small parcel simply by claiming that the new construction will block light or breeze, will smell bad, or will pollute the water. Without requiring a Plaintiff to show that these harms will actually materialize, the law would quickly spiral into absurdity.

Nevertheless, this approach to injunctions does not work as well when it comes to invasive species. While the disgruntled neighbor can wait until the contractor files her building plans, or a water treatment plant files its first monitoring reports, and wait for the Defendant to remedy the nuisance, one cannot simply order an advancing front of invasive species to retreat. Often, by the time a Plaintiff can conclusively prove that an invasive species is present, is too late. This section examines three case

⁸¹ *Id.* at 770.

⁸² *Michigan*, 667 F.3d at 770.

⁸³ *Id.* at 785 (“At best, Plaintiffs have shown that Defendants’ actions (or inactions) conceivably could satisfy one or more of the Restatement tests [for granting an injunction] if the evidence showed an actual, ongoing injury or imminent threat of injury to the water and aquatic resources of Lake Michigan and the other Great Lakes.”)

⁸⁴ *Id.* at 789.

⁸⁵ See generally Roland M. Frye, Jr., *The Current “Nuclear Renaissance” in the United States, its Underlying Reasons, and its Potential Pitfalls*, 29 ENERGY L.J. 279 (2008).

histories of invasive species to illustrate the need for a more precautionary approach to injunctions in this area of natural resource management.

A. Rock snot

“Rock snot” or Didymo (*Didymosphenia geminata*) is an invasive species of aquatic algae that coats streambeds in a thick, slippery layer of growth, choking out other forms of aquatic plant life.⁸⁶ In well-lit streams, Didymo is able to spread quickly and soon after introduction can form thick mats of algae with a consistency described as “wet cotton wool.”⁸⁷ Didymo can establish itself in a new stream after the introduction of a single cell carried from an infected stream.⁸⁸ Didymo also seriously impacts human populations by obstructing water intakes and discouraging recreational fishing, a major industry in many parts of the country.⁸⁹

While it is possible for animals and flooding to spread Didymo, its main mode of transportation in the United States has been via recreational fishermen.⁹⁰ The biggest culprit is the felt soled wading boots worn by many fly fishermen.⁹¹ While the boots provide superior traction to other types of wading boots, they are an ideal carrier for Didymo.⁹² After finding invasive Didymo in several rivers in the Northeast, several states moved quickly to ban felt soled wading boots.⁹³ Even if states universally implement and enforce these bans, only time will tell how effective these bans will be. It appears that the prevalence of Didymo in streams across states is so numerous that it is already too late to prevent its spread, and new regulations will likely be aimed at control.⁹⁴

To have any chance of preventing the spread of Didymo, regulators would have to impose a universal ban on felt soled wading boots (among other measures) at the first sign of rock snot outside of its native range. Unfortunately, any efforts to force such action through an injunction

⁸⁶ Ferrell Spencer Ryan, III, *Banning Felt Soles in Vermont: A Call for State Legislative Response to the Spread of Invasive Didymo*, 13 UNIV. DENVER WATER L. REV. 83, 89 (Fall 2009).

⁸⁷ *Id.* at 86.

⁸⁸ *Id.*

⁸⁹ *Id.* at 88.

⁹⁰ *Id.* at 101.

⁹¹ *Id.*

⁹² Ryan, *supra* note 85, at 101.

⁹³ *Id.*

⁹⁴ *Id.* at 94.

would be fruitless until researchers prove *Didymo* as an actual or imminent harm. Of course, given the current interpretation of “imminent,” this showing would not be possible until long after the algae has established itself.

B. Burmese Pythons

Burmese pythons have established a large, self-sustaining population in the Florida Everglades since the late 1980s or early 1990s.⁹⁵ While experts disagree on exactly how the pythons were introduced, most place blame on the pet trade.⁹⁶ When isolated Burmese pythons first appeared in the Everglades in the 1990s, herpetologists speculated that the snakes were simply released pets and would not survive long in their new habitat, or at least would not establish self-sustaining populations.⁹⁷ There may now be as many as 100,000.⁹⁸ The snakes are an invasive predator that feed on several endangered species including the Key Largo wood rat, key deer, wood stork, and alligators.⁹⁹

While lawmakers are now taking action on a state and federal level to prohibit the introduction and possession of large constrictors into Florida, these efforts are likely too little, too late.¹⁰⁰ Efforts to halt the introduction of Burmese pythons should have occurred when the first isolated animals were discovered, long before breeding populations were established. Though the remoteness of the Everglades may have made it impossible to detect the first specimens, by the time the snakes were found in large numbers, it was too late.¹⁰¹ The case of Burmese pythons is useful to illustrate the futility of the current “imminence” standard for the

⁹⁵ *Herpetologist Shawn Heflick Answers Your Questions*, PBS (Feb. 19, 2010), <http://www.pbs.org/wnet/nature/episodes/invasion-of-the-giant-pythons/herpetologist-shawn-heflick-answers-your-questions/5564/>.

⁹⁶ PYTHON HUNTERS (National Geographic 2010).

⁹⁷ *Nature: Invasion of the Giant Pythons* (PBS television broadcast Feb. 21, 2010) <http://www.pbs.org/wnet/nature/episodes/invasion-of-the-giant-pythons/video-full-episode/5565/>.

⁹⁸ *Herpetologist Shawn Heflick Answers Your Questions*, *supra* note 94.

⁹⁹ *Nature*, *supra* note 96.

¹⁰⁰ Injurious Wildlife Species; *Listing the Boa Constrictor, Four Python Species, and Four Anaconda Species as Injurious Reptiles* 75 Fed. Reg. 48 (proposed Mar. 12, 2010); Florida Fish and Wildlife Conservation Commission - *Conditional Reptiles*, http://www.myfwc.com/WILDLIFEHABITATS/Nonnative_ConditionalReptiles.htm; § 379.372 Fla. Stat. (2010).

¹⁰¹ *Nature*, *supra* note 96.

issuance of an injunction. Even if scientists had the foresight to realize the threat posed by Burmese pythons, courts would have likely treated a few isolated animals in much the same way as the court in *Michigan v. Army Corps of Engineers* treated the few Asian carp found above the electric barrier: isolated introductions that pose no imminent threat.¹⁰²

C. Zebra Mussels

Zebra mussels are an invasive species of mussel from Eastern Europe that are prevalent in the Great Lakes.¹⁰³ Cargo ships most likely introduced the mussels by discharging bilge water containing mussel larvae into Lake Erie in the mid 1980s.¹⁰⁴ Once established in the Great Lakes, the mussels bred prolifically and attached themselves to nearly every hard surface available.¹⁰⁵ The mussels have disrupted the ecosystem by filtering huge quantities of nutrients from the water, competing with native species for food, and by attaching themselves to native shellfish species, preventing the native species from opening their shells to feed.¹⁰⁶ Additionally, zebra mussels have caused huge disruptions to the industries on the Great Lakes by completely encasing every solid surface, including electric transmission lines, water intakes and outflows, and every conceivable type of equipment, costing hundreds of millions of dollars in cleanup.¹⁰⁷

The zebra mussel invasion was the catalyst of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, which was the first legislation aimed at preventing the spread of aquatic invasive species.¹⁰⁸ While the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, and its 1996 amendment, the National Invasive Species Control Act, have surely prevented subsequent invasions in the Great Lakes, the legislation was simply reactive to the zebra mussels and as such, was unable to prevent the establishment of a population in the Great Lakes.¹⁰⁹

¹⁰² *Michigan*, 667 F.3d at 782.

¹⁰³ John A. Ruiter, *Combating the Non-Native Species Invasion of the United States*, 2 *DRAKE J. AGRIC. L.* 259, 263 (1997).

¹⁰⁴ *Id.* at 264.

¹⁰⁵ *Id.* at 263.

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

¹⁰⁸ Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, 16 U.S.C. § 4701(b) (1994).

¹⁰⁹ *Id.*; National Invasive Species Act, 16 U.S.C. §§ 4701-04 (1996).

Zebra mussels provide another example of a devastating invasion that perhaps could have been prevented had the invasion been recognized in time, and had courts been willing to act at the first signs of a threat, rather than wait for proof of an “imminent” harm.

IV. DOES THE SAME TEST FOR INJUNCTIONS APPLY TO ALL SITUATIONS?

Reading the *Michigan v. Army Corps of Engineers* opinion, one might infer that the courts have simply set a high threshold for injunctive relief, which cannot be met in time to prevent invasive species from establishing breeding populations. Actually, the courts have not consistently applied the same standard for imminent harm over time. In the past, the courts have interpreted “imminent” broadly in cases involving unusually great harms, especially in the public health context.¹¹⁰

In a Kansas case, the court granted a Board of County Commissioners injunctive relief preventing a landowner from draining a pond on his property because of the risk posed by the prospect of a disease outbreak stemming from thousands of fish left to rot after the waters were drained.¹¹¹ The court found that even though the threat had not actually presented itself, it would be foolish to wait for a public health crisis to occur before taking action.¹¹² The court held:

[The Board] are not compelled to wait until the health menace, discomfort, ill health, and perhaps death, is actually present. To be of real value health authorities must have authority to take such action as is necessary to prevent a health menace which is reasonably likely to occur under the facts and circumstances applicable thereto. ... The facts and circumstances indicated a reasonable probability of health menace.¹¹³

Applying the same analysis, it is likely that a court would find that an Asian carp invasion of the Great Lakes is as reasonably probable as the threat of disease from rotting fish on an exposed, drained pond’s bed. Courts have also been more lenient towards the imminence of a harm

¹¹⁰ See *infra* notes 108 – 114.

¹¹¹ *Dougan v. Board of Com’rs of Shawnee County*, 43 P.2d 223, 227 (Kan. 1935).

¹¹² *Id.* at 228.

¹¹³ *Id.* at 227.

when that particular harm is decidedly distasteful, as well as a threat to public health. Before the use of vaults in cemeteries, when bodies were interred in wooden boxes, an Illinois court ruled that merely common opinion is necessary to demonstrate that a cemetery should be enjoined from installing a sewer to drain the land underneath the graves into a local stream, holding:

There was some conflict in the evidence on the question as to whether or not the stream would be thus polluted by the sewer, but we think the clear preponderance of the evidence sustains the finding of the master that it would be. It would also seem to accord with the common opinion of mankind that underdrains in wet and marshy land filled with decaying bodies, leading into a running brook flowing within a mile of such land, would pollute the waters of the brook.¹¹⁴

Perhaps if Asian carp were as repugnant as decaying human remains, the courts might acknowledge that “the common opinion of mankind” would conclude that nothing short of a physical barrier will halt the spread of an aquatic invasive species.¹¹⁵

English courts have used an additional sliding scale approach to evaluate the imminence of a harm, recognizing that an unlikely harm with devastating consequences may be more troubling than a nearly certain harm that will have little impact.¹¹⁶ In *Ripon v. Hobart*, a case involving the building of a steam engine to control water levels in a pond and possibly damaging the banks of the pond, the court held:

[T]he law cannot make over-nice distinctions, and refuse the [injunctive] relief, merely because there is a bare possibility that the evil may be avoided. Proceeding upon practical views of human affairs, it will guard against risks which are so imminent that no prudent person would incur them, although they do not amount to absolute certainty of damage. Nay, it will go further, according to the same practical and rational view; and, *balancing the magnitude of the evil against the chances of its occurrence, it will even provide against a somewhat less imminent probability, in cases where the mischief is vast and overwhelming should it be done.*¹¹⁷

¹¹⁴ *Barrett v. Mt. Greenwood Cemetery Ass’n.*, 159 Ill. 385, 389 (Ill. 1896) (Ironically, Mt. Greenwood Cemetery is located a few blocks from what is now the CAWS).

¹¹⁵ *Id.*

¹¹⁶ *Ripon v. Hobart*, 3 Myl. & K. 169, 40 Eng. Reprint, 65 (1834).

¹¹⁷ *Id.* (emphasis added).

V. THE NEW TEST FOR INVASIVE SPECIES

As demonstrated in Part III, by the time the most dangerous of invasive species are present in high enough concentrations to definitively prove they are present, the invaders have often already gained a strong foothold and established a breeding population. Because of the lag in scientific proof, it is crucially important to lower the bar for injunctive relief when dealing with invasive species. If the Northeastern states had waited until *Didymo* was present in a majority of their rivers before banning felt soled wading boots, it would have been too late to prevent the algae from spreading to every river in the region, and it may be too late for many rivers.¹¹⁸ Conversely, had the Great Lakes imposed restrictions on bilge water before zebra mussels had established populations, perhaps they could have held that invader at the walls.¹¹⁹ Of course, that type of foresight requires the ability to act before a harm has become “actual or imminent.”

What I propose is not a complete change in the standard for issuing an injunction, but only that courts adjust the standard when dealing with invasive species. Rather than continuing to blindly apply the same rule to invasive species with no chance of heading off an invasion, the courts should implement a sliding scale approach similar to that used by the court in *Michigan v. Corps of Engineers*, but without the requirement that the threat be imminent. Rather, an additional sliding scale similar to *Ripon* would allow the court to weigh the imminence of the threat against its gravity. The more severe the threatened harm, the less imminent the threat would need to be for the courts to grant the injunction.

Essentially, this sliding scale would allow courts to consider the severity of a harm when determining what level of risk should be acceptable, and at what point to enjoin the activity creating that risk. In instances of threats with devastating consequences, courts would be allowed to take a more cautious approach and issue an injunction under facts that currently do not qualify as an actual or imminent harm.¹²⁰ In circumstances of relatively minor harms, courts could require a much higher likelihood of that harm occurring before intervening.

For example, if in the wake of recent radiation leaks in Japan, a risk of organisms developing genetic mutations may exist. If, for example,

¹¹⁸ Ferrell, *supra* note 85.

¹¹⁹ Ruiters, *supra* note 102.

¹²⁰ *Michigan*, 667 F.3d at 781.

scientists discover that wild salmon from Japan may be at risk of a mutation that causes a change in the coloration of scales, United States fishermen and fish farmers may call for a ban on the importation of all Japanese salmon for fear of interbreeding with American stocks and damaging of the genetic line.¹²¹ Under the traditional approach, the courts would rule that the threat is too speculative and deny an injunction. Under the proposed test, the courts would balance the harm of damaging the genetic line against the chances that harm would actually occur. In this situation, the courts would likely not find the potential harm very grave and would require a showing of a fairly imminent threat. Under this approach, the courts would again deny the injunction.

If instead, a certain strain of prion carried by the salmon was effected by the radiation, the difference between the traditional imminence test and the sliding scale becomes more apparent. If Japanese salmon were infected with a prion similar to mad cow disease, and potentially capable of infecting people, the threatened harm would be more serious, as prion infections are considered universally fatal.¹²² Unfortunately, because so little is known about how prions are transmitted, it is unlikely that courts would ever consider this type of harm actual or imminent, and under the traditional approach, any petition for an injunction would be denied and the potentially infected salmon would continue to be imported. Under the proposed sliding scale, however, the courts could consider the dire consequences that could result from an introduction of infected salmon and enter an injunction even in the absence of scientific proof of an actual or imminent harm.

In the context of Asian carp, this sliding scale approach would allow the court to consider the great threat posed to the Great Lakes ecosystem and associated economies and balance it against the available scientific evidence of the likelihood of the carps spread. Using the sliding scale, the court in *Michigan v. Army Corps of Engineers* would have considered the actual merits of the case, weighing the potential harms of the Asian carp against the harms of closing the locks on the CAWS. Then at least, the actual controversy in the case would have been addressed, instead of the court refusing to take any action until science has proven that any action would be futile.

¹²¹ This hypothetical example assumes that there is no natural interaction between Japanese and American Pacific salmon.

¹²² See generally Debra L. Donahue, *Trampling the Public Trust*, 37 B.C. ENVTL. AFF. L. REV. 257 (2010); See also Sandra Hoffmann, William Harder, *Food Safety and Risk Governance in Globalized Markets*, 20 HEALTH MATRIX 5 (2010).

This approach would finally allow responsible plaintiffs to get in front of invading species and head them off, rather than continuing to wait until the species are established, and then bemoan the fact that action did not occur sooner. Hopefully, action will be taken to permanently separate the Mississippi River Basin from the Great Lakes before a population is able to establish itself above the electronic barrier. for it is likely only a matter of time before Asian carp are able to enter the Great Lakes. As the timeless wisdom of Dr. Ian Malcolm warned, “life finds a way.”¹²³

¹²³ JURASSIC PARK (Universal Pictures 1993).