Joint Hearing of the
Fisheries Conservation, Wildlife, and Oceans Subcommittee
(Committee on Resources), and
Environment, Technology, and Standards Subcommittee
(Committee on Science)
Of the U.S. House of Representatives

Testimony of Allegra Cangelosi, Senior Policy Analyst,
Northeast-Midwest Institute
November 14, 2002

Thank you for the opportunity to testify before the Subcommittees regarding the National Aquatic Invasive Species Act, and National Aquatic Invasive Species Research Act of 2002. These bills are urgently needed to protect America's public health, coastal resources, and economy. I urge the Subcommittees' support for and early action on this legislation.

All of the provisions contained in H.R. 5395 and 5396 are needed in the Northeast-Midwest region, and nationally. This testimony discusses that need, generally, and describes in some detail the potential benefits of provisions in the proposed legislation that would fix the federal program to prevent introductions of aquatic invasive species by ships. It also briefly highlights other important aspects of the bill, including provisions to manage high-risk pathways; establish consistent screening for species invasiveness for planned importations; encourage consultation and coordination with Canada and Mexico to prevent and manage infestations in shared ecosystems; and support state and regional grants to implement on-the-ground programs. Finally, this testimony describes the particularly urgent need which the legislation addresses to improve the dispersal barrier for the connecting waterway between the Mississippi River and the Great Lakes.

A great deal of multi-stakeholder discussion and negotiation have gone into the preparation of both bills over a period of several months, and both bills should be considered by committees of jurisdiction and enacted as soon as possible to get these worthwhile programs underway.

1. The federal government needs to get serious about preventing aquatic invasive species.

Hundred-pound Asian carp smash into recreational boats on the Mississippi River, while voracious Snakehead fish from China crawl out of a Maryland pond. Zebra mussels and alien fish conspire to infect Great Lakes waterfowl with botulism. An army of alien rats, numbering in the millions and weighing up to 20 pounds, raze wetland vegetation of the Chesapeake Bay, while softball-sized snails, Rapa whelks, silently devour any and all shellfish, and the industry they support, in their paths. What more do we need to know to get serious about the problem of aquatic invasive species?

Unfortunately, these highly visible invasions are only the tip of the iceberg. The list of invader species plaguing America's coasts is long, diverse, and constantly growing. A recent Pew Oceans Report cites aquatic invasive species as a top threat to marine biodiversity, and the Environmental Protection Agency has reported that invasive species are second only to habitat destruction as a threat to endangered species.

The environmental effects of invasive organisms can be as subtle as they are serious. As they ripple through ecosystems and morph over time, they have the effect of weakening entire ecological systems. For example, a serious wasting syndrome now afflicts the fry of native sport fish in Lake Ontario. After long and careful research the cause was traced to the fact that the diet of the adult sport fish is now made up of non-native forage fish. The non-native forage is nutritionally deficient to the made-to-order native lake perch with which the native sport fish evolved.

Goods traded in markets are not exempt from degradation by invasive species. Commercial fishing, aquaculture, water-related recreation, and waterborne transportation are all vulnerable to dramatic down-turns precipitated by foreign animals, plants, fish, and insects. Together, the damage amounts to an estimated $100 billion annually in the U.S..

These losses are particularly painful because they are self-inflicted and completely avoidable. Intentionally or not, we have moved organisms adapted to distant habitats to our own lakes, rivers, and shores where they lack natural limiting factors and their populations explode. In the absence of strong federal programs to prevent their introductions, we willingly cede our most valuable coastal and inland assets to them forever. They pose an enormous threat to the U.S. economy and environment. NAISA and NAISRA will assure the federal government finally gets serious about stopping them.

2. NAISA/NAISRA take the cost-effective approach to battling aquatic invasions – prevention

It is not a good time to be wasting federal dollars. Yet by failing to prevent new introductions of aquatic invasive species, that is exactly what we are doing. Invasive species often have no economic value to any stakeholder. Once established, aquatic invasions are particularly expensive and often impossible to eradicate in an environmentally safe way. On-going control is even more expensive. In the Great Lakes, about $15 million USD a year are spent by the US and Canada to control an exotic fish, the sea lamprey, which first invaded the system over 50 years ago. Effective prevention, on the other hand, results in the compound economic benefit of preventing the economic impacts to the receiving system, and the avoiding on-going costs of control.

Our negligence has already cost us and our children money we don't have, and it is time to clean up our act. NAISA and NAISRA will accomplish that goal in a variety of ways.

2.1. Improve existing law by providing necessary policy calls, structure, and information for preventing invasive species introduction by ships

Most invasive aquatic organisms hitch rides to U.S. waters on waterborne vessels – adhered to hulls and entrained in ballast water used for stability and trim. The U.S. has a law on the books to combat invasive species transfers by ships, but federal agencies have not aggressively implemented it, nor, therefore, has industry. Existing law provides too much flexibility to implementing agencies on issues of policy and time-frame, and the result has been stalemate. NAISA and NAISRA break the logjam by making the necessary policy calls, and providing a structure, standards and dates-certain to drive effective action.

2.1.1. Existing law too open-ended

The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) established the first federal requirements on ships with the purpose of attenuating transfers of non-native organisms. It required ships entering the Great Lakes after operating outside the exclusive economic zone to first purge their ballast in the open ocean using a process called ballast water exchange (BWE), or otherwise treat the water with an environmentally-sound alternative technology at least as effective as BWE. In 1996, Congress reauthorized NANPCA as the National Invasive Species Act (NISA). With this law, Congress expanded the ballast management program to be national in scope. Though the law called for this national program to be initially voluntary, it directed the secretary of transportation to make the program mandatory if compliance proved inadequate. In June 2002, with only 20 percent of vessels visiting US ports even bothering to report their ballast operations, much less comply with the new national ballast management guidelines, the U.S. Coast Guard announced its intent to make the national program mandatory at some future date (U.S. Coast Guard, 2001).

Congress allowed for the possibility of treatment on ships, even in 1990 when none was yet known, because BWE has many limitations. Greatest among them are that BWE is difficult to monitor and enforce, has unknown (perhaps unknowable) and partial effectiveness, and can occasionally be unsafe for ships. In addition, BWE has no demonstrated beneficial effect in coastal ship movements (only transoceanic). Treatment technology, on the other hand, could be equally effective for all voyage types, relatively easy to monitor, and have knowable and probably far better effectiveness than BWE. Though a “silver bullet” technology which can effectively and efficiently treat ballast water of any ship or voyage type is unlikely, a tool box of treatment types could address the variety of environmental, economic, and operational contexts in which ballast treatment must take place. This transition to treatment is especially important to port ranges, such as the Great Lakes and Eastern Seaboard, where many ship movements are either coastal or fully loaded with cargo such that BWE is not a possibility.

In NISA of 1996, Congress restated its commitment to the treatment option and attempted to encourage use of treatment by ships through authorizing grants to allow inventors of potential ballast treatments to demonstrate their systems and to enable researchers to measure their effects. Consequently, over the past six years, treatment alternatives such as ozone, ultraviolet radiation (UV), filtration, heat, chemical biocides, and deoxygenation have matured to the point of readiness for shipboard demonstration. Although it is too soon to know for sure, the effectiveness of these approaches could well prove competitive to BWE, especially when the numerous disadvantages of BWE are factored in.

Existing law states the transition to treatment from BWE as a clear policy objective, but leaves the way forward too undefined. As a result, in 2002, a full ten years after Congress first gave ship owners the option to treat their ballast as an alternative to BWE (in Great Lakes trade), and five years after grants began to flow to encourage develop of treatment systems, implementing agencies still have no formal approval process in place for motivated ship owners to exercise the option to use treatment. As a result, none has.

A good part of the hold-up has been that existing law (NANPCA and NISA) contains a narrative standard for treatment effectiveness that the Coast Guard has had difficulty putting into action. Existing law calls for treatment to be “at least as effective as BWE”, the default action. Ideally, the implementing agency would have translated this narrative standard into a working numeric estimate of BWE effectiveness and use that numeric standard as a benchmark for approving treatment alternatives. But the biological effectiveness of BWE is notoriously variable -- even among the ballast tanks within a single ship -- and difficult to measure. A report of the Ballast Water and Shipping Committee to the Aquatic Nuisance Species Task

Force found that BWE effectiveness ranged from "39 percent to 99.9 percent, depending upon the taxonomic groups and ships studied." In the face of these difficulties, the Coast Guard abandoned the prospect of a establishing a numeric surrogate for BWE effectiveness.

Instead, the Coast Guard has set forth a case-by-case "do-it-yourself" approach, directing interested ship owners to conduct complex shipboard experiments (post-installation) to undertake direct and real-time comparisons between BWE and treatment. If the comparison is favorable and defensible, the Coast Guard will approve the treatment. But this approach is counterproductive to the nation's policy objective of encouraging a transition to treatment. The size and complexity of the experimental subject (a moving ship), the rate of flow of the subject medium (ballast water), the compound variability of BWE, treatment effectiveness and control conditions, and the diversity of biological communities at the source and discharge of the treated water all can conspire to make such comparisons inaccurate. A simplified shipboard experiment measuring treatment efficiency relative to a numeric standard, while still not easy, is at least manageable. The only thing standing in the way of this simpler approach is the lack of a numeric benchmark for BWE effectiveness. Given that any estimate of BWE effectiveness is necessarily imprecise, it is a policy call, and one that the Coast Guard has stated it has no intention of making.

2.1.2. NAISA/NAISRA provide policy direction, structure, information

NAISA and NAISRA provide better structure and guidance for the agencies implementing the ship-management program so that it will be both efficient and effective. Most important, NAISA makes policy calls that break the logjam around the transition to ballast treatment by ships. Because we do not have all the information we need to design a long-standing program now, the bills set forth preliminary action by ships within 18 months of enactment, and more final standards by a later date certain. Specifically, within 18 months, all ships must undertake best management practices, reporting and have an invasive species management plan, and, if a ship is in transoceanic trade, exercise ballast water management. The ballast water management requirements include two phases: an interim phase during which BWE is necessarily acceptable, but ships may substitute treatments that meet an interim numeric standard if they choose; and a final phase during which ships are required to meet an environmentally protective standard using best available technology. During this final phase, BWE may well become obsolete for many types of ships as more effective approaches become available. NAISA sets a date-certain of no later than 2011 for this final, environmentally protective standard to take effect. NAISRA authorizes research activities to feed information into each step of this process, and fuel productive review and revision exercises along the way.

2.1.3. The final phase – the sooner the better

The final phase is pivotal to the success of the programs laid out in NAISA and NAISRA, and is therefore discussed first in this testimony. NAISA provides a clear performance objective for the final standard – the standard is to eliminate the risk of transfer of aquatic invasive organisms by ships. The legislation gives implementing agencies four years to define the final standard in numeric terms, and up to 8 years to promulgate it. This approach gives agencies time to conduct the needed research, and flexibility to craft the standard in ways that will assure efficient implementation. It also gives treatment vendors and ship-owners a clear target for research and development, and time to prepare for meeting the standard prior to its promulgation. The accompanying research bill (NAISRA) assures that the needed research will take place.

NAISA and NAISRA wisely incorporate the entire ship vector into the purview of the final standard. Ballast water may prove to be just a part of the problem. Other aspects of the ship, such as hulls,

anchor chains, and sea chests are receiving growing attention for their roles in introductions of aquatic organisms. It would be inefficient for industry, and expensive for the environment, if our focus remained exclusively on ballast water when other aspects of the ship also pose risk of organism transfers but are left unchecked. As a result, the final standard may well take the form of a suite of separate standards relative to different aspects of the ship vector.

Finally, the final standard in NAISA acknowledges a level of uncertainty regarding whether or not technology will exist to allow every class of ship to meet the environmentally protective standard at the time it takes effect. Rather than hold everything up until the silver bullet comes to light, the legislation borrows from our long experience in dealing with air and water pollution and allows industry to meet the standard using "best available technology economically achievable". This approach will require that agencies undertake periodic review of technologies available and revision of the list of acceptable technologies based on the performance of the very best ones for each class of ship. It is up to Congress to make sure that these reviews take place, but fortunately it will be in the interest of both the carriers and the resource protection interests for the reviews to take place. The approach gives vendors great incentive to develop more effective and more economically achievable methods than those already in play because they can then become the standard to beat. It also weans all classes of ships from BWE as soon as economically achievable alternatives exist.

The research program contained in NAISRA will be critical to continued progress in development of new and effective treatment options. For this reason, the experimental approval program in NAISA should be made continuous rather than expire upon promulgation of the interim standard.

2.1.4. The *interim phase – to tide us over*

During the interim phase, the time between 18 months of enactment and the promulgation of the final standard, ships may choose to use BWE or treatment. In NAISA, Congress resolves the impasse regarding equivalency to BWE by making a policy call that the Coast Guard has had trouble making at the agency level. NAISA establishes 95 percent inactivation or removal of plankton as the interim treatment standard. Many experts nationally and internationally, and the current International Maritime Organization draft convention, accept 95 percent inactivation or removal of plankton as a good surrogate for BWE effectiveness, because under ideal conditions 95 percent of the near coastal water is purged in open ocean using the safest BWE technique. As such, it is an upper limit of potential effectiveness of BWE.

The Coast Guard has expressed concern that a 95 percent inactivation or removal is not known to be environmentally protective. To be sure, at this stage of the game, most scientists would assert that only zero discharge of non-native organisms is known to be completely protective. But degree of environmental protectiveness -- entirely appropriate to determination of the final standard applicable to all ships -- is a misplaced concern in relation to the interim period. During the interim period, if a ship doesn't treat its water, it will use heavily flawed BWE. Next to BWE, a consistent 95 percent reduction in plankton relative to intake starts to look pretty good. A "double standard" to the management options – environmental protectiveness is a requirement for treatment but not BWE – would be counterproductive, creating an accidental and unnecessary disincentive for treatment, and removing the bottom rung of the research and development ladder.

Others have expressed concern that the 95 percent standard, a measure of treatment efficiency, poses problems of measurability -- that it is hard to compare intake and discharge in a moving vessel. They argue that an organism size cut-off would be easier to monitor, e.g. no detectable quantities of live organisms of x microns or greater.

Realistically, however, a shore-based type-approval process linked with in-line proxy measurements on board the ship will likely have to suffice for the interim period, and percent reductions are readily accommodated in that scenario. But, more to the point, a size-based approach is not precluded. The technical approach to measurement is undefined by the law; this level of detail is more suitable to regulation. Agencies could implement the 95 percent standard using a size cut-off (say, 50 microns) above which 95 percent of the vertebrates, invertebrates and plankton tend to fall.

Another perspective on the interim standard, currently being explored at the International Maritime Organization, is that it should be technologically achievable. Technological achievability is a moving target, and will vary wildly from one class of ship to the next. For some classes of ships, technologically feasible treatment could be far less effective than BWE. In these cases, BWE, not the technology should be the method of choice. During the interim period, regulatory requirements are already technologically achievable, because BWE is one option. It is during the final standard phase that technological achievability is relevant and the best technology available will be determined on a ship-class by ship-class basis.

NAISA's approach to the interim standard is the best approach given the fact that BWE remains one alternative for ships. But even if it isn't, the most important thing is for society to set a treatment goal for the interim period and move on. It is a critical stage for the assembly of a market and a tool box for technologically achievable and environmentally protective techniques for the final phase of the program. The urge to "perfect" the interim standard only delays the availability of treatments to meet the final standard. For this logic to hold, however, Congress, must assure that the interim period shall indeed expire and be replaced by the final standard at a date-certain; the only real purpose for the interim period is to assure a level of protectiveness for U.S. resources while agencies structure the implementation of the best-available technology economically achievable standard.

2.1.5. New ships on a faster track

NAISA correctly puts new ships on a faster track than existing ships. The most cost-effective time to incorporate ballast treatment into a ship is at the drawing stage. We have uselessly lost 10 years of new ships coming into service without treatment by not setting this requirement in our first aquatic invasive species statutes. NAISA correctly directs ships that enter service after January 1, 2006 to employ ballast treatment rather than BWE as their ballast water management method. In addition, the best available technology economically achievable will be quite different for new ships than existing ships, because options are limited by the constraints of retrofitting. For this reason, NAISA appropriately directs agencies to establish the BAT separately for new and existing ships in each ship class.

2.1.6. *Coast Guard and EPA join forces on the final phase*

Though the Coast Guard is the sole agency in charge of the prevention program for ships set forth in existing law, there is a lawsuit challenging EPA for excluding ship discharges from the NPDES program. The reality is that neither agency is by itself perfect for the job. The Coast Guard is skilled at regulating ships, but it does not have much experience with developing complex environmental standards for industry

in a context of great uncertainty. The Environmental Protection Agency does have experience setting environmental standards for industry but has only limited experience with ships. Under sole regulation by either agency, both the industry and the environment would suffer. NAISA therefore crafts a shared arrangement for prevention program management in which the Coast Guard implements standards promulgated jointly with the EPA. NAISA maintains the Coast Guard lead during the interim period (though the EPA undertakes an environmental soundness review on treatments), and creates a "joint custody" arrangement for the final standard. While any involvement of the EPA makes members of the maritime industry uncomfortable, enactment of NAISA and a joint arrangement is their best protection against the potentiality that EPA's petitioners will prevail, and the entire program is shifted to EPA.

2.2. Other prevention provisions

NAISA and NAISRA have many other programs of key concern to the region and country. One of them is the requirement that agencies develop consistent, comprehensive screening guidelines to review planned importations of aquatic non-native organisms for their potential to be invasive in U.S. waters. Again, prevention is often the only, and always the most cost-effective, approach to controlling aquatic invasive species in U.S. waters.

The two pieces of legislation also wisely call for and support risk assessment of all pathways by which aquatic invasive species may be entering the Unites States, and follow-up management of any high risk pathways. Ships are recognized as the leading pathway, but they are not the only one. As we become more successful at attenuating species introductions by ships, we need to protect the investment by assuring that other pathways do not simply replace ships as conveyers of invasive species into our waters.

3. NAISA/NAISRA management provisions and supporting research critical to success – Asian Carp a case in point

Prevention is critical, but unfortunately, in some cases, it is a luxury. NAISA and NAISRA address urgent management concerns. These programs, discussed in greater detail by other witnesses, include the early detection and rapid response program, and information and outreach to the public and industry. In addition, NAISA increases the authorization for state invasive species management plans. Except perhaps for aspects of the ship-related program, states are in the best position to implement many activities to prevent and manage aquatic invasive species. Existing law provided states with some grant money to help them become effective team-players with the federal agencies, but demand for these funds far outstrips the authorized supply. NAISA elevates the authorization to a realistic level to allow states to effectively implemented prevention and other programs.

The legislation also provides for interagency, interstate and international coordination to more effectively manage aquatic infestations. In particular, the NAISA directs the State Department to enter into negotiations with Canada and Mexico to conduct research and joint management of invasive species in shared ecosystems.

Finally, the bills address a particularly dire issue to the Great Lakes region, but shared nationally. The bills establish a demonstration and research program for dispersal barriers against the spread of invasives through connecting waterways. The best illustration for the need for this program pertains to the Great Lakes. Two species of Asian Carp (silver and bighead) are currently threatening to enter the Great Lakes ecosystem via the Chicago Ship and Sanitary Canal. These species were accidentally introduced into

the Mississippi River and have since been traveling north. Recent estimates place them within 50 miles of Lake Michigan. In the absence of any interdiction activity, it is likely Asian Carp will reach the Great Lakes within the next year. These carp could cause tremendous damage to the Great Lakes ecosystem. They are very large fish (between 50 and 110 lbs.) and voracious predators. They consume up to 40 percent of their weight daily in vegetation, zooplankton, fish and other aquatic organisms. In addition, Asian carp are extremely prolific; females may carry up to 1 million eggs each. Asian Carp would increase in numbers explosively in the Great Lakes, consume vast quantities of food, and decimate native populations of fish and mussels. They have already done so in the Mississippi, and have shut down commercial fisheries in some reaches of the river. Pursuant to existing law, a Chicago River Ship and Sanitary Canal Dispersal Barrier has been designed and installed to prevent fish species from traveling through the canal into Lake Michigan. Currently, the barrier is a temporary electrical barrier, but it is vulnerable to outages and there is no redundancy built in. With Asian Carp staging downstream, the investment could easily prove useless in its current formulation.

NAISA and NAISRA would authorize completion of the construction of the barrier, and funds to maintain and operate it permanently. In addition, the bills provide for a second permanent barrier to provide needed redundancy. A monitoring program is also established, to help determine the effectiveness of the barrier, and to determine the applicability of similar measures to other waterways.

4. Conclusions – Time is of the essence

Until now, invasive species have been a cost which the American public has unwittingly accepted. But growing awareness of the ecological and economic impact of aquatic invaders now attracts a diverse array of interest groups to an increasingly vibrant policy debate. This debate benefited this legislation. The result is a set of programs which will prevent and manage the problem effectively for the environment and efficiently for industry and government. Importantly, NAISA and NAISRA provide for a great deal of periodic review and revision to accommodate the fact that we are early in a steep learning process, and can expect to be able to make these prevention programs even more efficient and effective as we learn more.

Asian carp, nutria, Rapa whelks, and zebra mussels -- there are countless reasons out there for rapid passage of these bills. In most cases, we cannot yet name them, but they are large and small; they belong to every phylum and kingdom; and they threaten all U.S. waters -- coastal and inland alike. They cost Americans big money, and cause permanent loss of our precious natural resource assets. A recent study identified 22 fish species which could become newly established in the Great Lakes due to ship movements, at least five of which are likely to become nuisances and disrupt the current balance of fish in the Great Lakes. Every other coastline is similarly threatened. This problem is not going away unless Congress acts. I urge your timely consideration of these bills, and passage as soon as possible.

Sources

Carlton, J. T. 2001. Introduced Species in U.S. Coastal Waters: Environmental Impacts and Management Priorities. Pew Oceans Commission, Arlington, Virginia.
Committee on Ships' Ballast Operations, National Research Council, Stemming the Tide: Controlling Introductions of Nonindigenous Species by Ships' Ballast Water (Washington, DC: National Academy Press, 1996).
Great Lakes Ballast Technology Demonstration Project, www.nemw.org.
U.S. Coast Guard. Report to Congress on the Voluntary National Guidelines for Ballast Water

Management. November 2001.
U.S. Environmental Protection Agency. Aquatic Nuisance Species in Ballast Water Discharges: Issues and Options. September 2001.

Follow-Up Address

Allegra Cangelosi, Senior Policy Analyst
Northeast-Midwest Institute
218 D St. SE
Washington DC, 20003
202-544-5200
acangelo@nemw.org

Topical Summary

The National Aquatic Invasive Species Act, and National Aquatic Invasive Species Research Act of 2002 are urgently needed to protect America's public health, coastal resources, and economy. All of the provisions contained in H.R. 5395 and 5396 are needed in the Northeast-Midwest region, and nationally. This testimony discusses that need, generally, and describes in some detail the potential benefits of provisions in the proposed legislation that would fix the federal program to prevent introductions of aquatic invasive species by ships. It also briefly highlights other important aspects of the bill, including provisions to manage high-risk pathways; establish consistent screening for species invasiveness for planned importations; encourage consultation and coordination with Canada and Mexico to prevent and manage infestations in shared ecosystems; and support state and regional grants to implement on-the-ground programs. Finally, this testimony describes the particularly urgent need which the legislation addresses to improve the dispersal barrier for the connecting waterway between the Mississippi River and the Great Lakes. A great deal of multi-stakeholder discussion and negotiation have gone into the preparation of both bills over a period of several months, and both bills should be considered by committees of jurisdiction and enacted as soon as possible to get these worthwhile programs underway.