

**H.R. 5395 and H.R. 5396**

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**JOINT LEGISLATIVE HEARING**

BEFORE THE

SUBCOMMITTEE ON FISHERIES CONSERVATION,  
WILDLIFE AND OCEANS

OF THE

**COMMITTEE ON RESOURCES**

AND THE

SUBCOMMITTEE ON ENVIRONMENT, TECHNOLOGY,  
AND STANDARDS

OF THE

**COMMITTEE ON SCIENCE**

**U.S. HOUSE OF REPRESENTATIVES**

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**JOINT LEGISLATIVE HEARING ON H.R. 5395,  
TO ESTABLISH MARINE AND FRESHWATER  
RESEARCH, DEVELOPMENT, AND DEM-  
ONSTRATION PROGRAMS TO SUPPORT  
EFFORTS TO PREVENT, CONTROL, AND  
ERADICATE INVASIVE SPECIES, AND  
H.R. 5396, TO AMEND THE NONINDIGENOUS  
AQUATIC NUISANCE PREVENTION AND  
CONTROL ACT OF 1990**

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**Thursday, November 14, 2002**

**U.S. House of Representatives**

**Subcommittee on Fisheries Conservation, Wildlife and Oceans**

**Committee on Resources, joint with the**

**Subcommittee on Environment, Technology, and Standards**

**Committee on Science**

**Washington, DC**

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The Subcommittee met, pursuant to notice, at 10:06 a.m., in room 1334, Longworth House Office Building, Hon. Wayne T. Gilchrest [Chairman of the Subcommittee on Fisheries, Conservation, Wildlife, and Oceans], presiding.

**STATEMENT OF THE HON. WAYNE T. GILCHREST, A REP-  
RESENTATIVE IN CONGRESS FROM THE STATE OF MARY-  
LAND**

Mr. GILCHREST. Good morning. The Subcommittee will come to order.

What I think we will do right off the bat is—there are plenty of seats up here on this dias, so all the people who are standing, if you would not mind, could you come up and sit in these chairs. Please sit wherever you like.

For those of you who are just coming in, we have some seats up here on the lower dias. You are welcome to come up and sit down. There are six or seven seats left, and it might be better than standing in the back. Please come on up and sit in the seats.

Good morning. I want to welcome our witnesses and thank them for testifying this morning.

We are holding this hearing on two bills, H.R. 4395 and H.R. 5396, bills that combine to reauthorize the Nonindigenous Aquatic Nuisance Prevention and Control Act.

I am pleased that the Science Committee and one of its distinguished Chairmen, Mr. Ehlers, has joined the Subcommittee this morning. We also welcome Judy Biggert to the dias and my good friend Robert Underwood traveled here all the way from Guam for this Subcommittee hearing.

The two bills deal with the overall comprehensive aspect of the problem of invasive species, not only setting standards and deadlines and infrastructure to pursue the problem, but will deal with the necessary research to come up with the right kinds of conclusions.

Before those conclusions are settled, though, we want to come up with interim guidelines to more aggressively pursue what just about everybody concludes is a pretty serious problem.

During this reauthorization process, the proponents of this legislation would like the appropriate Federal agencies to—and most of us are proponents of this legislation, so we direct these questions toward the people at the witness table at this point—we would like the appropriate Federal agencies to consider other vectors and pathways of invasive species introduction besides ballast water; strengthen ballast water management regulations by expanding them to a national scale; establish guidelines and a timeframe to allow for other methods of ballast water management besides ballast water exchange; and expand the research, development, and demonstration projects designed to develop methods and treatment tools for detecting, preventing, controlling, and eradicating aquatic invasive species.

The bills before us are consensus documents. They have been developed with input from the scientific, environmental, shipping communities and the affected Government agencies. We understand that the bills are not perfect, and this hearing is the first step to modify and improve them so that we can strengthen environmental protections, alleviate the impact of invasive species, and still maintain a vibrant and prosperous shipping industry.

Today our two Subcommittees will hear from representatives of nonprofit organizations and from the administration. I look forward to the testimony that we will hear this morning, and I look forward to moving in a way that is responsible but with all deliberate speed to try to understand and then implement the necessary protocols.

At this point, I will yield to the gentleman from Guam, Mr. Underwood.

[The prepared statement of Mr. Gilchrest follows:]

**Statement of the Hon. Wayne T. Gilchrest , a Representative in Congress  
from the State of Maryland**

Good morning, I want to welcome our witnesses and thank them for testifying. We are holding this hearing on two bills, H.R. 5395 and H.R. 5396, bills that combine to reauthorize the Nonindigenous Aquatic Nuisance Prevention and Control Act. I am pleased that the Science Committee and one of its distinguished Chairmen, Vernon Ehlers, have joined with our subcommittee in this effort. H.R. 5395, introduced by Congressman Ehlers, addresses the research, development and control programs to eradicate invasive species, while H.R. 5396, which I introduced, addresses the regulatory framework and priorities of invasive species control. The

latter bill revisits the regulations concerning ballast water discharges - the major source of aquatic invasive species to our Nation's waters.

Invasive species are widely recognized as a primary threat to environmental health and are capable of substantially disrupting the balance of the world's aquatic and terrestrial ecosystems. The scientific community has long recognized the magnitude of this problem, and Capitol Hill has also recognized it, by enacting legislation such as the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990. This Act, and the National Invasive Species Act, which reauthorized it in 1996, have served as the cornerstone of aquatic invasive species management. While these were vitally important first steps, several problems exist with this legislation and invasive species are far from being under control. We have not gone far enough and we have not done enough to adequately address the extent and severity of this problem.

During this reauthorization process, the proponents of this legislation would like the appropriate Federal agencies to:

- consider other vectors and pathways of invasive species introductions besides ballast water,
- strengthen ballast water management regulations by expanding them to a National scale,
- establish guidelines and a timeframe to allow for other methods of ballast water management besides ballast water exchange, and
- expand the research, development, and demonstration projects designed to develop methods and treatment tools for detecting, preventing, controlling and eradicating aquatic invasive species.

The bills before us are consensus documents. They have been developed with input from the scientific, environmental, shipping, communities and the affected governmental agencies. We understand the bills are not perfect and this hearing is the first step to modify and improve them, so that we can strengthen environmental protections, alleviate the impact of invasive species, and still maintain a vibrant and prosperous shipping industry.

Today, our two subcommittees will hear from representatives from non-profit organizations and from the Administration. I look forward to hearing from all of our witnesses and working with them as we move through this process.

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**STATEMENT OF THE HON. ROBERT A. UNDERWOOD, A  
REPRESENTATIVE IN CONGRESS FROM GUAM**

Mr. UNDERWOOD. Good morning, and thank you, Mr. Chairman. I appreciate that you have scheduled this important hearing with our colleagues from the Science Committee.

I am confident that our witnesses today will provide valuable insights regarding how we might best strengthen our Nation's capabilities to better combat the influx of noninvasive, non-native species harming our marine and freshwater environments.

Islands in the Pacific region, including Guam, are rich with rare and endemic marine species. Several of the larger island chains, notably Coral Reef Sound and the Hawaiian Islands, are blessed with extraordinary species diversity.

Regrettably, our unique and culturally significant natural heritage is under constant siege. Many species have been lost due to the intentional release or unintentional introduction of aquatic nuisance pests. Sadly, the future prospect is pessimistic.

Additional scientific research development of a rapid-response capability, better financial and technical assistance to support local control efforts, and more stringent measures to eliminate invasive species pathways are long overdue, but all are necessary to address the growing ecological and economic threat.

This is why, Mr. Chairman, I remain excited by the prospect of H.R. 5396 and 5995, which seek to build upon the success of the Nonindigenous Aquatic Nuisance Species Prevention Act of 1990 and the National Invasive Species Act of 1996. These two bills re-

flect a decade of accumulated field experience confronting aquatic nuisance species and the recommendations of the scientific community. They offer a realistic strategy to aggressively address our most critical scientific and operational needs.

I am especially appreciative that you have included in H.R. 5396 an expansion of the existing Brown Tree Snake Control Program, which has provided vital support to people in Guam. Unfortunately, there is little hope and even less time for the 107th Congress to act on this legislation, and I implore you to keep that section in any new legislation in the 108th.

Nevertheless, both bills serve as important starting points for constructive discussion in the 108th Congress. And with that last thought, before acting on this legislation, I urge you again, Mr. Chairman, to visit the Pacific region next year to gain a first-hand understanding of the challenges we face to control invasive species.

Thank you.

Mr. GILCREST. Thank you, Mr. Underwood, and we will do all we can—we will keep that section in the bill in the next Congress.

Mr. UNDERWOOD. Thank you.

[The prepared statement of Mr. Underwood follows:]

**Statement of The Honorable Robert A. Underwood, a Delegate to Congress from Guam**

Good morning. Thank you, Mr. Chairman, I appreciate that you have scheduled this important joint hearing with our colleagues from the Science Committee.

I am confident that our witnesses today will provide valuable insights concerning how we might best strengthen our Nation's capabilities to better combat the influx of non-native species harming our marine and freshwater environments.

Islands in the Pacific Region, including Guam, are rich with rare and endemic marine and estuarine species. Several of the larger island chains, and notably coral reefs found in the Hawaiian Islands, are blessed with extraordinary species diversity.

Regrettably, this unique and culturally significant natural heritage is under constant siege. Many species have been lost due to the intentional release or unintentional introduction of aquatic nuisance pests. Sadly, the future prospect is pessimistic.

Additional scientific research, development of a rapid response capability, better financial and technical assistance to support local control efforts, and more stringent measures to eliminate invasive species pathways are long overdue. All are necessary to address this growing ecologic and economic threat.

That is why, Mr. Chairman, I am excited by the potential of H.R. 5396 and H.R. 5395, which seek to build upon the success of the Nonindigenous Aquatic Nuisance Species Prevention and Control Act of 1990 and the National Invasive Species Act of 1996.

These two bills reflect a decade of accumulated field experience confronting aquatic nuisance species and the recommendations of the scientific community. They offer a realistic strategy to aggressively address our most critical scientific and operational needs. I am especially appreciative that you have included in H.R. 5396 an expansion of the existing Brown Tree Snake Control Program which has provided vital support to my constituents in Guam.

Unfortunately there is little hope and even less time for the 107th Congress to act on this legislation. Nevertheless, both bills serve as important starting points for constructive discussion in the 108th Congress.

And with that last thought, before acting on this legislation, I urge you to visit the Pacific Region next year to gain first hand an understanding of the challenges we face to control invasive species. Thank you.

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Mr. GILCREST. Mr. Ehlers?

**STATEMENT OF THE HON. VERNON J. EHLERS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN**

Mr. EHLERS. Thank you, Mr. Chairman.

I would just add that I think it would be a marvelous thing to hold a field hearing in Guam at some point to look at the issues there. I am not sure that I would go, but I think it would be a great thing for you to do.

I certainly want to thank you, Chairman Gilchrest, for holding this hearing so that we can hear the administration's thoughts as well as those of several outside witnesses on this legislation that you, Chairman Gilchrest, and I drafted, H.R. 5395 and 5396. I appreciate your leadership in engaging the administration in a dialog about our legislation and also your willingness to make this a joint hearing between our two Subcommittees.

Based on the reaction I have received to the legislation that we submitted, there is great approval and support among the citizens of this Nation for what we are trying to do here.

During this Congress, the Chairman and I have found ourselves working together more often than not on issues shared by our respective Subcommittees. We have found common ground on Sea Grant reauthorization, oceans policy, climate change, and now on invasive species. In fact, we have worked so well together that Chairman Boehlert of the Science Committee and I added him to my Subcommittee because we wanted to be certain he had more than enough work to do.

While this is billed as a joint hearing between our Subcommittees, it is really much more than that. This is really a joint effort by two Members who are passionate about enacting comprehensive and tough legislation to stop the invasion of alien species into our country.

These are not illegal aliens in the sense of people sneaking into the U.S. from other countries, and these are not the little green aliens that Hollywood has made popular. These aliens are plants and animals, microorganisms and pathogens that come into our country aboard our ships, planes, cargo containers, agricultural and horticultural shipments, as well as other pathways.

They invade and take hold of our native ecosystems and then cause enormous economic and environmental damage by, for example, harming crops and crowding out native species.

Mitigating this damage and controlling and eradicating invasive species once they are established creates an intolerable economic burden on our society, a burden that has been estimated to cost \$137 billion each year.

Once these invasive species are established, they become the most persistent pollutant known to man—one without a half-life and one that can reproduce and multiply unchecked. It is that burden that Chairman Gilchrest and I seek to mitigate by passing H.R. 5395 and 5396. These pieces of legislation focus on aquatic invasive species and follow an age-old adage: An ounce of prevention is worth a pound of cure. I probably should change that to a milligram of prevention is worth a kilogram of cure.

If we spend millions preventing invasive species from entering the United States, we can avoid spending billions trying to control and manage them once they are here.

But what will it take to get this legislation enacted next year? First, it is going to take continued commitment from Chairman Gilchrest, myself, Senators, and other key Members such as Mr. Baird and Mr. Hoekstra to push this legislation through Congress.

Chairman Gilchrest and I will continue to lead this fight in the House, and we have agreed to reintroduce the bills the first day that Congress reconvenes next year. We received a promising sign of how important this is to Members of Congress when we obtained over 40 bipartisan cosponsors on the legislation with very little effort.

Second, the administration will have to recognize that this legislation and this issue must be a priority. The harm caused by invasive species affects all Americans and, thanks to the now infamous snakehead fish, they are recognizing this threat.

The administration should be actively engaged in not only making sure that passage of this legislation is a top priority but also that it is fully implemented once it is enacted. I, along with many of my colleagues, have been very frustrated by the lack of progress that the Coast Guard has made in implementing provisions of the National Invasive Species Act of 1996.

Third, the key constituencies affected by this legislation—State and local governments, the shipping, fishing, pet and aquaculture industries, and environmental groups—will have to help forge a consensus about these bills. These groups must realize that both of these bills are in the best long-term interest of all Americans, and that we must work together to achieve their enactment.

The time has come for us to move this legislation forward. Invasive species do not respect political boundaries or time lines, and they are arriving here and multiplying even as we speak today.

Thank you, Mr. Gilchrest. I look forward to working with you on this venture and many other joint ventures in the next Congress, and I also look forward to hearing from our witnesses today.

Thank you.

Mr. GILCHREST. Thank you, Mr. Ehlers.

[The prepared statement of Mr. Ehlers follows:]

**Statement of Vernon J. Ehlers, a Representative in Congress from the State of Michigan**

I want to thank Chairman Gilchrest for holding this hearing so that we can hear the Administration's thoughts, and those of several outside witnesses, on the legislation that Chairman Gilchrest and I drafted—H.R. 5395 and H.R. 5396. I appreciate his leadership in engaging the Administration in a dialogue about our legislation, and also his willingness to make this a joint hearing between our two subcommittees.

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culture shipments, and other pathways. They invade and take hold in our native ecosystems, and then cause enormous economic and environmental damage, by, for example, harming crops and crowding out native species. Mitigating this damage and controlling and eradicating invasive species once they are established creates an intolerable economic burden on our society, a burden that has been estimated at \$137 billion each year. Once these invasive species are established, they become the most persistent pollutant known to man—one without a half-life and one that can reproduce and multiply unchecked.

It is that burden that Chairman Gilchrest and I seek to mitigate by passing H.R. 5395 and H.R. 5396. These pieces of legislation focus on aquatic invasive species and follow an age-old adage—an ounce of prevention is worth a pound of cure. If we spend millions preventing invasive species from entering the United States, we can avoid spending billions trying to control and manage them once they are here.

But what will it take to get this legislation enacted next year?

First, it is going to take continued commitment from, Chairman Gilchrest, myself, Senators, and other key Members, such as Mr. Baird and Mr. Hoekstra, to push this legislation through Congress. Chairman Gilchrest and I will continue to lead this fight in the House, and we have agreed to reintroduce the bills the first day that Congress reconvenes next year. We received a promising sign of how important this issue is to Members of Congress when we obtained over 40 bipartisan cosponsors on the legislation with little effort.

Second, the Administration will have to recognize that this legislation and this issue must be a priority. The harm caused by invasive species affects all Americans, and thanks to the now infamous Snakehead fish, they are recognizing this threat. The Administration should be actively engaged in not only making sure that passage of this legislation is a top priority, but also that it is fully implemented once it is enacted. I, along with many of my colleagues, have been very frustrated by the lack of progress that the Coast Guard has made in implementing provisions of the National Invasive Species Act of 1996.

Third, the key constituencies affected by this legislation—states and local governments; the shipping, fishing, pet, and aquaculture industries; and environmental groups—will have to help forge a consensus about these bills. These groups must realize that both of these bills are in the best long-term interest of all Americans and that we must work together to achieve their enactment.

The time has come for us to move this legislation forward—invasive species don't respect political boundaries or timelines, and they are arriving here and multiplying even as we speak to you today.

Thank you, Mr. Gilchrest, and I look forward working with you on more joint ventures next Congress and to hearing from our witnesses today.

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Mr. GILCHREST. Mrs. Biggert?

**STATEMENT OF THE HON. JUDY BIGGERT, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS**

Mrs. BIGGERT. Thank you very much, Mr. Chairman.

I would like to thank you and Chairman Ehlers and Ranking Member Underwood for allowing me to join you today. I do want to commend you for holding this joint hearing today and for introducing two important bills on such a critical topic as invasive species.

I join you today because in my congressional district in Illinois, the Asian carp has found the doorway into the Great Lakes, and that entrance is the Chicago Ship and Sanitary Canal, the only aquatic link between the Mississippi River and the Great Lakes, and it is in this manmade waterway that the Asian carp are creeping—I should say leaping—their way toward Lake Michigan.

We do have what we hope is a stopgap measure, which is an invisible electronic fence that repulses the Asian carp. The fence is as wide as the canal and extends at a length of 60 feet, and in order for the carp to traverse the barrier, they would have to not

only set the world record in the long jump but shatter it by almost 30 feet.

This barrier was originally designed as a demonstration project to contain the nuisance round goby and the zebra mussel, and the electronic fence became operational only 6 months ago, and it is a good thing, since the U.S. Fish and Wildlife Service says that this ferocious fish is within 55 miles of Lake Michigan and approaching fast.

So while the experts say that this short-term strategy has worked so far, we must do two things to win the battle over the long term. No. 1, we have to ensure that this barrier remains operational. And I have requested funds included in the fiscal year 2003 energy and water appropriations bill, but without the proper funding, the electricity could go out at any time, and the carp will swim into Lake Michigan, and we certainly cannot allow this to happen. So your bills that you have introduced are crucial to my problem and the problem in the Midwest so that we can construct another barrier and find the long-term solution, and that, we just do fast.

So make no mistake—the Asian carp, as many of these invasive species, waits for no one, not even Congress.

So I thank you for allowing me to join you today.

Mr. GILCHREST. Thank you, Ms. Biggert.

The introduction at this late date—we have some certainty that it will probably not be voted on and sent to the President for his signature before the 107th Congress is over. However, what we want to do is get the agencies prepared for an accelerated process that we hope to pursue with this legislation in the 108th Congress.

So this is a clear signal that we hope within the first 100 days of the 108th Congress for this legislation to be passed into law.

I want to thank all of you for coming today to testify, and we will start with Mr. Steve Williams, Director of the Fish and Wildlife Service.

**STATEMENT OF STEVE WILLIAMS, DIRECTOR, U.S. FISH AND WILDLIFE SERVICE**

Mr. WILLIAMS. Thank you.

Good morning, Chairman Gilchrest, Chairman Ehlers, and members of both Subcommittees.

I am Steve Williams, Director of the U.S. Fish and Wildlife Service, and I thank you for inviting the Department of the Interior to comment on both of these bills.

There is no question that the introduction and establishment of aquatic and invasive species have significantly impacted our natural areas. We have only to look at the history of invasions from the sea lamprey to the zebra mussel to the snakehead fish this summer to see that the problem is getting worse.

The United States continues to see an increase in the number of aquatic species crossing our borders, and we expect this trend to continue if preventive action is not taken.

The Department supports the overall direction of these two bills and is very encouraged by the leadership and foresight shown by Congress in introducing legislation that is so comprehensive. We are especially enthusiastic about the continued focus on partner-

ships and cooperative efforts to address this nationally significant problem.

One of the purposes of the original legislation was to encourage Federal and State agencies to work together with partners to enhance our collective efforts. We believe that the partnerships and cooperative entities established through the Aquatic Nuisance Species Task Force and the National Invasive Species Council have been instrumental in making significant progress to prevent and control aquatic invasive species.

While invasive aquatic species continue to be a significant threat to our natural resources, we believe that our efforts to prevent and control aquatic invasive species have resulted in fewer species introduced and reduced impacts from those that have become established.

The ANS Task Force authorized by the original Act is meeting this week in Hawaii with regional people from all the islands and some of the territories, including Guam, to discuss the special vulnerability of island ecosystems to aquatic invasive species. Just yesterday, the task force took action to establish a nutria working group that will bring together Federal, State, and other expertise in the development of a coordinated management and control plan for nutria.

Now I will briefly address some of our concerns with H.R. 5396. Let me begin my comments by saying that we support reauthorization, and we look forward to working with you to address the Department's concerns.

As these two bills are very comprehensive, I will limit our comments today to several general areas and certainly make our staff available to work with your staff on some of the details.

One specific concern we have is the proposed deadlines required by H.R. 5396. We hope to have the opportunity to work with you and your staff to ensure that the deadlines are manageable while still ensuring that we continue to deal aggressively with these issues.

While ballast water has been acknowledged as one of the leading vectors of introduction, we are encouraged to see that additional emphasis is being placed on other aquatic pathways. This additional emphasis will encourage the development of management actions which may minimize threats from new aquatic invasive species that have the potential to impact our fish and wildlife populations and associated habitats.

The Department supports the development of a screening process for planned importations of live aquatic organisms. Having the opportunity to evaluate new, non-native species that are proposed to be brought into the United States is an invaluable tool to ensure that we are proactive in preventing the introduction of new aquatic invasive species into U.S. waters.

While the injurious wildlife provisions of the Lacey Act give the Service the ability to evaluate and list species as injurious, the nature of the law makes our efforts more reactive than proactive. The screening process outlined in the proposed legislation is a more proactive approach to preventing introductions of aquatic invasive species.

However, there appear to be some regulatory gaps, and we would like to work with you to address these issues.

We are concerned about provisions in section 105(b) that delegate sole authority to screen cultured species to the U.S. Department of Agriculture. Because of the risks to fish and wildlife, we believe that the Service should also have some role in this type of screening.

We are also concerned that the level of funding identified in the bill to develop and implement the screening process may be insufficient to accomplish these tasks within the stated deadlines. The added workload associated with developing the guidelines and regulations, conducting the evaluations, and ensuring effective compliance will be substantial.

The State ANS management plan provisions have been very successful, and we are happy to see that the program was continued and expanded. We look forward to working collaboratively with the States to integrate these new provisions into their efforts to more effectively address invasive species issues.

Education and outreach continue to be critical elements to the success of invasive species prevention and control. Within the Department, the Service has been actively working for many years on the 100th Meridian Initiative to stop the westward spread of zebra mussels. We support the proposed enhancement of those efforts through increased and targeted outreach.

Turning briefly to H.R. 5395, we are particularly encouraged by the increased emphasis on research and monitoring efforts. In its strategic planning effort, the Task Force determined that additional actions were needed and restructured its committees to better address these problems.

Key areas addressed in the legislation including pathways, ballast water management, early detection, and monitoring and control, can only be successful if they are based on sound research. However, we do have some concerns about the coordination of agencies and organizations that collect and store information regarding aquatic invasive species.

We also support the development of methods for rapid assessment of newly detected aquatic species and recommend that adequate resources for conducting such assessments be included as an integral component of coordinated planning for rapid responses.

In closing, I want to thank you again for providing the Department with an opportunity to comment on this legislation, and as I stated earlier, we would be very happy to work with you and your staff to address issues related to deadlines and implementation. We believe that the comprehensive approach outlined in the legislation will result in a more balanced, holistic effort to address the problems caused by aquatic invasive species.

Mr. Chairman, this concludes my prepared remarks.

Mr. GILCHREST. Thank you, Mr. Williams.

[The prepared statement of Mr. Williams follows:]

**Statement of Steve Williams, Director, U.S. Fish and Wildlife Service,  
Department of the Interior**

Good morning, Mr. Chairman and Members of the Subcommittee. I am Steve Williams, Director of the U.S. Fish and Wildlife Service (Service) and a co-chair of the Aquatic Nuisance Species Task Force (ANS Task Force). Thank you for inviting the

Department of the Interior (Department) to comment on H.R. 5396, the National Aquatic Invasive Species Act, and H.R. 5395, the National Aquatic Invasive Species Research Act. Working primarily through the Service and the U.S. Geological Survey (USGS), the Department has a long history of aggressively working on issues related to aquatic invasive species.

There is no question that the introduction and establishment of aquatic invasive species have significantly impacted our natural areas. We have only to look at a history of invasions from the sea lamprey to the zebra mussel to the snakehead fish this summer to understand the broad scope of the problem. The United States continues to see a number of aquatic species crossing our borders, and we expect this trend to continue. The Department supports the overall direction of these two bills and is encouraged by the leadership and foresight shown by Congress to address this difficult issue. However, the Department offers to work with the Subcommittee on specific program details. We also note that new spending authorized by these bills is not currently included in the President's Budget and, as such, must be considered within existing resources and priorities.

We agree with the continued focus on partnerships and cooperative efforts to address this nationally significant problem. One of the purposes of the original bill, the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, was to encourage Federal and State agencies to work with partners to enhance our collective efforts. We believe that the partnerships and cooperative entities established through the ANS Task Force and the National Invasive Species Council (Council) have been instrumental in making significant progress to prevent and control aquatic invasive species.

We note that H.R. 5396 would give statutory recognition to the Council, which the Secretary co-chairs along with the Secretaries of Agriculture and Commerce. We endorse this provision, and believe that this statutory recognition will assist the Council in providing coordination and policy guidance for federal invasive species programs. We also support inclusion of research agencies, such as the USGS and the Smithsonian Institution, as participants in the Task Force to encourage strong links between research and the management of non-indigenous aquatic species.

The ANS Task Force, authorized by the original Act, is meeting this week in Hawaii with regional people from all the islands and some of the territories (including Guam) to discuss the special vulnerability of island ecosystems to aquatic invasive species. Over the last 12 years, the Task Force has held meetings throughout the country to better understand regional invasive species issues, increase awareness, and enhance coordination efforts with local and regional entities.

The Task Force has been successful in establishing additional Regional Aquatic Nuisance Species Panels, bringing together governmental and private entities to coordinate aquatic invasive species activities at a regional level. The 1990 Act authorized the Great Lakes Panel, and the National Invasive Species Act of 1996 (NISA) authorized the establishment of a Western Regional Panel. NISA also recommended that the ANS Task Force establish additional panels. Three additional panels have been established since 1997—the Gulf of Mexico Panel in 1999, the Northeast ANS Panel in 2001, and the Mississippi River Basin Panel should be approved by the ANS Task Force soon. The ANS Task Force is also encouraging the establishment of a Mid-Atlantic Panel. The ANS Task Force is proud of many of the accomplishments made over the last decade including enhancement of regional coordination on aquatic invasive species issues. While invasive aquatic species continue to be a significant threat to our natural resources, we believe our efforts to prevent and control aquatic invasive species have resulted in fewer species introduced and reduced impacts from those that have become established.

#### H.R. 5396

Let me begin by saying that, while we have some concerns with the bill, we support reauthorization and want to work with you and your staff regarding the details. As these two bills are very comprehensive, we will limit our comments today to several general areas. However, one specific concern we have are the proposed deadlines required by H.R. 5396. We hope to have the opportunity to work with you and your staff to ensure that the deadlines are manageable while still ensuring that we continue to deal aggressively with these issues.

#### *Ballast Water*

We believe that substantial progress has been made regarding the management of ballast water, however, much remains to be done. Through NISA, Congress required that the Coast Guard develop voluntary guidelines for ballast water management, and that those guidelines be made mandatory if the industry did not comply

with the guidelines or did not adequately report on compliance. In 1996, as required by NISA, the ANS Task Force provided the Coast Guard with a report outlining the criteria for determining the adequacy and effectiveness of the voluntary guidelines. The Coast Guard utilized the input from the ANS Task Force and submitted their report to Congress on the Voluntary Guidelines for Ballast Water Management, which outlined a process to transition to a mandatory program. The Department supports the Coast Guard's ongoing efforts to transition from the voluntary national program to a mandatory program, as well as efforts to establish a standard to serve as the benchmark for ballast water management options, and we urge a continuation and emphasis for research on ballast water management to assure that the resulting standards are effective and environmentally sound.

#### *Pathways*

While ballast water has been acknowledged as one of the leading vectors of introduction, we are encouraged to see that additional emphasis is being placed on other aquatic pathways. Some of these other pathways include bait fish, pet trade for use in aquariums, horticulture and live food. This additional emphasis will encourage the development of management actions, which may minimize the threats from new aquatic invasive species that have the potential to impact our fish and wildlife populations and associated habitats. We support interagency priority pathway research and management efforts to identify high risk pathways and develop management strategies to address them. In developing its strategic plan last year, the ANS Task Force also identified the management of pathways by which invasive species are introduced as a vital action to prevent future establishment of aquatic invasive species. A number of the actions called for in this bill are similar to those included in the "Prevention" section of the Council's National Invasive Species Management Plan (Plan).

#### *Screening of Planned Importations*

The Department has recognized the need for the development of a screening process for planned importations of live aquatic organisms. Having the opportunity to evaluate new non-native species that are proposed to be brought into the United States is an invaluable tool to ensure that we are proactive in preventing the introduction of new aquatic invasive species into United States waters. An example of the need for such a tool is the discovery this summer of a population of snakehead fish in a pond in Maryland.

Snakehead fish are an aquatic invasive species that are sold live for food or as aquarium pets. Snakeheads are top predators that multiply quickly and have several special features that enhance their ability to survive in wild. In addition to the population found in Maryland, another population was found a year ago in Florida. After the discovery in Florida during the summer of 2001, the Service and the USGS initiated a risk assessment to gather scientific information to determine the injurious nature, and potential impacts, of snakeheads. Data from this risk assessment indicated that the snakeheads were indeed detrimental and the Service began the process of listing snakeheads as injurious wildlife. That process was recently completed when a final rule was published on October 4, 2002. That rule makes it illegal under the Lacey Act to import into the United States or transport across State lines all members of the Channidae family, including the 28 currently recognized species and any species that may be classified under the Channidae family in the future.

While the Injurious Wildlife provisions of the Lacey Act give the Service the ability to evaluate and list species as injurious, the nature of the law makes our efforts more reactive than proactive. The screening process outlined in the proposed legislation is an example of a more proactive and effective approach to preventing introductions of aquatic invasive species.

Having recognized the need for improved screening, the Council's Plan, which I previously mentioned, also calls for working with key stakeholders to develop and test a screening process for intentionally-introduced species. Preliminary work to develop this system has begun in conjunction with the ANS Task Force. We also recommend the development of risk assessment methods to evaluate the potential threat of species that have not yet been introduced. This will be critical in making our screening efforts effective. The Department, the Council, and the ANS Task Force would like to work with the Subcommittee to consider whether the specifics of this proposal should be revised during the legislative process.

We are concerned about the provisions in section 105 (b) that delegate sole authority to screen species for use in aquaculture to the U.S. Department of Agriculture. Because of the risk to fish and wildlife, we believe that the Service should also have a role in this type of screening.

In addition to evaluating potentially invasive species through the screening process, the Service would also be responsible for enforcement of the resulting regulations. Currently, the Service has 94 uniformed Wildlife Inspectors at 32 staffed ports. In 2001, there were 119,581 shipments that were imported or exported through the United States. Of those, 26,279, or 22 percent, were physically inspected. The added workload associated with developing the guidelines and regulations, conducting the evaluations, and ensuring effective compliance will be substantial. Given the comprehensive nature of this provision, it will be necessary to work cooperatively with other agencies who may also have responsibility for aquatic invasive species. We embrace the opportunity to work with these other agencies to develop an effective and efficient screening process that is protective of both the human and natural environment.

#### *State ANS Plans*

The State ANS Management Plan provisions have been very successful and we are happy to see that the program is continued. The ANS Task Force developed guidelines to help States develop ANS plans, and made those guidelines available to the States in 2000. As outlined in the bill, the ANS Task Force will update and enhance those guidelines to address additional components related to early detection and rapid response, aquatic plant control and screening of planned importations. We look forward to continuing collaborative work with the States on their efforts to more effectively address invasive species issues. The ANS Task Force provides us with an excellent venue to pursue these collaborative partnerships. In fact, the ANS Task Force and its Regional Panels have encouraged the continued development of State and Interstate ANS Management Plans. There are currently 9 State and Interstate Plans approved by the ANS Task Force and a number of other States are in the process of developing plans. The Service provided cost-share grants to 11 States and tribes to implement those approved plans. Four additional States, Massachusetts, Maine, Montana and Alaska, submitted their plans to the ANS Task Force and the plans are expected to be approved at the meeting in Hawaii.

#### *Cooperative control/management plans*

The ANS Task Force also has a long history of developing and implementing cooperative control and management plans. For example, plans for brown tree snake and Eurasian ruffe were developed in the mid-1990s, and the ANS Task Force is currently developing management/control plans for the Chinese mitten crab and *Caulerpa taxifolia*, a marine algae. The objectives of these plans are to outline strategies and actions to control or manage aquatic invasive species. These plans are developed and implemented cooperatively by Federal, State and regional entities where appropriate. At the Task Force meeting in Hawaii, the ANS Task Force is taking action to approve, for public review, an Asian Swamp Eel Management Plan and a Green Crab Management Plan. The Department recognizes the importance of the Brown Tree Snake Control Program, but we believe that the Council—which is given responsibility for brown tree snake control under H.R. 5396—is better equipped to provide general policy guidance, not implementation of specific control plans.

#### *Early Detection and Monitoring*

We support the objectives addressed in Section 106. An early detection network based on the best available science is key to reducing the impacts of invasive aquatic species.

#### *Education and Outreach*

Education and outreach continue to be critical elements to the success of invasive species prevention and control. Within the Department, the Service has been actively working for many years on a 100th Meridian Initiative to stop the westward spread of zebra mussels and other aquatic invasive species. The bill proposes to enhance these efforts through increased and targeted outreach and education efforts. The ANS Task Force and the Service have established a new public awareness campaign known as Stop Aquatic Hitchhikers! that targets aquatic recreation users and promotes voluntary guidelines to ensure that aquatic invasive species are not spread through recreational activities. Stop Aquatic Hitchhikers! compliments the 100th Meridian Initiative and was designed to unify the conservation community to inform recreation users about the issue and encourage them to become part of the solution to prevent the spread of aquatic invasive species.

The National Park Service also provides information to millions of visitors every year regarding conservation of natural and cultural resources. The Act, as amended, recognizes the vital role that the National Park Service has in education and outreach on resource conservation and, more specifically, during the commemoration of

the Lewis and Clark Bicentennial Expedition. Invasive Species education and information, integrated within ongoing educational efforts, will provide critical context to increase understanding of the impacts of invasive species on natural resources.

Again, we applaud the legislation's multi-agency approach to education and outreach as there are already significant efforts to coordinate the dissemination of information. One example is the National Biological Information Infrastructure (NBII), an extensive information network already in wide public use, can be utilized as a means to facilitate public access to survey, monitoring, and risk assessment information.

H.R. 5395

*Research*

We are encouraged by the increased emphasis on research and monitoring efforts in the bill. In its strategic planning effort, the Task Force determined that additional actions were needed and restructured its committees to better address these problems. Key areas addressed in the legislation, including pathways, ballast water management, early detection and monitoring and control, can only be successful if they are based on sound research.

We recognize the need for methods for rapid assessment of newly detected aquatic species, and recommend that adequate resources for conducting such assessments be included as an integral component of coordinated planning for rapid responses. We recommend that particular attention be given to expanding and coordinating existing databases, such as the USGS's National Non-indigenous Aquatic Species Database, which provides basic scientific information for addressing invasive species threats. Finally, we recommend that the legislation ensure better coordination among the agencies and organizations that collect and store invasive aquatic species information, and we offer our assistance to the Subcommittee in this regard.

*Conclusion*

In closing, I want to thank you for providing the Department with an opportunity to comment on this legislation. As I stated earlier, we would be happy to work with you and your staff programmatic and other technical issues.

Mr. Chairman, this concludes my prepared remarks. I am happy to respond to any questions you or the other Committee members may have.

Mr. GILCREST. Mr. Keeney, Deputy Assistant Secretary for Oceans and Atmosphere of NOAA.

Welcome, Mr. Keeney.

**STATEMENT OF TIMOTHY R.E. KEENEY, DEPUTY ASSISTANT SECRETARY OF COMMERCE FOR OCEANS AND ATMOSPHERE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**

Mr. KEENEY. Good morning, Chairman Gilchrest, Chairman Ehlers, and members of the Subcommittees.

I am Timothy Keeney, Deputy Assistant Secretary of Commerce for Oceans and Atmosphere at the National Oceanic and Atmospheric Administration, and co-chair of the Task Force.

I appreciate the opportunity to present NOAA's views on H.R. 5395 and H.R. 5396.

Your bills, Chairman Gilchrest and Chairman Ehlers, address some gaps in the existing programs. There is a need to develop an early detection and rapid response mechanism in order to detect invasions while they are still localized and to control them before they spread. Even though members of the Task Force have taken preliminary steps toward invasive species control, there is a need to systematically assess eradication technologies to determine how best to control invasives as well as to prevent them from occurring.

Finally, the Task Force recognizes that education and research are important supporting elements for all invasive species activi-

ties. We appreciate that the importance of these activities is emphasized in the two bills.

NOAA would, however, like to suggest some technical modifications, and I am happy to have my staff work with the Committee staffs to address some of the technical issues that NOAA believes are necessary.

Some provisions of the two bills are duplicative and overlap each other. As examples, provisions on ballast water technology development and dispersal barriers are contained in both bills.

A point already raised by Director Williams of the Fish and Wildlife Service, NOAA is also concerned that there are 31 separate deadlines for specific actions that must be completed by members of the Task Force within 18 months of passage. When treated individually, these actions are not unreasonable, but it will be extremely difficult to simultaneously give each of them the level of attention they require in the time allowed. We would be happy to work with the Committees on this issue to develop an appropriate time line.

Further, the chronology of some of the activities in the legislation should be examined. In some instances, an action is required before the deadline for the guidelines and/or protocols necessary for that action are complete and available. An example is the provision for screening, where the screening process is to begin before the guidelines for the screening are in place.

The last reauthorization in 1986 anticipated that nationwide ballast water management would become mandatory. As the Coast Guard's report to the Congress in June pointed out, compliance with the voluntary guidelines has not been satisfactory. The Federal Government should issue uniform nationwide regulations to ensure that the shipping industry is not burdened with a variety of standards in different geographic locations. The Coast Guard has indicated that it will issue national regulations, and we support the Coast Guard's effort and appreciate the Committees' support of such efforts.

In addition, the legislation may contain unnecessary detail in several places that could impose an undue burden on the private sector and State governments. Two instances occur in the ballast water provisions. The bill requires that rapid response measures be included in a ship's invasive species management plan. As I indicated earlier, NOAA supports additional efforts on rapid response. We cannot envision, however, that all ships should be aware of each State's rapid response contingency plan.

NOAA is aware of the frustration in developing a standardized measure for new ballast water treatment technologies. We believe that ultimately, there needs to be a standard based on sound science that is biologically meaningful, such as discharge rate. The interim standard, however, should set a clear direction from which the final standard will evolve.

NOAA is concerned about a kill rate being used as an interim standard because it is a dynamic measure, and a standard percentage does not always ensure that invasive species levels are below appropriate levels of concern. A set kill rate as an interim standard is a step in the right direction, however.

Both bills recognize the fact that the science involved with all aquatic invasives is much less advanced than the science dealing with terrestrial invasives. The science of biological invasives in aquatic ecosystems is still in its nascent stages, and although considerable progress has been made in the last decade, there are still areas in which knowledge is deficient. NOAA is pleased that both bills give additional emphasis to research activities.

Finally, I would like to discuss two areas of current limitations. First, there is inadequate monitoring in aquatic systems. In many instances, we do not even have baseline species content information so that we know when a serious new invader has been introduced. Both NOAA and the Task Force recognize the need for baseline surveys and have taken initial steps to correct this deficiency. We are pleased that both bills highlight the need for a uniform protocol for such monitoring activities.

Second, our scientific knowledge of control methods in aquatic environments is still in its infancy, and such control presents unique problems. It is much more difficult to locate biocide applications in the aquatic environment, because water transports chemicals so readily. In addition, there are special concerns that available chemicals are not species-specific. In addition, there is no specific knowledge of control methods for certain taxonomic groups.

My written testimony, Mr. Chairman, contains comments on other provisions of the bill, and I am happy to discuss those with your staff.

Thank you for the opportunity to testify.

Mr. GILCREST. Thank you, Mr. Keeney.

[The prepared statement of Mr. Keeney follows:]

**Statement of Timothy R.E. Keeney, Deputy Assistant for Oceans and Atmosphere, U.S. Department of Commerce**

Good morning, Chairman Gilchrest, Chairman Ehlers, and members of the Subcommittees. I am Timothy Keeney, Deputy Assistant Secretary of Commerce for Oceans and Atmosphere and the National Oceanic and Atmospheric Administration (NOAA) co-chair of the Aquatic Nuisance Species Task Force. I appreciate the opportunity to present NOAA views on H.R. 5395 and H.R. 5396, which would reauthorize the Nonindigenous Aquatic Nuisance Prevention and Control Act as amended by the National Invasive Species Act of 1996.

I begin my testimony with some observations on the evolution of the Act which mirrors our current state of understanding of aquatic invasive species. The bulk of my testimony will focus on the ballast water and research provisions of the bills. Here we address the need to create national standards for ballast water based on sound science as well as technical changes to the bill. Before concluding, I will also mention concerns with non-ballast related provisions within the bills.

When the Act was first passed, the focus was on a single species-the zebra mussel, a single region-the Great Lakes, and a single pathway-ballast water. It subsequently became obvious that the problems caused by invasive species generally, and aquatic invasive species specifically, are broader than originally envisioned and this was reflected in the 1996 amendments. This recognition is further reflected in the two pieces of legislation that have been introduced constitute a major rewrite of the existing law.

Earlier this year, the Aquatic Nuisance Species Task Force adopted a five-year strategic plan in which we assessed current activities and looked at areas requiring additional attention. In several areas, the Task Force's conclusions are similar to issues addressed in this legislation. Your bills, Chairman Gilchrest and Chairman Ehlers, address some gaps in our existing programs. There is a need to develop an early detection and rapid response mechanism in order to detect invasions while they are still localized and to control them before they spread. Recognizing this, the Task Force already has asked its Regional Panels to prepare rapid response contingency plans. The first of these plans, prepared by the Western Regional Panel, was

submitted for approval by the Task Force this week. Even though members of the Task Force have taken preliminary steps, there is a need to systematically assess pathways to determine how best to interdict them as well as prevent invasions from occurring. Finally, the Task Force recognized that education and research are important supporting elements for all invasive species activities. The importance of these activities is emphasized in the two bills.

We would like to express our appreciation to the sponsors of the legislation for taking a comprehensive view of the problems posed by aquatic invasive species. NOAA would, however, like to suggest some technical modifications. I am happy to have my staff work with committee staffs to address some of these technical issues.

During the last re-authorization in 1996, the need to develop a more effective ballast water management was recognized. As the Coast Guard's report to the Congress in June pointed out, compliance with the voluntary guidelines, even to the extent of reporting, has not been satisfactory. Since 1996, we have continued to see the introduction of non-native species into coastal areas, and the situation has been serious enough that west coast states have acted independently to require ballast water management measures. The Federal government should develop a coordinated nationwide response to ensure that the shipping industry is not burdened by a variety of standards in different geographic locations. Such action is possible under existing law, and the Coast Guard, in its report to Congress on compliance with voluntary guidelines, has indicated that it would take steps to issue national standards. We support the Coast Guard's efforts to establish mandatory guidelines and appreciate the Committees' support of such efforts.

In several places, the legislation may contain unnecessary detail that could impose an undue burden on the private sector and State governments. Two instances occur in the ballast water provisions. The bill requires that rapid response measures be included in a ship's invasive species management plan. As I indicated earlier, NOAA supports additional efforts on rapid response. We cannot envision, however, that all ships would be aware of each State's rapid response contingency plan. Since such plans are likely to vary among the States, preparation for compliance with such provisions by the shipping companies may be unnecessarily problematic. The primary purpose behind a ballast water management plan should be to reduce the risk that a ship will be the source of new inoculations. The major responsibility for a ship during a rapid response is likely to be either not entering an area where a rapid response action is occurring, not loading ballast water which could contribute to the spread of an invasive species, or not discharging water known to have originated from a rapid response area. Rather than require a rapid response plan for unknown organisms in a multiplicity of areas, the better approach would be to require that a ship cooperate with State governments during a rapid response effort. We would be happy to provide the Committees with technical drafting assistance to clarify this provision.

NOAA is aware of the frustration in developing a standard for new ballast water treatment technologies. We believe that ultimately there needs to be a discharge standard based on sound science and one that is biologically meaningful. NOAA is concerned about a "kill rate" being used as an interim standard. Although a 95 percent kill rate may reduce the risk of new invasions, there may be difficulties posed with verification and enforcement. In addition to verification and enforcement difficulties, there is no scientific evidence that a 95 percent "kill rate" reduces the risk of new invasions. Verification of kill rates may also be impractical because in order to prove such a kill rate both the departure point and the discharge point must be sampled. There also could be a significant gap in coverage by this standard. What is killed can be as important, if not more so, than what percentage is killed (*i.e.*, the phytoplankton that cause harmful algal blooms). Some algal blooms worldwide have been attributed to ballast water introductions. Concentrations of up to 10 million cells per liter have been documented during some blooms. For such species, the normal maximum for human safety is 5,000 cells per liter. A technology could successfully kill 95 percent of the organisms and still be at an order of magnitude above what is safe for human health. The Coast Guard, in cooperation with other Federal Agencies, is currently assessing various options for the standards, including standards based on allowable concentrations of organisms. This process should be allowed to continue in order to ensure that the standards are biologically meaningful and technologically feasible.

Another modification that we recommend to the Committees relates to the 31 separate deadlines for specific actions that must be completed by members of the Aquatic Nuisance Species Task Force within 18 months of passage. It will be difficult to simultaneously give all of these actions the level of attention they deserve in the time allowed. We recommend that the Committees assess the priority level

of each of these actions and allow for additional time for lower level priority activities. We would be happy to work with the Committees on such an assessment.

Further, the chronology of some of the activities in the legislation should be examined. In some instances, an activity is required before the deadline for the guidelines and/or protocols necessary for the activity are available. An example are the provisions for screening where the screening process is to begin before the guidelines for screening are in place.

In H.R. 5396, appropriations are authorized for NOAA and the U.S. Fish and Wildlife Service (FWS) to carry out the revised section 1101. With a couple of minor exceptions, NOAA and FWS only have consultive responsibilities under section 1101. If the intent was to authorize appropriations for the ballast water demonstration program, the referenced section should be section 1104. It should be noted that H.R. 5395 does contain an authorization for section 1104.

Section 1202(f) authorizes a competitive research program under the National Sea Grant College Program but there is no authorization of appropriations for activities under this section. The bulk of current knowledge and most of the current research being conducted on all aspects of aquatic invasive species have been funded by Sea Grant under this provision. An authorization for research on aquatic invasives is contained in proposed legislation considered by both of these Committees that would re-authorize the Sea Grant program. We recommend that H.R. 5396 include an authorization of appropriations for Sea Grant invasive species activities that parallels H.R. 3389.

Both bills recognize the fact that the science involved with aquatic invasives is much less advanced than the science dealing with terrestrial invasives particularly as they relate to livestock and crops. While some of our colleagues in the Department of Agriculture have been dealing with weed and insect problems for most of the last century, the science of biological invasions in aquatic ecosystems is still very young. The Aquatic Nuisance Species Task Force has recognized that virtually every activity from prevention to control to restoration needs to have a scientific underpinning. Although considerable progress has been made in the last decade, there are still areas in which our knowledge is seriously deficient. NOAA is pleased that both bills give additional emphasis to research activities.

I would like to discuss two areas as an illustration of our current limitations. First, there is inadequate monitoring in aquatic systems. In many instances, we do not even have baseline information so that we know when a serious new invader has been introduced. This also hampers efforts to characterize invasion rates, and without monitoring activities, early detection and rapid response occur only by chance. It should be noted that there are exceptions, but they are limited to specific geographic areas. As an example, the Aquatic Nuisance Species Task Force-sponsored study of San Francisco Bay by scientists Dr. Andrew Cohen and Dr. James Carlton is outstanding in documenting nonindigenous species occurrence in that ecosystem and is often cited even in terrestrial studies. A similar study of the Chesapeake Bay sponsored by FWS and performed by Dr. Greg Ruiz at the Smithsonian Environmental Research Center provides a very good baseline for Chesapeake Bay. Both the Aquatic Nuisance Species Task Force and NOAA recognize the need for baseline surveys and have taken first steps to correct this deficiency. The U.S. Fish and Wildlife Service sponsored a workshop on developing protocols and requirements for an effective monitoring program in aquatic ecosystems, and earlier this year, NOAA's National Ocean Service conducted a similar workshop for monitoring within the National Estuarine Research Reserve System. We are pleased that both bills highlight the need for a uniform protocol for such monitoring activities.

Our scientific knowledge of control methods in aquatic environments is still in its infancy, and control in aquatic ecosystems present unique problems. Because water is a medium which will move chemicals from one place to another, it is much more difficult to localize biocide applications. In addition, there is special concern that available chemicals are not species specific. Last summer when the State of Maryland used rotenone to eradicate the northern snakehead from a pond near Washington, DC, it should be noted that the application was in a small, isolated body of water and that all other fish species were also killed. Obviously, there are only limited circumstances when such a method can be used. There are even taxonomic groups for which there is no scientific knowledge of control methods. NOAA confronted this issue two summers ago when there was a bloom of spotted jellyfish in the Gulf of Mexico. We recognized that the species was having a major impact in localized areas and was affecting commercial fisheries, but we were in a situation where nobody had ever tried to control jellyfish in the past.

With the exception of aquatic weeds, where the Army Corps of Engineers has had some notable successes, we also have just begun to look at biocontrol agents. We do have some promising results, though, with a pathogen that could be used for

zebra mussel control. In a project funded by NOAA Sea Grant and FWS, a researcher has found that the *Pseudomonas fluorescens* bacterium causes extremely high mortality in zebra mussels and preliminary results indicate that it may be specific to zebra mussels. To show the difficulty in finding an acceptable biocontrol agent, it should be noted that the researcher looked at over 600 different pathogens. In addition, once such a pathogen is found, it is necessary to make sure that the biocontrol agent will not affect native species. This is particularly important in this case because many of our native freshwater bivalves are already listed as threatened and endangered.

Some provisions in the two bills are duplicative or overlap each other. As examples, provisions on ballast water technology development, monitoring for both baselines and new introductions, and dispersal barriers are contained in both bills.

Although the invitation asked that I specifically address the ballast water and research provisions, I would like to address a couple of other items contained in the legislation. First, NOAA is pleased that increasing emphasis is given to the role played by State governments. If we are to be successful in combating invasive species, partnerships with other levels of government are absolutely essential. H.R. 5396 recognizes this by placing a greater emphasis on State management plans, contingency plans, and rapid response. As I indicated earlier in my testimony, however, there are places where the proposed legislation may be a little too detailed and could ultimately become burdensome on State governments. As an example, there is a provision requiring education to be part of a rapid response plan. While NOAA and the Task Force believe that education is extremely important and have encouraged inclusion of education provisions in State Management Plans, we do not believe that it is an essential element of a contingency plan for rapid response. In fact, Sea Grant Colleges already conduct education and outreach programs associated with research including invasive species. We also have concerns about the requirement for an early detection program before rapid response funding could be approved. The situation may arise where a program is needed before a State has resources available to establish a program. The absence of such a program should not preclude a rapid response effort if a serious invasive species is discovered.

H.R. 5396 also would give statutory recognition to the Invasive Species Council. Such statutory recognition will assist in providing policy guidance and coordination of the Federal government's invasive species program. In at least one instance, however, NOAA believes that the proposed legislation assigns a task which is inappropriate for the Council. The legislation would give the Council responsibility for control of brown tree snakes. NOAA, which co-chairs the Aquatic Nuisance Species Task Force and is Commerce's designee as the co-chair of the Council, does not believe that the Council should be responsible for implementation of specific control plans. The Council's primary focus is to provide policy guidance and we do not recommend changing that focus. The Council does not have the same expertise or infrastructure as the ANS Task Force has to implement control plans. Specific control plans should be implemented by the ANS Task Force in coordination with State and Local governments.

Screening provisions in the bill may need to be revised. In addition to chronology problems, the limitations imposed by the screening process could be viewed as too restrictive. In addition to the research exception, there may be other instances where importation of invasive species may be appropriate. To illustrate this point, the risk of a saltwater fish species imported for display by the Shedd Aquarium in Chicago becoming a problem is minimal. Not only is the Aquarium a very reputable organization, but even if the species were to escape, it would not be likely to become established in the freshwater environment of Illinois.

NOAA is also concerned about the provision that grants the Department of Agriculture the sole authority to screen species proposed for aquaculture use. NOAA believes that the end use of an importation is irrelevant to whether or not a species is invasive. We are concerned because, in the case of aquaculture, what is most often cultured are wild species normally under the jurisdiction of either NOAA or the U.S. Fish and Wildlife Service. In addition, aquaculture is not limited to closed systems. Often species such as oysters and clams are released into natural ecosystems. We would also point out that much of the scientific expertise for making determinations on aquatic imports is in the management agencies. In order to make such determinations, information on life history and impacts on natural ecosystems and native species is necessary. Finally, if end use helps to determine whether a species should be prohibited, we could end up with contradictory decisions. The recent case of the northern snakehead is illustrative. The fish released into the local pond were imported for human consumption and would presumably be under the authority of the U.S. Fish and Wildlife Service. The same species has been cultured

in Hawaii and a determination of invasiveness would presumably be made by the Department of Agriculture.

Chairman Gilchrest and Chairman Ehlers, and members of the subcommittees, the legislation before you builds on the previous Act and addresses some gaps that have already been identified by the Aquatic Nuisance Species Task Force. As with any complicated piece of legislation, there are some technical difficulties, and we would be happy to work with the subcommittee to address them. Among these issues, we note that new spending authorized by these bills is not currently included in the President's fiscal year 2003 Budget, and as such, must be considered within existing resources and priorities. As one of the trustees for marine and coastal resources, NOAA has been aware of the problems caused by aquatic invasive species and recognized that we have a responsibility to help prevent these invasions and reduce the impact if such invasions occur. NOAA also recognizes that we cannot be successful without partnerships with other Federal agencies, State and local governments, and the private sector. We are pleased that the proposed legislation places an increasing emphasis on such partnerships. Thank you for allowing me the opportunity to present the Department of Commerce's views on this topic. This concludes my testimony, and I would be happy to answer any questions you may have.

Mr. GILCHREST. Before we go to Captain Brown, there are five or six seats up here on the lower dias. If anybody in the back would like to come up and sit down, you are welcome to. We may not have time for each of you to ask questions, though.

Captain Brown?

**STATEMENT OF CAPTAIN MICHAEL W. BROWN, CHIEF, OFFICE OF OPERATING AND ENVIRONMENTAL STANDARDS, U.S. COAST GUARD**

Captain BROWN. Thank you, Mr. Chairman, and good morning. I am Captain Mike Brown, from the Coast Guard, Chief of the Operating and Environmental Standards Office.

I am pleased to be here today to provide the Coast Guard's views on the House of Representatives bills 5395 and 5396.

As a lead Federal agency with responsibility for protecting the marine environment, the Coast Guard is a leader in ensuring that our environment is protected, and we recognize the significant damage that ANS has caused. Clearly, it is a significant problem, and this is our highest marine environmental protection regulatory priority.

We feel that the two bills appropriately identify the significant issues in the effort to protect the environment, and we believe that the reauthorization and amendment of the existing legislation is necessary and desirable. Clearly, a lot of hard work and careful thought has gone into the preparation of the bills. However, we believe that implementing the bills in their current form is problematic and would impede in some respects the program advancements that we are trying to make.

Working under our current authorities, we are already addressing many of the ballast water issues that the bills raised. It was gratifying to hear in your earlier remarks, Mr. Chairman, some of the things that you were concerned about, because we are addressing those very issues.

For example, we are in the process right now of establishing a mandatory ballast water management regime. We are trying to set up a scientifically supportable set of standards for ballast water discharge. We are establishing a process to facilitate development of the testing and evaluation of experimental treatment programs.

And we are working internationally to have the international regime be consistent with our regulatory approach.

We believe that our current strategy is sound and aggressive given the state of ballast water treatment technologies today which, quite frankly, are still maturing.

We believe and are concerned that the detailed requirements and the new management arrangements will complicate and delay the implementation of an effective Federal regime. We would like to work with the Committee regarding the proposed interim standard. We are working with other agencies internationally, and are looking toward an allowable concentration of organisms approach with regard to a standard for ballast water treatment. We agree that there needs to be some expanded research effort.

With regard to the deadlines, I would echo my colleagues' comments that there are some concerns about those deadlines and being able to meet them. As you know, we have established some deadlines for ourselves, as we reported in the report to Congress, for the voluntary measures as a result of the National Invasive Species Act requirements, and we believe that the deadlines that we have established for ourselves are reasonable, are realistic, and while certainly time is of the essence, we believe that those deadlines are reasonable and meetable.

I want to thank you for the opportunity to comment. We in the Coast Guard are prepared to work with the Committee and with the staff to try to develop and improve upon the legislation so as to meet all of our goals, which is to prevent the further introduction of aquatic nuisance species.

Again, we do recognize the seriousness of the matter, and we are working as aggressively and as deliberately as we can. While it is important to get it done, it is also important to get it done right, and we want to be sure that whatever we do, we are doing the right thing and protecting the environment in the most reasonable manner possible.

Thank you.

Mr. GILCHREST. Thank you, Captain Brown.

[The prepared statement of Captain Brown follows:]

**Statement of Captain Michael W. Brown, United States Coast Guard, U.S.  
Department of Transportation**

Good morning, Mr. Chairman and distinguished members of the Subcommittee. It is a pleasure to appear before you today to provide our views on H.R. 5395 and H.R. 5396.

The Coast Guard is a leader in ensuring America's marine environment and precious natural resources are protected. As a lead federal agency for protecting the marine environment, we take great pride in providing valuable services to the American people to ensure our nation is cleaner, safer, more mobile, and more secure. Today, the spread of non-native aquatic species throughout our waterways as a result of vessel operations remains a serious and growing national problem. We know all too well that once introduced, many of these species are capable of disrupting native ecosystems, resulting in lost natural resources in mitigation costs.

In reauthorizing and amending existing federal aquatic nuisance species (ANS) legislation, the combination of H.R. 5395 and H.R. 5396 would provide detailed guidance and requirements for the conduct of a federal ballast water management program and establish a research program to support the battle against all ANS. While we fully agree that these bills appropriately identify significant issues related to improving the nation's defense against the introduction of ANS, and that reauthorization and amendment of the legislation is necessary to effectively address this

growing environmental problem, we believe that implementing these bills in their current form.

Working under the broad ballast water management authorities granted by current legislation, our ongoing regulatory efforts are addressing many of the ballast water management provisions contained in H.R. 5396. As detailed in the transmittal letter accompanying the Secretary of Transportation's June 2002 voluntary ballast water management assessment report to Congress, mandated by the 1996 reauthorization process, the Coast Guard is in the midst of establishing a mandatory national ballast water management program. These efforts include: (1) the setting of an enforceable and scientifically supportable ballast water treatment standard, and (2) establishing a process that will facilitate the development, testing and evaluation of promising experimental treatment systems. We believe that our current regulatory strategy is both sound and aggressive, especially when viewed in the light of the current state of ballast water management technology, which is best described as being in its infancy. We further believe that the detailed requirements and new management arrangements contained in H.R. 5396 would unnecessarily complicate our work and inevitably delay the implementation of an effective mandatory federal regime.

We would like to work with the Committee regarding the bill's proposed interim ballast water treatment standard. In consultation with other federal agencies, the Coast Guard is currently looking toward standards that would be expressed as allowable concentrations of organisms in discharged ballast water. Working under a cooperative arrangement between the Coast Guard and the Environmental Protection Agency to develop verification protocols for ballast water treatment technologies, technical experts from a wide range of U.S. federal agencies and research institutions are considering the appropriate organism concentrations and the methods for their detection and enumeration. We are also tracking several complementary international efforts to develop effective management technologies and will use their findings as appropriate in developing our domestic program.

We agree that there is a need for research efforts. The technical challenges to preventing, evaluating the effects of, and responding to aquatic invasions are extensive and costly.

While the Coast Guard is not assigned responsibilities for conducting the ecological surveys described in H.R. 5395, the results of these surveys will likely be used to evaluate the efficacy of our and other federal agency efforts in reducing the rate of invasions by aquatic nuisance species.

Thank you for the opportunity to present some of our views on these bills today. The Coast Guard looks forward to working with Congress on the reauthorization of ANS legislation while we continue our ongoing efforts to implement an effective ballast water management regime. I will be happy to answer any questions you may have.

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Mr. GILCHREST. Next is Dr. Gregory Ruiz, Senior Scientist with the Smithsonian Environmental Research Center.

Welcome, Dr. Ruiz.

**STATEMENT OF GREGORY M. RUIZ, SENIOR SCIENTIST,  
SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER**

Dr. RUIZ. Thank you. Good morning, and thank you for the opportunity to be here today.

I am Greg Ruiz, a research scientist from the Smithsonian Environmental Research Center on the shore of the Chesapeake Bay.

Each year, thousands to tens of thousands of non-native species are transferred to U.S. waters by human activities. The rate of newly detected invasions has increased exponentially for many parts of the U.S. Left unchecked, the rate of species transfer and invasion is expected to increase even further.

There remain some fundamental gaps in knowledge, and especially predictive ability, for invasion ecology that have significant implications for developing management strategies to reduce transfers and invasions.

First, the quantitative dose-response relationship between the number of organisms released and the number of new invasions is poorly resolved.

Second, our predictive capability for both unintentional and intentional introductions is very limited at the present time.

Management of the shipping vector is the most appropriate strategy as a first step to reduce aquatic invasions and their impact. The U.S. Coast Guard is in the best position to implement and oversee management of the shipping vector. It should be given lead responsibility and adequate resources to carry out this mission and already has many elements in place.

The EPA and the Aquatic Nuisance Species Task Force have important roles to play as well in determination of environmental soundness and information dissemination, respectively. However, I believe it is most efficient and desirable that one lead agency, the Coast Guard, should have clear authority to develop and implement this program, with others providing secondary support where they have expertise.

Ballast water management should reduce the rate of invasions, but there are limitations and unknowns in this area. Among these, the reduction in invasions expected for various management actions is unknown, resulting from uncertainty about the dose-response relationship. We simply don't know how low to go in reducing species transfer which complicates identification of the goal or standards for treatment. We need research to measure changes in species transfer and invasion patterns in response to management actions and to provide the scientific understanding of dose-response relationships and invasibility to guide management.

Tracking of shipping and ballast discharge patterns, combined with measurement of effects for particular treatments, should be used to assess the effects of management on ship-mediated transfer. All vessels should report at each port to provide an important short-term proxy of treatment efficacy to reduce overall transfer.

Ecological surveys using standardized measures should be used as a key feedback system to assess the long-term changes in actual invasions associated with various management schemes. This is the indicator, analogous to measuring air or water quality, for whether management is working and whether further steps are required.

In my view, field surveys and experiments should operate together in a well-coordinated fashion under one program rather than separate programs to strengthen understanding about dose-response relationships and factors that contribute to invasion susceptibility.

One lead research group should be charged with oversight and coordination of the surveys and experimental measures. This lead group should be composed of separate designated lead agencies for each freshwater and marine ecosystem. Each ecosystem is complex, involves somewhat different approaches and expertise, and requires significant effort and oversight. The lead group should establish protocols, provide data management, develop demonstration sites, and serve to coordinate surveys among a distributed network of collaborating researchers working at sites throughout the country.

In contrast with ecological surveys, an early detection system would detect only a limited number of invasions by known “target” species. This target list approach will necessarily include a small subset of future high-impact organisms.

For this reason, I place a much higher premium on prevention measures. It is highly desirable to have an established framework for evaluation and approval of intentional introductions that is consistent among geographic regions. Ideally, such a framework would involve Federal oversight, a precautionary approach, and include better tracking of imports by Customs, and reporting to international bodies such as ICES.

In my opinion, the national strategy for aquatic invasion should focus predominantly on prevention. A strong program should exist to reduce unintentional transfers, including tracking systems for vectors and invasions. A parallel program should rigorously screen planned introductions. Although control measures for established invasions, including rapid response, can have merit, I believe prevention measures provide a more comprehensive, cost-effective, and reliable approach.

Thank you.

[The prepared statement of Dr. Ruiz follows:]

**Statement of Dr. Gregory M. Ruiz, Senior Scientist, Smithsonian Environmental Research Center, Edgewater, Maryland**

I am a Senior Scientist at the Smithsonian Environmental Research Center (SERC), where I head the Marine Invasion Research Laboratory—the largest research program in the U.S. to focus on the invasion of coastal ecosystems by non-native species. This research group provides synthesis, analysis, and interpretation of invasion-related patterns on a national scale (see Appendix 1 for further details).

Today, I wish to highlight the current state of knowledge and predictive ability for invasions of marine and freshwater ecosystems. Against this backdrop, I will review key elements and approaches necessary to reduce the risk of new invasions and their unwanted impacts.

*Current Knowledge & Predictive Ability*

Thousands to tens of thousands of non-native species arrive to U.S. waters each year by myriad human activities, which breach existing geographic barriers to dispersal—such as ocean basins and continents. Upon delivery and release, a subset of organisms survive local conditions in the recipient environment, a smaller subset become successfully established, and a still smaller subset is known to have significant impacts on economies, ecological functions, fishery resources, and human health.

The rate of newly detected aquatic invasions has increased exponentially in many locations, both within the U.S. and overseas. Many different transfer mechanisms, or vectors, have caused invasions. The relative importance of individual vectors has varied geographically and temporally, reflecting differences in vector operation and probable differences in susceptibility of ecosystems to invasion.

If current practices continue, the rate of species transfer is expected to increase even further, as existing trade activities expand and new trade activities develop. Invasion rates should increase with increasing rates of transfer.

For example, the scale of commercial shipping—a major transfer mechanism, by itself responsible for most known marine invasions—is projected to increase many fold over the next 20 years, resulting in more ships, larger ships, faster ships, and more trading partners (sources of invaders). Each of these attributes will likely operate to increase the number of species delivered, and concentrations of organisms (within and across species) associated with shipping. In the absence of management actions, intended to reduce organism transfer, we should expect an increase in invasions to result.

The extent and impact of aquatic invasions have become increasingly clear in the past few decades, warranting the great public concern that has resulted. However, there remain some fundamental gaps in knowledge, and especially predictive ability, for invasion ecology that have significant implications for management.

First, although invasion rates should increase with organism transfer, the quantitative “dose-response” relationship—between the number of propagules (organisms) released and invasion success (establishment)—is poorly resolved and may vary geographically.

Second, our predictive capability for both unintentional and intentional introductions is very limited at the present time.

For unintentional introductions, like ship-mediated transfer, it remains extremely difficult to predict which species will invade, when they will invade, where they will invade, and what they will do. The identity of many transferred organisms is still not resolved. For example, U.S. ports receive approximately 50,000 commercial vessel arrivals per year that originate overseas, a minimum of tens-to-hundreds of species are associated with each ship (in ballast tanks and on hulls), and the species composition is simply not known in advance for any one arrival. Even when identified, key aspects of biology and ecology for many (if not most) species are unknown. Thus, it is often not possible to predict when a species can survive in the recipient environment (*i.e.*, the various aquatic habitats of the U.S.) or how it will perform—in terms of abundance, spread, and impact. Our predictive capability surrounding unintentional transfers is very limited at the present time.

Even for intentional introductions, a high level of uncertainty can exist about the outcome of introduction. This results from limited information about biology and ecology, but also a fundamental uncertainty about whether behavior (*i.e.*, population dynamics and ecology) in the native range can predict behavior in a novel environmental and biological setting. The current controversy surrounding the Asian oyster *Crassostrea ariakensis* provides an illustrative example. Although under consideration for introduction in Chesapeake Bay, very little information is available on the species, limiting predictions about the possible performance and effects within Chesapeake Bay and the Atlantic coast of North America.

#### *Management of the Shipping Vector*

Management of the shipping vector is the most appropriate strategy, as a first step, to reduce aquatic invasions and their impacts for multiple reasons. First, on a national scale, shipping is the largest single source of known invasions, currently and cumulatively, to coastal marine ecosystems and the Great Lakes. Second, in my opinion, ship-mediated introductions—composed mainly of organisms transferred in ballasted materials and on hulls—cannot be effectively managed on a species-by-species basis (as outlined above).

Implementation of ballast water management, including ballast water exchange and alternative technologies, should reduce the rate of invasions.

It is however important to recognize some of the possible limitations (or unknown aspects) of ballast management.

- Ballast management only addresses a portion of the problem. For ship-mediated transfer, the relative importance of ships’ hulls versus ballast tanks is often not clear—since some organisms can be transferred by either mode. Although shipping is a dominant vector, other non-shipping vectors are also contributing to invasions.
- The level of reduced invasions expected for various management actions is unknown, resulting from uncertainty about the dose-response relationship for invasions. Although a reduction in invasions should result from ballast water management, we simply don’t know “how low to go” in reducing species transfer—which is a source of uncertainty about the appropriate goal or “standards” for treatments.

These gaps in knowledge underscore the need for research and analyses, which measure (a) changes in species transfer and invasion patterns in response to management actions and (b) provide the scientific understanding of dose-response relationships and invasibility needed to guide management.

#### *The Role of Tracking Ballast Management & Delivery*

Measuring changes in the ballast water delivery and management provides one measure of management effect. Tracking shipping and ballast discharge patterns for all vessel arrivals—both those from foreign ports and domestic ports—should be fully implemented to assess the effect of management on ship-mediated transfer. First, reporting by vessels informs us of how ballast water delivery, and arrival of hull surface (as a possible source of organisms), varies among ports and changes over time. Second, measurements of the effect of particular treatments (*e.g.*, ballast water exchange or alternative treatment) on organism transfer, when combined with vessel reporting, provide an important short-term proxy of treatment efficacy—estimating how overall management practices influence delivery of organisms by shipping.

### *The Role of Ecological Surveys*

By comparison, ecological surveys measure the long-term changes in actual invasions associated with various management schemes.

Ecological surveys (hereafter surveys), using standardized and repeated field measures, are a fundamental building block for invasion science and invasion management—providing critical information for prevention and control. Surveys are used to assess the following key attributes of invasions in our waters:

- The source(s) of invasions, in terms of geographic origin and mechanism of introduction (or vector);
- How invasion patterns vary in space and time; and
- How effective management actions, including ballast water management, are in reducing the rate of new invasions.

Surveys provide a tracking system to determine which species have colonized, or are in the process of colonizing, our aquatic habitats. With knowledge about the taxonomic identity and biology of these organisms, it is often possible to identify the mechanism or vector of introduction. This tells us which vectors and geographic source regions have resulted in successful invasions, historically and presently.

Analysis of survey data—the cumulative picture across all non-native species identified—can be used to estimate the relative importance of vectors or geographic source regions in space or time. Such an assessment of vector importance (possibly by source region) can be used to prioritize where prevention efforts are best directed, to reduce the largest number of future invasions.

Beyond informing and directing initial management actions, surveys provide an essential feedback system to assess how well prevention measures work in reducing new invasions. Although we can assess the change in delivery of organisms by a particular vector, and how this is affected by management actions (as above), this does not tell us the effect of management action(s) on the actual number of invasions. Since we don't know enough about the quantitative “dose-response” relationship between number of organisms delivered and invasion success, it is critical to actually measure the efficacy of management action by invasion rate. Thus, should invasions continue to occur at an unacceptable rate (despite management actions), this indicates that further steps are required.

### *Susceptibility to Invasion*

Surveys also inform our understanding of which ecosystems are most susceptible to invasions, providing key information about dose-response relationships and factors that contribute to invasion resistance. Although invasions can occur in all ecosystems, there is clearly a great deal of variation in the number of established invasions among systems. Analysis of this pattern, using standardized surveys and shipping data (outlined above) across many bays and habitats, can be used to test for correlation with specific biological or environmental characteristics—elucidating which factors explain most of this variation. This approach can identify a suite of factors that may affect the success or failure of non-native species to establish—such as salinity regime, habitat disturbance, flow regime, or biological diversity—and help focus management actions to particular regions or habitats that are most vulnerable.

I recommend this approach (using surveys) to test statistically for factors that influence susceptibility to invasion, combined with an experimental approach. This additional, experimental step is used to test whether there is a cause-effect relationship, or simply an association, between invasion outcome and particular factors. Thus, analyses of actual invasion patterns by surveys are necessary but not sufficient, by themselves, to guide management decisions about susceptibility or resistance to invasions.

In my view, experimental measures and field surveys should operate together—in a well-coordinated fashion under one program, rather than separate programs—to strengthen the inferences drawn about invasion susceptibility. This is further enhanced by detailed vector information for the same localities. In the case of the shipping vector, this would include not only ballast discharge and management data (as above) but also some tracking of organism supply characteristics (pathway surveys) for ballast water and hull fouling.

### *Early Detection—Rapid Response*

I would like to draw a distinction between the “ecological surveys” and efforts associated with an “early detection—rapid response system”. The former are designed to provide key information about sources and rates of invasion—across different sites, habitats, and environmental conditions—and essentially track how sources and rates are changing over time. This information is used to direct and evaluate

management actions, focused largely on vectors and pathways of invasion. Although surveys may provide some “early detection capability” this is not the primary goal.

In contrast, an “early detection—rapid response system” would require a more focused effort to detect a limited number of known “target” species of concern. To have an early warning system would require frequent monitoring of specific habitats for a finite suite of organisms. In my opinion, it is not feasible to monitor for all organisms on a frequent basis—and allow for rapid response—due to obvious logistical and cost constraints. The goal of “early detection” is to trigger particular management actions (*e.g.*, eradication, containment, etc.) for the target species. Using a focused list of species for such early warning detection, it is possible presently to locate “sentinel sites” for detection at locations with specific habitat and environmental conditions appropriate for the target species.

Development of some rapid-response capability has merit, but I place a much higher premium on prevention efforts—including management actions, vector tracking, and ecological surveys (to estimate changes in invasions and efficacy of management actions). This stems from the fact that:

- Early detection will locate only a subset of the target “high-impact” species that colonize;
- The effects of most invasions cannot be adequately predicted at the present time;
- Successful control and eradication will likely be limited to a fraction of those organisms detected.

A list of target “high-impact” organisms can be compiled, based upon experience elsewhere in the world, providing the basis for an early detection system. However, a “target list approach” will necessarily include a small subset of future “high-impact” organisms, as many additional species that are ecologically potent (*i.e.*, will have significant impacts) will not appear on any such list—simply because they do not have a previous record of high-impact invasions. Thus, when a new incursion occurs, both for organisms on and off the target list, it will often be difficult to assess the likely impact and to decide on an appropriate trigger for rapid response.

#### *Planned Introductions*

There are many species for which planned imports and introductions have received little scrutiny from an invasion perspective. Examples include organisms used for bait or food—such as the Vietnamese Nereid worm and the Chinese snakehead fish (although importation of the latter has recently been banned, following an invasion in Maryland). In addition, the recent discussion surrounding a possible introduction of the Asian oyster *C. ariakensis* to Chesapeake Bay underscores the lack of a coherent framework or policy surrounding intentional marine introductions.

It is highly desirable to have an established framework for evaluation and approval of intentional introductions that is consistent among geographic regions. This approach recognizes that organisms can spread beyond political boundaries. Ideally, such a framework would include better tracking of imports, which are poorly characterized in terms of quantity, source, and species identity—making evaluation of invasion risks problematic. In addition, improved information exchange on intentional introductions, especially with the International Council for the Exploration of the Sea (ICES), would be an important improvement.

#### *Conclusion*

In my opinion, the national strategy for aquatic invasions should focus predominantly on prevention. A strong program to reduce future invasions of unwanted species requires: (a) management actions to restrict or interrupt the scale of unintentional transfers, (b) tracking systems to measure the short-term response of management action on transfer, and (c) ecological surveys to assess the efficacy of management actions on invasion patterns and rates, and to identify new vectors as they emerge. A parallel program should exist to rigorously screen intentional (planned) introductions, providing a formal cost-benefit analysis aimed at reducing the likelihood of introduction for “high impact” species and those species for which considerable uncertainty exists about impacts.

Control measures such as mitigation and eradication efforts, including rapid-response, can have merit. However, such measures are idiosyncratic to the target species, the results are somewhat uncertain, and this approach can only hope to address a small subset of problems associated with invasions following establishment. As a result, I believe prevention is a more efficient, reliable, and cost-effective strategy to limit invasions and invasion impacts, when compared to control measures, and should be the primary focus for available resources.

[Attachments to Dr. Ruiz's statement follow:]

#### APPENDIX 1

##### ROLE OF THE SMITHSONIAN INSTITUTION IN COASTAL INVASION RESEARCH:

##### MARINE INVASION RESEARCH LABORATORY, SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER (MAY 2002)

###### *Overview*

The Smithsonian Environmental Research Center (SERC), located on the shore of Chesapeake Bay, is a leading national and international center for research in the area of non-native species invasions in coastal ecosystems.

SERC has developed the largest research program in the U.S. to focus on coastal invasions.

A primary goal of SERC's Marine Invasion Research Laboratory is to provide the fundamental science that is critical to develop effective management and policy in this topic area. In short, SERC's invasion research bridges the gap between science and policy, to develop a scientific understanding that is key to guide and evaluate management strategies for invasive species.

The Marine Invasion Research Laboratory has a staff of approximately 20 biologists, who conduct research throughout the country and overseas. Since its inception 10 years ago, the laboratory has been a nationwide training center in invasion ecology for roughly 35 technicians, 4 graduate students, 5 postdoctoral researchers, and 40 undergraduate summer interns. The students and technicians arrive from all over the country, staying for 3 months to many years. Many participants in this program have gone on to graduate training and academic or government positions in Alabama, California, Connecticut, Hawaii, Massachusetts, Tennessee, Washington, Washington D.C.

###### *Research Program*

As a national center, SERC's Marine Invasion Research Laboratory provides synthesis, analysis, and interpretation of invasion-related patterns for the country. Under the National Invasive Species Act of 1996, the U.S. Coast Guard and SERC created the National Ballast Water Information Clearinghouse, hereafter Clearinghouse, to collect and analyze national data relevant to coastal marine invasions (see Box 1). Established at SERC in 1997, the Clearinghouse measures:

- Nationwide Patterns of Ballast Water Delivery and Management. All commercial ships arriving to all U.S. ports from overseas report information about the quantity, origin, possible control measures for their ballast water - a primary mechanism for transfer of non-native marine species throughout the world. At present, SERC receives roughly 20,000 such reports per year. Every two years, SERC provides a detailed analysis and report to U.S. Coast Guard and Congress on the patterns of ballast water delivery by coastal state, vessel type, port of origin, and season. A key issue is the extent to which ships undertake ballast water exchange, a management technique to flush potential invaders out of the tanks prior to arrival in U.S. waters. SERC's analyses are used by U.S. Coast Guard and Congress to assess national needs with respect to ballast water management and to track program performance.
- Rates and Patterns of U.S. Coastal Invasions. SERC has developed and maintains a national database of marine and estuarine invasions to assess patterns of invasion in space and time. This database compiles a detailed invasion history of approximately 500 different species of plants, fish, invertebrates, and algae that have invaded coastal states of the North America. Among multiple uses, the database identifies which species are invading, as well as when, where, and how they invaded; it also summarizes any existing information on the ecological and economic impacts of each invader. Over the long-term, this database will help assess the effectiveness of various management strategies (such as ballast water management, above) in reducing the rate of invasions. More broadly, this information is a valuable resource for many user groups—from resource managers and scientists to policy-makers and industry groups.

**Box 1****Except from the National Invasive Species Act of 1996****NATIONAL BALLAST INFORMATION CLEARINGHOUSE-**

(1) IN GENERAL- The Secretary shall develop and maintain, in consultation and cooperation with the Task Force and the Smithsonian Institution (acting through the Smithsonian Environmental Research Center), a clearinghouse of national data concerning--

- (A) ballasting practices;
- (B) compliance with the guidelines issued pursuant to section 1101(c); and
- (C) any other information obtained by the Task Force under subsection (b).

(2) REPORT- In consultation and cooperation with the Task Force and the Smithsonian Institution (acting through the Smithsonian Environmental Research Center), the Secretary shall prepare and submit to the Task Force and the Congress, on a biannual basis, a report that synthesizes and analyzes the data referred to in paragraph (1) relating to--

- (A) ballast water delivery and management; and
- (B) invasions of aquatic nuisance species resulting from ballast water.

SERC has further expanded the scope of Clearinghouse activities to improve the quantity and quality of data on coastal marine invasions that are used to (a) assess the rates and patterns of invasion and (b) inform key management decisions at national, regional, and local levels. Through competitive grants, we have initiated two components in this area, including:

- **Nationwide Field Surveys.** SERC has implemented an ambitious program of field surveys to detect new invasions, as well as measure contemporary patterns and effects of invasions, for 15–20 different bays throughout the country (see Figure 1). Our intent is to expand this program to include additional regions, providing a national baseline of information with which to evaluate invasion rates. The resulting information will contribute to the national database (above) and will be used both to document patterns of invasion and to assess the effects of management on invasion rates (as discussed above).
- **Comprehensive National Database.** SERC has established a formal agreement (Memorandum of Understanding) with the U.S. Geological Survey's Caribbean Research Center to develop a comprehensive database of all freshwater and marine invasions in the United States. SERC maintains a database of exotic marine species (above), and the U.S.G.S. maintains a complementary database for exotic freshwater species. Our goal is to functionally link these databases, creating web-based access to key information about each species for managers, researchers, policy-makers and the public.

In addition to the Clearinghouse role of analysis and interpretation of national data, SERC also conducts research to understand underlying mechanisms of species transfer, invasion, and ecological effects of invasions. This research serves a dual purpose of advancing our fundamental knowledge of invasion processes and using this knowledge to improve prediction and management strategies for invasions. Some selected examples of our research in these areas, funded by external grants and contracts, include:

- **Measuring the Patterns and Processes of Species Transfer Associated with Shipping.** The Marine Invasion Research Laboratory has measured the density and diversity of organisms in the ballast water of approximately 450 different commercial vessels, primarily oil tankers and bulk cargo carriers that arrived to Chesapeake Bay and Port Valdez, Alaska. This has been a collaborative and cooperative research program with the shipping industry, over the past 8 years, to better assess the risks of invasion and effectiveness of various management techniques to reduce that risk. We are now expanding this research to include container ships arriving to San Francisco Bay, expanding existing measures to include a different vessel type and geographic region than the previous studies.
- **Assessing the Magnitude and Consequences of Pathogenic Microorganism Transfer by Ships.** Very little is known about the relative risks of pathogens, both for humans and commercially important species, which are transferred in ballast water. SERC's invasion program is measuring the concentration of microorganisms and human pathogens, including *Vibrio cholerae* (causative agent of epidemic human cholera), discharged into U.S. waters with the ballast water of ships. In addition, we are conducting experiments to test the viability and potential significance of these transfers to result in newly established populations, or invasions, of pathogenic organisms.

- Measuring the Ecological Impacts of Non-Native Species. SERC has implemented a broad range of field-based and experimental studies to measure the effects of marine invasions in coastal ecosystems, including impacts on commercial fishery resources. Much of this work to date has focused on the European green crab (*Carcinus maenas*) impacts in California and New England. We have also implemented experiments in California and Virginia to test for effects of particular fouling organisms on invaded communities, and the extent to which this is exacerbated by human disturbance (*e.g.*, pollutants, hypoxia, etc.). The overall goal of work in this area is to understand and predict impacts of invasions across a diverse array of coastal communities.
- Testing Invasibility of Communities. We have just begun manipulative laboratory and field experiments to test environmental and biological factors that influence invasibility of marine communities. Our work in this area focuses on microorganisms and invertebrates. The main objective of this research is to measure the dose-response relationship between delivery of organisms and subsequent invasion, and how this may vary across different environmental and biological conditions. This approach has direct bearing on the effect (and target) for management strategy to reduce the delivery of non-native organisms by ships or other vectors.
- Feasibility of Eradication and Control of Established Marine Invasions. SERC has also initiated work to test the feasibility of eradication and control for a non-native marine snail in San Francisco Bay. This is effectively a demonstration project to critically examine management strategies, based upon key habitat and biological characteristics, and develop the decision process (*i.e.*, under what conditions and for which species) and capacity for eradication.

#### *Geographic Coverage*

SERC's Marine Invasion Research Laboratory, with staff based at Chesapeake Bay and San Francisco Bay, has established research sites throughout the U.S. to implement its research programs, in collaboration with researchers from approximately 25 different academic institutions and federal or state agencies. For example, active projects and collaborations are on-going in the following states: Alaska, California, Connecticut, Florida, Maine, Maryland, Massachusetts, Michigan, New Jersey, Oregon, Rhode Island, Texas, Virginia, Washington, and Washington D.C.

Internationally, SERC has become increasingly active over the past 5 years. A primary goal of the international program is to foster information exchange and build complementary, comparative, and collaborative research programs. For example, the Marine Invasion Research Laboratory has active collaborations in many areas of invasion ecology with the Centre for Research on Introduced Marine Pests (CSIRO, Australia). This includes comparative analyses of invasion patterns and effects, as well as development of an international standard for databases on marine invasions. Another long-term collaboration exists with scientists in Israel, where we have measured changes in the ballast water communities during roughly 20 different voyages between Israel and Chesapeake Bay. SERC also has been a participant and sponsor of international conferences and workshops on marine invasion ecology.

Although SERC programs are active at the national and international scales, a great deal of this effort has also focused on understanding invasion issues at the regional scale. In fact, this program has conducted research on invasions in nearly every coastal state in the country, producing regional understanding as well. Examples include:

- Analysis of invasion patterns for Chesapeake Bay over the past 400 years, representing the first such analysis for the Chesapeake as well as any estuary in the eastern U.S. This documents the invasion history of 160 non-native species established in this Bay.
- Analysis of extent of invasions for Prince William Sound, Alaska, providing the most detailed analysis in the world to assess the risks of invasion for a high-latitude system.

For More Information about the Marine Invasion Research Laboratory contact:  
 Monaca Noble, Smithsonian Environmental Research Center, P.O. Box 28,  
 Edgewater, Maryland 21037 USA; Phone - (443)482-2414; FAX - (443)482-2380;  
 email - noble@serc.si.edu; website - <http://invasions.si.edu/>

## SERC Marine Invasion Research Sites

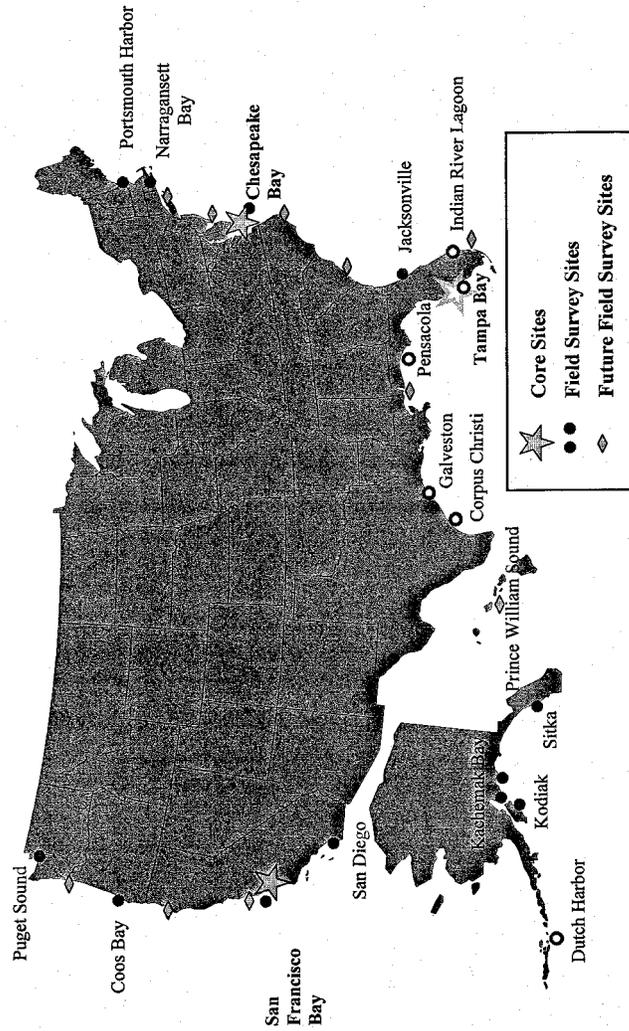


Figure 1. Distribution of field surveys to detect invasions, and measure invasion patterns, in U.S. coastal waters. Surveys completed by SERC through 2001 are shown as filled symbols (● baseline survey, ● core sites), whereas surveys in 2002 are shown as open symbols. Symbol color refers to funding source. Future surveys planned at additional sites shown as open symbols (◇). Alaska (to the left) and Hawaii (to the right) are shown at the bottom of the figure.

Mr. GILCREST. Thank you, Dr. Ruiz.

I would like to pose the first question to anyone at the table, for all the witnesses to respond to. This is the first introduction of this legislation, and we want to pursue it in a way that is the most effective. And I understand concerns about deadlines, concerns about

standards and interim standards and things like that, and the fact that you have been working on this for over a decade, but I can assure you that we are going to push as hard as we can to get a piece of legislation passed in the first 100 days.

So I would like to have you give your perspective on how this legislation will affect the following three things—the status of let us say a particular invasive species program like zebra mussels and how to prevent zebra mussels from going west of the 100th Meridian; how this legislation will affect the National Dispersal Barrier Program in an understanding of how it is or is not working right now; and how this legislation will affect compliance—for example NISA 1996 basically was a voluntary program unless there was inadequate compliance, and then it would be a mandatory program.

I would like to have some understanding of, where there has been inadequate compliance with NISA 1996, how many areas have been required to go to the mandatory route and how will this legislation impact that.

Captain BROWN. I can start with your last item first with regard to how this Act will affect compliance.

The current legislation gives us the authority to—

Mr. GILCHREST. Do you mean the current statute?

Captain BROWN.—the current statute, yes, that is currently in effect—not the new one, not the NAISA—does give the Coast Guard the ability to issue the regulation to make ballast water exchange and ballast water management activities mandatory, and we are in the process of doing that.

Now, as you rightly pointed out, it was a voluntary program, and one of the first things that we are looking to do in terms of our regulatory program is to establish some penalty provisions for failing to report. While there was a requirement to report your ballast water management activities in this voluntary program, there were not penalty provisions for it, so the rate of compliance was not very good.

So our first step is to establish some penalty provisions—

Mr. GILCHREST. So you are taking that step as a separate part of this legislation?

Captain BROWN. That is correct, sir.

Mr. GILCHREST. So those people who were not in compliance, you are going to pursue a penalty as opposed to mandatory?

Captain BROWN. Not exactly. What we are proposing to do is we are going to do both. We are going to establish a penalty provision to ensure that everyone who is required to report right now—because the current legislation does require that even though the measures are voluntary, the reporting of those measures is mandatory. So without the penalty provision—

Mr. GILCHREST. What areas are not in compliance?

Captain BROWN. I am sorry, I do not know what you mean, sir.

Mr. GILCHREST. Can you tell me what areas around the country are not in compliance with NISA 1996?

Captain BROWN. Both the Atlantic Coast and the Pacific Coast. In the Great Lakes, the requirements are already mandatory, so the reporting requirements in the Great Lakes are relatively high.

Mr. GILCHREST. So you are saying that everybody except the Great Lakes is not in compliance?

Captain BROWN. That is correct.

Mr. GILCHREST. Interesting. Do you think this legislation will help bring about a better protocol to bring people not only into compliance, but reduce invasive species?

Captain BROWN. Well, yes, it would, but the existing legislation that is currently in effect, NISA, will also have that effect.

Mr. GILCHREST. But it has not had that effect yet.

Captain BROWN. That is correct. That is because the measures were voluntary, and we had to give the voluntary measures a chance to work to see how well they would perform. We did that for well over a year. We found that they were not working very well. So now we are in the process of establishing mandatory provisions.

Mr. GILCHREST. Has it been difficult to establish the mandatory provisions because there have not been any standards?

Captain BROWN. No, sir. The mandatory provisions that we are going to apply first will be the ballast water management issues and then, secondarily, the establishment of some sort of a standard that all vessels will ultimately have to meet. Now, the way they meet that standard will be left up to them. If they can meet it through a ballast water exchange, that is fine; if they meet it through some kind of treatment technology, that is fine. We will not be that prescriptive. We will just be setting a standard to say that this is the maximum allowable amount of organisms that can be permitted—

Mr. GILCHREST. When will you come up with that?

Captain BROWN. We would hope to be able to have a definitive standard in 2004.

Mr. GILCHREST. In 2004. We are looking for an interim—will you have an interim standard before that?

Captain BROWN. We are not looking to do an interim standard at this time. We are just focusing on the final standard. Now, in the interim before this final standard is reached, we would look to have mandatory ballast water management policies and procedures such as ballast water exchange, such as limiting your intake in an area of known algae bloom, for example, et cetera, et cetera.

Mr. GILCHREST. My time is up. We will have a second round, I think.

I would like to ask you a yes or no question—I hate it when people ask me yes or no questions—but Captain Brown, do you think the legislation before us today is necessary or unnecessary?

Captain BROWN. I think it is necessary in the sense that NISA should be reauthorized. Our concerns are that the legislation that we have before us today is unduly prescriptive. We believe that there are a lot of good things in this legislation, we believe that the NISA should be reauthorized, but we would like to work with you to work out the details.

Mr. GILCHREST. Thank you.

I guess what we are doing is giving a homework assignment with a deadline on it.

Mr. Underwood?

Mr. UNDERWOOD. Just as a quick follow-up, has the existence of voluntary standards as opposed to mandatory standards allowed

industry to kind of string out the process in terms of adopting best technology?

Captain BROWN. I do not know that I can answer that, because I do not have a sense of what the industry's decisionmaking process is. The fact that there are not mandatory requirements means that industry is not obligated to comply with any particular requirements.

So I would have to defer that question to perhaps someone from industry. Clearly, they are not in compliance or they are not complying very much with the voluntary standards. That is something that we found that was quite clear. There is a big difference between compliance in the Great Lakes as opposed to the rest of the country.

So, clearly, some sort of mandatory requirements are needed.

Mr. UNDERWOOD. Well, I would assume that the difference between the Great Lakes and the other areas proves that you need something stronger than voluntary standards.

Captain BROWN. We agree, and that is why, after we have given the voluntary standards the opportunity to work as per the direction in NISA, found that they did not work, reported this to you, we are now in the process of establishing mandatory requirements.

Mr. UNDERWOOD. What additional incentives might work other than requiring more than voluntary standards?

Captain BROWN. One thing that we are looking to do is, in addition to mandatory ballast water management, encouraging experimental technologies. We would look to establish some sort of protocol for a firm to come in and say, "I would like to try this experimental technology aboard my vessel," and if we approve the protocol, after having some peer review to be sure that the technology looks promising and that it will do no harm, if you will, we would be prepared to look at some sort of grandfathering provision.

In other words, when standards are ultimately developed, if you are part of an experimental program and you have an experimental technology that you have installed upon your vessel, you would be considered to be in compliance for some period of time after the new standards came into effect. So you would not be making an investment for nothing, in other words.

Ultimately, all vessels would have to comply with whatever the revised and final standard would be, but we understand that a businessman wants to make a business decision; he does not want to invest a great deal of capital on something that may be overtaken by events within a year or two.

Mr. UNDERWOOD. Mr. Keeney, do you have any comment on that general question?

Mr. KEENEY. Yes, Representative Underwood.

I just want to give an example with regard to the voluntary nature as to how it is working. I understand that there was a report due in June of this year, and it was a mandatory report that was required, and only 30 percent of those who were to respond actually filed a report.

So we believe that a mandatory program for ballast water management is absolutely necessary.

Mr. UNDERWOOD. Dr. Ruiz, do you have a comment on that?

Dr. RUIZ. Yes. I too believe that a mandatory program is necessary and desirable. What I believe is happening is that the Coast Guard is going forward with that program. Many of the elements that they have been developing are included in the present legislation, so I do not think there is much disagreement about the desirability of pursuing that approach.

Mr. UNDERWOOD. Mr. Williams and Mr. Keeney, have we ever successfully eradicated an aquatic nuisance species?

Mr. WILLIAMS. Well, we certainly hoped we had with the snakehead fish that we saw this summer in Maryland. I do not know that I can tell you definitively yes or no.

Mr. UNDERWOOD. Mr. Keeney?

Mr. KEENEY. I am not aware of any examples where we have eradicated the species.

Mr. UNDERWOOD. Dr. Ruiz, you are nodding your head.

Dr. RUIZ. Yes. There are a number of examples that I think have changed the way people think about eradication in marine systems.

There is a sabellid worm, a polikeet worm, that colonized a portion of the California coast and appears to have been successfully eradicated. It was very limited in distribution. There is a marine algae *Caulerpa* that had become established in a couple of bays in Southern California, and an eradication program has been undertaken—it may be premature to say that it has been successful, but it looks promising. And there are some examples from other parts of the world, too, that say basically that it can be done under particular circumstances where you have fairly limited distribution and the appropriate biology, I guess.

Mr. UNDERWOOD. Thank you.

Thank you, Mr. Chairman.

Mr. GILCHREST. Thank you, Mr. Underwood.

Mr. Ehlers?

Mr. EHLERS. Thank you, Mr. Chairman.

I have a host of questions of various people, but I think I will concentrate on the Coast Guard. And no offense to you and no personal attack intended on you, Captain Brown.

But Captain Brown, you are the logical agency to carry this out. My problem is that you are the logical agency, you have the responsibility. The first law was passed in 1996, yet it took the Coast Guard 6 years to even issue an Advance Notice of Proposed Rule-making, which is virtually nothing.

I think the Coast Guard has failed miserably in this task, and yet you say that this legislation is overly prescriptive. The reason is that you have not done the job, so we are going to specifically tell you how to do the job until you prove that you can do the job.

It is a major problem in many areas, and I recognize that in a few special circumstances, we have been able to eliminate invasive species, but in Michigan, we have had the lamprey eel for years. We spend a lot of money every year dealing with it, both the Federal and the State governments. We now have the zebra mussel. The cost just to the boat owners in Michigan is in the neighborhood of \$100 million per year. Now, I do not know how that rates compared to how much you are spending trying to deal with invasive species, but that is a lot of money, and that is just the cost to individual boat owners in one State of the Union. If you add together

the costs to municipal water systems, to power plants, and so forth, you are getting into huge amounts of money because of one little critter that got in.

I was also disappointed to meet with your predecessor a few years ago to talk about this issue when I first got involved, and in retrospect, he was basically telling me do not do anything—everything is fine, we are going to take care of it—and nothing has been done. We obviously have to do something.

Yet in your testimony—which, incidentally, was not submitted until this morning, contrary to Committee rules, and contains an incomplete sentence, which indicates that it did not get a lot of thought—in your testimony, you say that your current strategy is “both sound and aggressive.” I have seen no evidence at all that it is either sound or aggressive, and you have a long way to go to convince me that it is.

Now, I am not here to chew you out, but I think the Coast Guard has simply failed, and I hope we will see better examples of taking this problem seriously. If you do not—I recognize that you have too many jobs given to you and not enough money, especially with drug interdiction which has been added to your duties—but if you do not have the resources, we have to know, and if you do not want to do it, we have to know, and we will get someone else to do it.

Out of fairness, I want to give you a chance to respond.

Captain BROWN. Congressman, I certainly understand your frustration. Clearly the costs from an economic standpoint, from a biodiversity standpoint, of aquatic nuisance species are considerable, and we recognize that this is a problem that does need to be addressed.

That said, we do believe that we are moving in a deliberative fashion to generate the appropriate rulemaking documents, take the appropriate regulatory approach to address the problem.

We believe that we did follow the mandates of the legislation that called for us to establish a voluntary program. We did the voluntary program and found that it did not work, and as soon as we found that it did not work, we started a process to make that program mandatory.

We recognize that ultimately, there has to be a standard. There is an issue where there is considerable divergence of opinion, as some of my colleagues have pointed out, as to what this standard ought to be, because we want to make sure that whatever standard we come up with, we want to be sure that the standard is effective, is scientifically supportable, and is going to do the job, especially since we recognize that establishing any kind of rulemaking regime imposes costs, and we want to be sure that when we do that, we are doing so in the most responsible way possible.

So I hear you, and the Coast Guard hears you, sir, with regard to the frustration. I assure you that we are not sitting on our hands on this. We are trying to work as quickly and as deliberatively as possible so that we can get the job done in a manner that meets the needs of the Nation.

Mr. EHLERS. Well, you have mentioned that it is a deliberative process, but I think that is the problem. Six years from the time the bill passes and becomes law until you take an action is simply too deliberative.

And when you talk about costs—and the shipping industry has talked to me, too, about their costs, and I said, “Well, that is fine. If those costs are too great, I will tell you what—you do whatever you want, but we will make you pay the costs resulting from these invasive species coming in. Which do you want?” Obviously, they do not want to pay that.

Also, on the matter of the standards, I know you are concerned about the standard that we put in the bill, and rightfully so, because it is not established scientifically. That is simply because we have to do something immediately to create action, and that is why we put it in the bill while you go through the deliberative process.

That is the other reason I introduced the bill dealing with research. I think we need a great deal more research before we will really know precisely what we should be doing. But in the meantime, we cannot stand still and wait until we know enough to do it right. We have to start doing something immediately.

Can you give me some specific time lines as to when your standards will be issued and when you expect them to be implemented if we do not pass this legislation?

Captain BROWN. We would expect that our ballast water management regulations would be out next year, and we would expect the standards to be promulgated the following year, in 2004.

Mr. EHLERS. Can you be more specific on the dates—at least which quarter?

Captain BROWN. We would anticipate the standards in the last quarter of 2004.

Mr. EHLERS. And the first step you said would be next year?

Captain BROWN. Yes, sir. We are looking to do essentially four things—establish a penalty provision, which we hope to have out fairly quickly; an experimental technology protocol so that individuals can know how they can go about trying to establish an experimental technology program aboard their vessel, and we hope to have that out at the beginning of next year; we look to have some sort of ballast water management rulemaking next year, 2003, and the final standards in 2004.

That said, I must be honest with you. The implementation date, even though the standards may be out, we are not in a position to say when that implementation date would be. We may say that the standards are out in 2004, and there may be some period of time for ships to come into compliance. So I want to be clear. I do not want to mislead you or anything in that regard.

Mr. EHLERS. I will write those on my office wall, and in the meantime, we will proceed with our legislation.

Thank you very much.

Mr. GILCHREST. Thank you, Mr. Ehlers.

Mrs. Biggert?

Mrs. BIGGERT. Thank you, Mr. Chairman.

Mr. Williams, in your testimony, you said that you supported the legislation’s interagency approach in many areas, and then you described your support for the research on pathways to determine how invasive species are entering into the United States.

Do you think that these bills adequately address or provide enough flexibility to Federal authorities to address the introduction of these nuisance species by means other than ballast water dis-

charge—for example, with some of the carp that are coming in, where there is the Asian ritual of buying two fish and letting one go, or the Asian carp which was introduced in southern Illinois by fish farmers to help keep the fish ponds clean.

Mr. WILLIAMS. I think the legislation really advances the ball, if you will, on that. There are some areas that I am really not prepared to go into at this time that we would like to work with staff to fine-tune. But I think this legislation really provides a number of things. One, just the fact that we are sitting here discussing this raises the level of awareness, certainly in Congress and with the American people, and that is something that, in my experience working for State government in three different States and trying to deal with zebra mussels, for instance, we assume—professionals assume—that everyone is aware of this and everyone is looking and checking their boats and trailers and so on, and in fact that is not the case.

So again, the awareness that this bill provides to the issue and the resources that it provides Federal and State agencies is long overdue.

Mrs. BIGGERT. Thank you. Could you or Mr. Keeney tell me about the regional panels that currently work on the invasive species councils? Who sits on these panels, and what is their role?

Mr. WILLIAMS. Let me take a shot at it, and then, Tim, if you want to jump in.

The Aquatic Nuisance Species Task Force is co-chaired by the Fish and Wildlife Service and NOAA. There are at this time four different panels—Western Region, Great Lakes, Northeast, and the Gulf of Mexico. They are obviously made up of staff from both of our agencies. It also involves resource agency staff from States within those panels.

Tim, I do not know if you want to add anything.

Mr. KEENEY. I would just add that the panels are very broadly based. They have representatives from State governments, tribal governments, stakeholders. We are looking at the possibility right now of creating a new panel for the Mid-Atlantic Region. The Great Lakes panel has been doing a great job for quite a while now.

Mrs. BIGGERT. I guess the reason I am asking this is because it was mentioned in the testimony the problem of coordination with all the different agencies, and then we have the regional panels and the Council. Will these bills all of these groups to work more efficiently together?

Mr. KEENEY. It will assist them; yes, it will.

Mrs. BIGGERT. Thank you.

Thank you, Mr. Chairman.

Mr. GILCHREST. Thank you, Mrs. Biggert.

Mr. Gutknecht?

Mr. GUTKNECHT. Thank you, Mr. Chairman.

A lot of the things that I wanted to say and ask have already been said and asked. I would just remind everybody here that we have been laboring on this issue for a very long time, and the idea that we passed legislation in 1996, and we still have not fully promulgated the rules in 2002 just reminds me that we won World War II in less time than that.

This is unacceptable. And I am not a trial lawyer, and I really have no particular love for trial lawyers, but it strikes me that what we are setting the ground for here is a massive class action suit against the shippers.

It seems to me that if I were a shipping company, I would be eager to at least get something done here, because in the absence of that, the door is wide open, because as Mr. Ehlers pointed out, we have hundreds of millions of dollars worth of damage. And again, I am not a lawyer, but I do understand the principle of tort liability—for every wrong, there is a remedy. And that remedy may be in Federal court.

It strikes me that all the Government agencies, whether it is the Coast Guard or whomever, have a huge responsibility to get busy on this problem, and we do not see it happening. Maybe the best thing we could do is repeal it all and say just settle this all in Federal court and see how much it costs.

I yield back my time.

Mr. GILCHREST. Thank you, Mr. Gutknecht.

In case there are any other questions, I am just going to very briefly start another round before we bring the next panel up.

The panel is receiving the grave concern of Members of Congress about the issue of invasive species not being solved yet. We started in 1990. We reauthorized it and made some changes in 1996, and now it is 2002.

I think all of us understand the huge complexity of a constantly evolving ecosystem down to the level of microorganisms and how fast they change from phytoplankton to toxic dinoflagellates, and how quickly they adapt and maneuver.

I know the Chesapeake Bay is still battling with the huge problems of MSX and dermo, which have fundamentally decimated about 90 percent of the oysters in the Chesapeake Bay, and that was probably at least in part by the introduction of some Asian species of oyster and ballast water.

So that periodically, there is potential for this type of explosion of invasive species which decimate for decades, or maybe centuries, the ecosystem, which in our case is the Chesapeake Bay. It could be the Great Lakes. It could be the Gulf of Mexico. It could be the San Francisco Bay. It could be anywhere.

So our frustration up here—and we have always, I think, collectively understood that frustration is a bad trait to have for a very long period of time, because it is not good for the ecosystem of our metabolisms—so what we are trying to do is be a little more clever and direct our energies to accelerate the process, not to the point where we are coming up with the wrong standard, a size limit or an organism limit versus a percentage limit, or how do we exchange ballast water versus some other creative alternative that the private sector is now undergoing.

So we are going to move forward as quickly as possible starting in the 108th Congress and get something passed, come hell or high water, in the first 100 days. So we want you fully engaged in this process, and we want you fully aware that we are going to move along with this process.

There are just a couple of quick items, though, that you could probably help us with—and I know that Federal agents do not like

to do things that the mysterious OMB entity would oppose, because we very rarely see any real human being from OMB, but they are this big, massive—do you think the Speaker of the House has power? No. Do you think the President has power? Not always. But OMB—we should sick him after Osama bin Laden.

We are going to move forward, and we are going to move forward fast. So what do you need? Is it a manpower problem now? Is it a resource problem? Is it a leadership problem? We want to put it into that legislation. We understand the 31—I think somebody mentioned 31 deadlines. I know there is always a problem with lawsuits if you come up to a deadline—and we are going to come up with an interim standard; we are going to have an interim standard. So you are going to have to help us with the best kind of interim standard. Is it 50 microns? Is it 95 percent? What kind of interim standard do we need, because we are going to implement it as quickly as possible.

So what do you need—resources, manpower, more scientists, more collaborative effort, the interim standards, the deadlines—those kinds of things. And you do not have to give me all of those answers right now, but I think that to some extent, those are the kinds of things that we really need to pull in. And what should we do with the Lacey Act? Do we need more power, more authority with the Lacey Act? Is the snakehead fish on the Lacey Act now?

Mr. WILLIAMS. Yes.

Mr. GILCHREST. Good, good. Is the black carp on the Lacey Act, the black Asian carp?

Mr. WILLIAMS. Mr. Chairman, first off, let me back up and note for the record that I like OMB. I think they are wonderful.

[Laughter.]

Mr. GILCHREST. OK, great. Good. We like OMB, too. I do not want to start a big battle between us—although you submit your testimony, OMB goes through your testimony and changes your testimony. Sometimes we have a chance to see the original testimony from different agencies before it goes through the filter. But we are all Americans here, we are all collaborative, and we want to make this thing work.

Mitch Daniels is a great guy.

Mr. WILLIAMS. He is a wonderful guy.

Mr. GILCHREST. Let the record show that.

Mr. WILLIAMS. Ditto.

On the black carp, the comment period has closed, and we are reviewing those comments. We had proposed to put it on the list of injurious species, so we will be making a decision on that in the near future.

Mr. GILCHREST. Great.

My time is up for the second round.

Mr. Underwood, do you have any questions—I'm sorry. Mr. Underwood, I guess, is yielding me his time for anybody else who wants to respond. He wants to hear any response that might be out there—you do not have to mention OMB, just tell us what you need to get this thing going.

Do you want us to have interim standards? If you do not—Dr. Ruiz?

Dr. RUIZ. I guess I would just like to comment that I really appreciate and share your sense of urgency that we should move forward. This is a complex problem maybe not unlike issues having to do with air quality or water quality or cancer or global change. It is a very complex problem, but that should not stop us from moving forward and taking our best guess at what needs to be done and providing feedback systems to evaluate how it is going.

So I think I share your sense of urgency and that we should go forward.

From my perspective, I think one of the impediments in the past has been actual funding to move some of these things forward. And if you look at the 1996 legislation and the 1990 legislation, I believe that, as with most legislation, only a fraction of the authorization to implement those components was actually appropriated. So I see that as an impediment that is understandable. There is that disconnect between authorization and appropriation, but I think that has limited our progress in some areas.

Thank you.

Mr. GILCHREST. Thank you.

Mr. KEENEY. Mr. Chairman, I would like to say a few things. First of all, with regard to leadership, I think we have that. I think there is a lot of interest in this issue; it is a very high priority.

Resources are always a challenge, and obviously, we are competing against other requirements within our own agency. There is only so much money that Congress can give us. We are also, of course, competing with national interests, and homeland security, of course, is the big focus, and that takes a lot of support.

With regard to the interim standard, we support it. NOAA's primary concern is really the final standard. A 95 percent kill rate would certainly represent an improvement over what we currently have. We could live with it for an interim standard, but we would ultimately want to go beyond that. Something that limits discharge to, say, 100 cells per liter at the point of discharge would be of interest to us.

NOAA is concerned that we should be locking in a specific approach as we move toward the final standard. Often, an interim standard becomes the basis for a final standard, and as pointed out in my testimony, there are some problems with the percentage kill rate.

Mr. GILCHREST. Could I just ask a question on behalf of Mr. Underwood?

Actually, I have two questions. I think the interim standard is not the critical thing here. I know the final standard is critical. But instead of losing some time with probably the private sector that will come up with the mechanism or the way that we are going to irradiate or eliminate or mechanically eliminate the organisms, don't they need some type of basis upon which to begin creating those things, finding the technology? Is it going to be 95 percent, or is it going to be a certain micron or a certain centimeter or millimeter or something like that?

So for us to send a signal to the private sector, I think—as we go through this process, before this bill gets signed into law, I would like to have something in the interim so that whoever is pro-

ducing these things to kill these microorganisms will have some standard to begin to go by.

Mr. KEENEY. I might just say, Mr. Chairman, that I am always moving in the direction of a size standard for an interim period. They are looking at a standard which would provide no organisms above something like 50 or 100 microns could be discharged. That is just something to keep in mind. I think we need to remember what that organization is doing as well.

Mr. GILCHREST. You can answer also, Captain. My time is almost up—or, Mr. Underwood's time is almost up.

Mr. Underwood would like to know if there should be a zero discharge goal for ballast water. That can be a one-word answer.

Mr. KEENEY. I do not believe so.

[Pause.]

Captain BROWN. If I may, a zero discharge for—I assume you are talking about a zero discharge of treated ballast water as opposed to no discharge of any ballast water at all—is that correct?

Mr. GILCHREST. Yes.

Captain BROWN. That presents some pretty significant technical challenges. I do not know that a) we would be able to detect such a discharge standard of no organisms, that we would be able to know for sure that there is an effect of zero discharge; and b) I do not know that the technology that we have available to us today and in the foreseeable future could get us there at any kind of reasonable cost.

If I may just go back to one or two of your earlier issues, first, I would like to thank you for the opportunity to get back to you on what it is that we might need. We would like to take that back and think on it and come back and give you some intelligent views on that.

With regard to the interim standard, the interim standard that is set up in the current bill, the bill that is pending before Congress right now, we find problematic for a couple of reasons. First of all, there is an enforceability problem. We are not sure how such a bill would be able to be enforced as an enforcing agency. And second, we are not sure that a percentage of removal, as my colleagues have indicated, is necessarily going to be environmentally sound or will do the job for us, because in some cases, you could remove 95 percent of the organisms, but you could leave enough of the organisms to still pose a problem; so now, you have removed a bunch of organisms, but you really have not solved your problem at all.

With regard to the idea that if we set some sort of standard, we would have industry working toward some sort of technologies, what often happens when you set up an interim standard is that it takes on an inertia of its own, and as my colleagues have pointed out, the interim standard sometimes becomes the final standard. And it does not necessarily follow that if I am able to get something at the—

Mr. GILCHREST. I think we would try to make sure that we would follow this issue; that that interim standard is always known as an interim standard. We just want to get something done. And I appreciate, Captain Brown, your comments, but Mr. Underwood's time has expired.

Mr. Ehlers?

Mr. EHLERS. I had another question, but I just want to follow this up. As I understand it, NOAA is saying this interim standard that we have in here is acceptable.

Mr. KEENEY. It is helpful.

Mr. EHLERS. Yes. And my problem with the Coast Guard response is that you are pointing out the problems with the interim standard, which we all understand, but the question to you is is it better or worse than what we have right now? In other words, is the interim standard proposed here better than the ballast water exchange that we are talking about right now?

Captain BROWN. I do not know that you could make the statement that it is better or worse, and by that, I mean this. If you have a standard—any standard, anything that you do that reduces the number of aquatic species is going to improve the environment to some extent. But if you reduce the number of invasive species by 90 percent, 80 percent, whatever, but still allow a significant enough amount of invasive species to come in to still cause the damage, I do not know that we have accomplished very much. My concern is that we may not have accomplished very much by establishing an interim standard, perhaps giving us a false sense of security when we are not quite sure what we need to do in order to give us the highest degree and the highest level of assurance that we can get.

Mr. EHLERS. The point is now that under the ballast water exchange, you have the same situation—you also have organisms coming in.

Captain BROWN. That is correct, yes.

Mr. EHLERS. OK. So I am just saying that I think your objection to the interim standard is wrong unless you can show me that it is worse than what you are already doing. And you are saying that you do not know if it is better or worse.

Captain BROWN. No. I think that an interim standard does not give us or guarantee us or provide us with any greater level of protection than we already have right now. We do not know that it is providing us any—

Mr. EHLERS. You said you do not know whether it does or it does not.

Captain BROWN. That is correct.

Mr. EHLERS. OK. Then, you have no basis in saying that it is bad.

Captain BROWN. Well, I would disagree with that characterization, sir.

Mr. EHLERS. OK.

Dr. Ruiz, 5395 is intended to do some of the research to solve the questions we have just been discussing here so that we do know what we are talking about. It calls for the inclusion of academic researchers. What role would you see for the university community in helping to meet the research standard? And a related question—the Coast Guard has expressed some concern about clearly delineating agency responsibilities in the ecological and pathway surveys research. However, USGS and you have been working—you already have an established working relationship, I believe—and also, NOAA has been doing some work with the National Estuarine Research Reserve System.

Is the Coast Guard's concern justified in that, or do you think we can coordinate the program all right? So, there are two questions: How will you involve the university community, and second, do you think the agencies will be able to work together and coordinate a research program?

Dr. RUIZ. Yes, thank you.

I think that the university and academic community—and I would expand that to include State and local agencies as well—play a key role in the research component for ecological surveys, for early detection, as well as some assessments of what particular management strategies do. I think they play a very important role, and I guess the way that I have thought about this has been considering sort of a distributed network whereby the academic community and others would engage in a variety of research activities that would be integrated and coordinated by a group—possibly, USGS, Smithsonian, NOAA, and others—that would help establish a core set of standards and measures that could be collected across a variety of sites but would not be completely prescriptive. It would have core measurements, but it would also create and hopefully encourage innovation and new thought and input from the academic community, because I think they have a great deal to offer, a lot of expertise out there.

Hopefully, that addresses your first question, that I think they play a critical role and that it would be a distributed network and a coordinated, collaborative endeavor across all interested parties that have something to offer.

In terms of the coordination, I do have some concerns about exactly how the effort would be coordinated across the different Federal agencies or lead agencies, if you will, and have wondered whether it might be better to designate a specific lead for marine and a specific lead for freshwater. While I think the agencies can certainly work together in developing a program, I think it may be beneficial to have clear leads and responsibilities for who is going to develop the framework and solicit comment and feedback from the other participants.

Mr. EHLERS. If I may for just a minute borrow a little of Mr. Underwood's time, too, and just follow that up—the Aquatic Nuisance Species Task Force was created in 1990, and the Invasive Species Council in 1999. Maybe Mr. Keeney is the better one to ask, but whoever wants to answer, are those two bodies working well? They seem to have some overlapping duties. Are they coordinating well, or is their work largely separate?

Mr. KEENEY. From my experience, I think they are working quite well.

Mr. EHLERS. Is there a need for both?

Mr. KEENEY. They are both helpful; each individually in its own way is helpful.

Mr. EHLERS. OK.

Thank you, Mr. Chairman.

Mr. GILCHREST. Thank you, Mr. Ehlers.

Mrs. Biggert?

Mrs. BIGGERT. Thank you, Mr. Chairman.

I think this will be directed to Mr. Williams again. Within Mr. Gilchrest's bill, there is a section for containment and control, and

it deals with the National Dispersal Barrier Project, which involves the Chicago Ship and Sanitary Canal. And you might not know this specifically, but maybe if you could get me the answer if you do not have it—if the Aquatic Nuisance Species Task Force or the Invasive Species Council or just the Fish and Wildlife Service as a whole have been monitoring that project—it just mentions that you are supposed to establish a monitoring program to track the species and then analyze whether there should be other projects such as this.

I wonder if anything is being done right now about that?

Mr. WILLIAMS. Our role in that project—let me back up. Building it and operating it is a Corps of Engineers responsibility. Our role is primarily monitoring. Also, we do have an active project monitoring carp, as you mentioned, in the Mississippi River.

Our role is not to operate the barrier, but it is to monitor.

Mrs. BIGGERT. I understand that you are to monitor the species, and the Army Corps is to monitor how it works.

Mr. WILLIAMS. To try to determine how effective it is, yes.

Mrs. BIGGERT. I just wondered if that is sufficient, or should more research organizations be involved.

Mr. WILLIAMS. Certainly, additional research would help, because there are certain life stages of aquatic organisms that the dispersal barrier may be ineffective in stopping from moving, particularly downstream.

But if the question is would additional research help in those efforts, my answer would be absolutely.

Mrs. BIGGERT. I wonder also whether we are taking sufficient advantage of the learning opportunity that has been presented by that construction and operation of the barrier by monitoring it now, or do we have to wait until this bill is passed?

Mr. WILLIAMS. I do not think we need to wait until the bill is passed. Certainly, I think this legislation would strengthen the commitment to that project, but we along with others, as I mentioned, are trying to assess how effective it is and will continue our efforts up and down stream, not just in the Mississippi River but focused on the Mississippi River, looking at any invasive species and trying to come up with ways to prevent or control those species from entering the Great Lakes.

Mrs. BIGGERT. Yes, Mr. Keeney?

Mr. KEENEY. Yes, ma'am. I would just like to say that the Task Force, which is meeting this week, recognizes the threat posed by the potential movement of the bighead and silver carp into the Great Lakes. This week's meeting is setting up a working group that will explore additional methods of controlling the carp species and slowing their movement into the Great Lakes.

Finally, I would like to recognize that interconnecting waterways in other areas is also an issue, and the legislation that is being proposed has a feasibility study for a dispersal barrier on a canal leading into Lake Champlain. We believe at NOAA that this provision is not needed because NOAA has already contracted with the University of Vermont for such a study, and the results are expected to be back in the year 2003.

Mrs. BIGGERT. So that would be just for the Lake Champlain?

Mr. KEENEY. Exactly.

Mrs. BIGGERT. Thank you.

Thank you, Mr. Chairman.

Mr. EHLERS. Would the gentlelady yield?

Mrs. BIGGERT. Yes, I yield.

Mr. EHLERS. Is there any confidence on the part of the two of you that we can stop the Asian carp, or is the only solution to once again disconnect the Chicago Canal from Lake Michigan?

Mr. KEENEY. I think the answer is we want to make every effort possible to do that, and we cannot tell you with great confidence at this point that we can accomplish that, but we will do everything we can to accomplish that.

Mr. EHLERS. Because this would be so incredibly destructive to the entire Great Lakes system that incredible measures are going to have to be required. And I was not jesting when I suggested closing off the canal. You can still pump the water over and keep the sewage system operating, but that would cutoff the pathway totally. And I am very, very nervous about having just one electronic barrier there. That is just not going to do it.

Mrs. BIGGERT. If I might reclaim my time, too, this canal is not just for water movement, but it has to do with our economy for the State of Illinois and other States—shipping going up the Mississippi, up the canal into the Great Lakes or vice versa.

Mr. GILCHREST. What is the canal used for? Is it just for sanitary purposes, or is there grain shipped to and fro, or what?

Captain BROWN. It provides a link, sir, between trade on the Great Lakes and trade into the Mississippi River system.

Mr. GILCHREST. In what way?

Captain BROWN. Barge traffic.

Mrs. BIGGERT. Barge; there is constant barge traffic up the canal from the Mississippi and the Illinois River to the canal and up into Chicago.

Captain BROWN. A variety of commodities are transported—bulk petroleum, some grain, coal, gravel—a wide range of commodities that are most efficiently shipped by vessel.

Mr. GILCHREST. I see. Well, I am with Vernon. We are going to work with you, though, Judy.

Mr. Williams, Mr. Keeney, Captain Brown, and Dr. Ruiz, thank you so much for your time and your patience. We look forward to working with you over the next many months.

Thank you very much.

I ask unanimous consent that the statement of the honorable Solomon P. Ortiz be submitted to the record.

[The prepared statement of Mr. Ortiz follows:]

**Statement of the Hon. Solomon P. Ortiz, a Representative in Congress from the State of Texas**

Mr. Chairman,

I commend you for holding this important hearing today. I hope we will be able to gather valuable information from our experts today as we work to amend the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, to reauthorize and improve this Act. In particular, I am interested to hear if there are currently any efforts being undertaken along the U.S.–Mexico border to eradicate the aquatic plant hydrilla.

I would like to thank you Mr. Chairman, and your staff, for addressing our concerns about the needs of the South Texas region by including provisions that deal with hydrilla, which is devastating our economy and also hampering the water de-

livery needs for many of my constituents along the Rio Grande. In my District, and along the Rio Grande River, the hydrilla is a giant problem when it comes to water flowing downstream. The Rio Grande is no longer the mighty river it once was, as the mouth remains closed and the water does not flow freely into the Gulf of Mexico. The state and regional grants that will be included in this legislation will assist in the eradication and control of the hydrilla to once again allow that flow of water to the Gulf.

Furthermore, H.R. 5396 expands the coordination of invasive species programs by increasing the positions on the Aquatic Nuisance Species (ANS) Task force to include other affected federal agencies. It also encourages the United States to enter into agreements with Canada and Mexico by enhancing cooperation with our international partners. Along the U.S.–Mexico there are already several federal and state agencies working closely together with their counterparts in Mexico and I would encourage that the federal agencies participating in this hearing today work with the interested parties in a cooperative effort to eradicate this hydrilla.

I thank you for your participation here today and look forward to working with all those present here today.

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Mr. GILCHREST. Our next panel includes Dr. Gabriela Chavarria, Policy Director for Wildlife Management, National Wildlife Federation; Ms. Allegra Cangelosi, Senior Policy Analyst, Northeast-Midwest Institute; Dr. Roger Mann, Professor, Virginia Institute for Marine Science; and Dr. Phyllis Windle, Senior Scientist, Union of Concerned Scientists.

Dr. Chavarria, thank you for coming today. You may begin.

**STATEMENT OF GABRIELA CHAVARRIA, POLICY DIRECTOR  
FOR WILDLIFE MANAGEMENT, NATIONAL WILDLIFE FED-  
ERATION**

Dr. CHAVARRIA. Thank you, Mr. Chairman.

On behalf of the National Wildlife Federation, I would like to thank you and the members of the Committees for the opportunity to testify on H.R. 5396, the Nonindigenous Aquatic Nuisance Prevention and Control Act, and H.R. 5395, the Aquatic Invasive Species Research Act.

I am Gabriela Chavarria, Policy Director for Wildlife Management for the National Wildlife Federation.

The National Wildlife Federation is the largest not-for-profit conservation education and advocacy organization, with more than 4 million members and supporters, and nine natural resources centers throughout the United States. The Federation's family also includes 46 States and Territorial affiliate organizations. Founded in 1936, the National Wildlife Federation works for the protection of wildlife species and their habitat and for the conservation of our natural resources.

The National Wildlife Federation's affiliated organizations across the United States adopted a position statement on invasive non-native species in 2000. In March of this year, they adopted the resolution, "Protection of the Great Lakes from Exotic Species." In this resolution, we identify the need for additional Federal and State legislation requiring the treatment of ballast water in ships entering the Great Lakes.

We were delighted to see that H.R. 5396 addresses some of the issues addressed in the resolution. This legislation will finally close the loophole which exempts ships entering the Great Lakes, declaring that they have no ballast on board from regulation under the Nonindigenous Aquatic Nuisance Prevention and Control Act of

1990. Experience has shown that these exempted ships can still transport invasive non-native species to the Great Lakes and other areas.

The impacts of invasive non-native species are not confined to our natural ecosystems. Navigation on many of our Nation's waterways has been hampered by dense growths of aquatic invasive non-native plants such as hydrilla and water hyacinth and, most recently, giant salvinia.

Industry also has suffered due to the spread of invasive non-native plants and animals into equipment and pipeline. The Federation comments the members of the Committee for encouraging partnerships among public agencies and other interests.

Prevention of aquatic invasive species is the most environmentally sound and cost-effective management approach because, once established, aquatic invasive species are costly and sometimes impossible to control.

To be effective, the prevention, early detection, and control of and the rapid response to aquatic invasive species should be coordinated regionally, nationally, and internationally. Research underlies every aspect of detecting, preventing, controlling, and eradicating invasive species, educating citizens and stakeholders, and restoring ecosystems.

Development of regional rapid response contingency strategies that provide a consistent and coordinated approach to rapid response needs to be a priority. We need to try to avoid that new non-native species get established. This in the short term will promote greater cooperation among Federal, State, Tribal, and local land water managers and owners of private land, water rights, or other interests to control harmful non-native species that are already established.

We also need to be aware that they should be a big emphasis on providing better guidance for more consistent strategies that can be developed on a short timeframe to be able to act almost immediately. We do need deadlines.

H.R. 5395 will fulfill a big gap. A comprehensive and thorough research, development, and demonstration program on aquatic invasive species needs to be done in order to better understand how aquatic invasive species are introduced and become established, and to support efforts to prevent the introduction and establishment of and to eradicate these species.

H.R. 5396 is an important complement to H.R. 3558, the Species Protection and Conservation of the Environment Act, of what should be a broad and diverse effort to minimize the impact of invasive non-native species, control their spread, and prevent their introduction in the first place. The problem of invasive non-native species is so widespread and pervasive that no single program or action can address it comprehensively. This is particularly true where the spread of invasive species may be exacerbated by other environmental problems.

H.R. 5396 and H.R. 5395 are a step forward to the implementation of the National Invasive Species Management Plan and complements other existing bills like H.R. 3558 because they enhance the capacity of private, State, Tribal, and Federal entities to manage invasive species.

Although we embrace legislation authorizing funding for the control of invasive species, two precautionary notes are in order. First, the ultimate test of Congress' commitment to controlling invasive non-native species is in the annual appropriations process. Unless adequate funds are appropriated, the problem of invasive non-native species will continue to grow unchecked.

Second, programs to control and manage invasive non-native species must be developed and implemented in such a manner that they are not harmful to our natural ecosystems. All projects and programs addressing invasive non-natives should be evaluated according to their success in implementing appropriate environmental controls.

The list of invasive non-native species destroying our native communities is already too long and is still growing. Both bills are good steps toward not allowing this list to grow more. We strongly support both bills and look forward to working with this Committee as these bills move through the legislative process.

We appreciate the opportunity to testify today.

Thank you, Mr. Chairman.

Mr. GILCHREST. Thank you very much, Dr. Chavarria.

[The prepared statement of Dr. Chavarria follows:]

**Statement of Gabriela Chavarria, Policy Director, National Wildlife Federation**

The National Wildlife Federation appreciates the opportunity to submit this statement for the record on H.R. 5396 Nonindigenous Aquatic Nuisance Prevention and Control Act, and H.R. 5395 Aquatic Invasive Species Research Act.

I am Gabriela Chavarria, Policy Director, for Wildlife Management, of the National Wildlife Federation. I was member of the National Invasive Species Advisory Committee, and I am vice-chair of the Executive Board of the Global Invasive Species Programme. In my previous job with the National Fish and Wildlife Foundation I oversaw and coordinated the Pulling Together Initiative, Private-Public Partnership to manage, control and eradicate invasive noxious weeds. The National Wildlife Federation is the largest not for profit conservation education and advocacy organization with more than four million members and supporters, and nine natural resources centers throughout the United States. National Wildlife Federation's family also includes forty-six states and territorial affiliate organizations. Founded in 1936, the National Wildlife Federation works for the protection of wildlife species and their habitat, and for the conservation of our natural resources.

The conservation of our nation's natural ecosystems in a healthy and abundant state provides innumerable and irreplaceable benefits to society. To conserve these ecosystems and realize their benefits for all of us, we must address many complex issues, including human population growth, pollution, sprawling development patterns, unsustainable agricultural practices and global climate change. All of these are important and the National Wildlife Federation is actively working on each of them. However, another pernicious threat too often overlooked and the subject of today's hearing is the harm brought upon our natural aquatic ecosystems by invasive non-native species.

The National Wildlife Federation's affiliated organizations across the United States adopted a position statement on invasive non-native species in 2000. And in March 8, 2002 they adopted the resolution "Protection of the Great Lakes from Exotic Species." In this resolution, we identify the need for additional federal and state legislation requiring the treatment of ballast water in ships entering the Great Lakes. Both resolutions are attached at the end of my testimony. We were delighted to see that H.R. 5396 addresses some of the issues addressed in the resolution. This legislation would finally close the loop hole which exempts ships entering the Great Lakes declaring that they have no ballast on board from regulation under the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990. Experience has shown that these exempted ships can still transport invasive non-native species to the Great Lakes and other areas. You can find copies of these resolutions at the end of my testimony.

For decades, the National Wildlife Federation has worked to protect the biological integrity of the Great Lakes from numerous environmental threats. One of the most alarming threats to the Great Lakes, however, comes from invasive non-native plants such as Eurasian water milfoil, non-native fish such as the Eurasian ruffe and round goby, and the zebra mussels. These and other species were introduced into the Great Lakes from ballast water discharged by foreign ships using our coastal and inland waterways. Native to the Balkans, Poland, and the former Soviet Union, the zebra mussel is spreading across North America at an astounding rate. Dense zebra mussel colonies grow in pipes and other hard surfaces, severely impacting water flow at power plants, water treatment systems and other facilities. Although the full biological impact of zebra mussels is not entirely known, it is clear that where zebra mussels invade, native mussel species quickly decline.

Our concern is that invasive non-native species can so radically change an area's physical and biological environment that the habitat requirements for native plants and animals no longer exist. After habitat loss, invasive non-native plants are the second greatest threat to native species. At least 5,000 non-native species, including more than 2,100 exotic plants and 2,000 insects, have invaded North America since the arrival of European explorers. Many of these species have been harmful to native wildlife and ecosystems. They overwhelm native species for food, space, water and other needs. In some cases these species prey on native species and alter their habitat.

The impacts of invasive non-native species are not confined to our natural ecosystems. Navigation on many of our nation's waterways has been hampered by dense growths of aquatic invasive non-native plants such as hydrilla and water hyacinth. Industry also has suffered due to the spread of invasive non-native plants and animals into equipment and piping.

*Comments and Opportunities on H.R. 5396 and H.R. 5395*

The Federation commends the members of the Committee to encourage partnerships among public agencies and other interests.

Prevention of aquatic invasive species is the most environmentally sound and cost effective management approach, because once established, aquatic invasive species are costly, and sometimes impossible to control. To be effective, the prevention, early detection and control of and the rapid response to aquatic invasive species should be coordinated regionally, nationally, and internationally. Research underlies every aspect of detecting, preventing, controlling, and eradicating invasive species, educating citizens and stakeholders, and restoring ecosystems.

Development of regional rapid response contingency strategies that provide a consistent and coordinated approach to rapid response, need to be a priority, we need to try to avoid that new nonnative species get established. This in the short-term will promote greater cooperation among Federal, State, Tribal, and local land water managers, and owners of private land, water rights, or other interests to control harmful nonnative species that are already established. We also need to be aware that they should be a big emphasis on providing better guidance for more consistent strategies that can be developed on a short time frame to be able to act almost immediately.

H.R. 5395 will fulfill a big gap. A comprehensive and thorough research, development, and demonstration program on aquatic invasive species needs to be done in order to better understand how aquatic invasive species are introduced and become established, and to support efforts to prevent the introduction and establishment of, and to eradicate, these species.

H.R. 5396 is an important complement to H.R. 3558 The Species Protection and Conservation of the Environment of what should be a broad and diverse effort to minimize the impact of invasive non-native species, control their spread and prevent their introduction in the first place. The problem of invasive non-native species is so widespread and pervasive that no single program or action can address it comprehensively. This is particularly true where the spread of invasive species may be exacerbated by other environmental problems

H.R. 5396 and H.R. 5395 are a step forward to the implementation of the National Invasive Species Management Plan, and complements other existing bills like H.R. 3558 because enhances the capacity of private, State, and Federal entities to manage invasive species.

Although we embrace legislation-authorizing funding for the control of invasive non-natives, two precautionary notes are in order. First, the ultimate test of Congress's commitment to controlling invasive non-native species is in the annual appropriations process. Unless adequate funds are appropriated, the problem of invasive non-native species will continue to grow unchecked.

Second, programs to control and manage invasive non-native species must be developed and implemented in such a manner that they are not harmful to our natural ecosystems. The introduction of non-native species to control other non-native species must be vigorously screened to ensure the species is host specific and non-harmful to other species and our natural ecosystems. Furthermore, all control methods should seek to minimize the use of pesticides, herbicides and other chemicals. In the few cases where use of chemicals may be appropriate, this use must be tightly regulated and carefully monitored to avoid harming non-target native species. All projects and programs addressing invasive non-natives should be evaluated according to their success in implementing appropriate environmental controls.

The list of invasive non-native species destroying our native communities is already too long and is still growing. H.R. 5395 and H.R. 5396 are good steps towards not allowing this list to grow more. We strongly support both bills and look forward to working with this Committee as H.R. 5395 and H.R. 5396 move through the legislative process

We appreciate the opportunity to appear before this Committee to discuss the issue of invasive species. We would like to thank you Mr. Chairman, for your efforts to address this issue through H.R. 5396 and H.R.5395.National Wildlife Federation

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[Attachments to Dr. Chavarria's statement follow:]

National Wildlife Federation  
RESOLUTION NO. 1  
2000

#### **Invasive Species**

WHEREAS, some non-indigenous invasive plants, animals and other organisms have an adverse impact upon indigenous communities by reducing available light, water, nutrients, and space and can cause other long term changes in the area's hydrology, soil chemistry and erodibility, and the frequency of fires; and

WHEREAS, some introduced non-indigenous plants, animals and other organisms are highly invasive, capable of rapid reproduction and/or growth resulting in the displacement of indigenous species, and can radically change an area's physical and/or biological environment so that the habitat requirements for indigenous plants, animals and other organisms no longer exist; and

WHEREAS, non-indigenous invasive plants, animals and other organisms by nature are easily spread from one area to another; and

WHEREAS, the impact of non-indigenous invasive species threatens regional biodiversity in a manner that is not easily quantified; for example, the loss of an indigenous plant community to non-indigenous invasive species may mean the loss of an insect, animal or indigenous plant dependent upon that community; and

WHEREAS, according to the National Park Service,"invasions of non-native plants are the second greatest threat to native species after direct habitat destruction"; and

WHEREAS, the US Fish and Wildlife Service stated, "an estimated 42% of the nation's endangered and threatened species have declined as a result of encroaching exotic plants and animals"; and

WHEREAS, the problem of non-indigenous invasive plants is widespread and, according to federal and other accounts, now extend into more than 1.5 million acres of national park land and are spreading at a rate of 4,600 acres per day into federally owned land; and

WHEREAS, it is "estimated that in the 20th century, just 79 introduced plant and animal species have cost the US economy \$97 billion in losses to such industries as forestry, ranching, fisheries, tourism, and utilities"; and

WHEREAS, research is required to establish best management practices to control and prevent the spread of non-indigenous invasive species; and

WHEREAS, international trade agreements and rules, regulations, and protocols related to international transportation and trade can significantly affect the possible transportation of non-indigenous invasive species into the United States and other countries;

NOW, THEREFORE, BE IT RESOLVED that the National Wildlife Federation in its Annual Meeting assembled March 16–18, 2000, in Seattle, Washington, supports the President's efforts in establishing the Invasive Species Council to integrate efforts of federal agencies to combat the problem and to prepare and issue the first edition of a National Invasive Management Plan that shall "detail and recommend performance-oriented goals and objectives and specific measures of success for federal agency efforts concerning invasive species"; and

BE IT FURTHER RESOLVED that the National Wildlife Federation supports increased federal funding for non-indigenous invasive species management in National Parks and on other federal lands and/or waters, and the continued funding of the Wildlife Habitat Incentives Program (WHIP) that, in part, provides cost sharing for private initiatives to control non-native (invasive) plants from natural ecosystems"; and

BE IT FURTHER RESOLVED that the National Wildlife Federation encourages state and federal agencies, universities and other groups to work together to identify and list the highly and potentially invasive non-indigenous species specific to that state, and to promote that the list be used as an educational and managerial tool; and

BE IT FURTHER RESOLVED that the National Wildlife Federation calls upon state and federal agencies to carefully formulate regulations to control, reduce, or, if necessary, prohibit the introduction, transportation, propagation, sale, or distribution of non-indigenous plants known to be harmful or otherwise undesirable; and

BE IT FURTHER RESOLVED that the National Wildlife Federation encourages state and federal agencies, universities, and other groups to work with the nursery industry to establish policies to control and prevent the further introduction and spread of non-indigenous invasive species, and to promote a list of alternative, preferably native plants, that can be the basis of educational programs that will benefit growers, the public, and the environment; and

BE IT FURTHER RESOLVED that the National Wildlife Federation encourages state and federal entities engaged in research and development involving management of vegetation to intensify their studies of ecology and control of invasive non-indigenous plants; and

BE IT FURTHER RESOLVED that the National Wildlife Federation urges monitoring of areas that have endangered or threatened species and/or are relatively free of non-indigenous invasive species and encourages careful management practices to be used in the removal of non-indigenous invasive species; and

BE IT FURTHER RESOLVED that the National Wildlife Federation urges the Congress and federal agencies to ensure that the United States' international trade obligations, including the World Trade Organization and its Sanitary and Phytosanitary Agreement, are formulated and implemented to provide sufficient flexibility to allow for regulations to control and prohibit intentional or unintentional introduction of non-indigenous invasive species and other organisms into the United States and other countries; and

BE IT FURTHER RESOLVED that the National Wildlife Federation urges the Congress of the United States to recognize the high environmental and economic costs associated with non-indigenous invasive plants, animals and other organisms and to appropriately fund efforts to control this enormous national environmental crisis through educational programs, research, and cost-share incentives to restore native habitats.

2002

**Protection of the Great Lakes and Other Waters from Exotic Species**

WHEREAS, our Great Lakes, estuarine habitats, coastal and inland waters continue to be invaded by exotic (non-native) aquatic organisms and pathogens transported from foreign waters; and

WHEREAS, these organisms arrive in the ballast water discharged by ships using our estuarine, coastal and inland waterways; and

WHEREAS, previously introduced exotic species, such as Eurasian ruffe and round gobies, are being carried in ballast water from one Great Lakes port to another; and

WHEREAS, once introduced and established, these non-native aquatic organisms are expensive to control and almost impossible to eliminate; and

WHEREAS, the impact on sport and commercial fisheries is immense and disrupts the aquatic diversity of the Great Lakes, estuarine habitats, coastal and inland waters; and

WHEREAS, moreover, shoreline communities in the Great Lakes region alone are being forced to spend an estimated \$500 million annually on control measures to protect drinking water, power plants, and recreational facilities; and

WHEREAS, some of these aquatic organisms, such as zebra mussels and Eurasian water milfoil, are now making their way into inland lakes and streams across the United States where they are displacing native animal and plant species; and

WHEREAS, the ballast water that harbors these invaders is used to maintain the stability of cargo vessels when they are empty or only partially loaded and is pumped in or out of large holding tanks, as needed, before the ships enter or leave port; and

WHEREAS, although U.S. and Canadian laws currently require ships entering the Great Lakes to exchange their ballast water at sea, ship design makes it impossible to eliminate all of the ballast water; and

WHEREAS, the majority of ships entering the Great Lakes do so with "No ballast on Board" and ships in this condition are commonly referred to as NOBOBs; and

WHEREAS, ships in the NOBOB condition still carry sediment in their ballast that can harbor exotic species; and

WHEREAS, the average ship retains 42,000 gallons of ballast water and sludge when entering the Great Lakes or moving between ports; and

WHEREAS, exotic organisms are flushed into the lakes as ships take on and discharge residual ballast water in the course of their voyages; and

WHEREAS, ships in the NOBOB condition are currently exempt from requirement to exchange their ballast under federal law; and

WHEREAS, federal laws as they are currently administered have clearly failed to prevent exotic species in this residual ballast water from reaching the Great Lakes, estuarine habitats, coastal and inland waterways; and

WHEREAS, in the 106th Congress a bill was introduced that would have amended the Non-indigenous Aquatic Nuisance Control and Protection Act of 1990 and require ships traveling in and out of the Great Lakes, estuarine habitats, coastal and inland waters to replace or purify their ballast water or certify that any discharge or exchange within U.S. waters will not introduce any non-indigenous organisms; and

WHEREAS, the National Wildlife Federation believes the ultimate control has to come from the Federal government working in concert with Canada; and

WHEREAS, the National Wildlife Federation and many other organizations recognize the threat posed to the Great Lakes, estuarine habitats, coastal and other inland lakes and streams of the United States by the continued introduction of non-indigenous aquatic organisms carried in the ballast water of ocean going vessels.

NOW, THEREFORE, BE IT RESOLVED that the National Wildlife Federation, at its Annual Meeting assembled March 7–9, 2002 in Stone Mountain, Georgia, supports the enactment of federal legislation to protect the Great Lakes, estuarine habitats, coastal and inland waters from undesirable exotic species and pathogens, by requiring treatment of ballast water of all ships entering or moving between the Great Lakes, estuarine habitats, coastal or inland ports, including ships with no ballast on board (NOBOBs) to eliminate viable exotic organisms without damage to the environment; and

BE IT FURTHER RESOLVED, that the National Wildlife Federation encourages the development, funding, and use of environmentally sound technologies that prevent the introduction of exotic species into the aquatic environment by minimizing or eliminating the uptake of organisms into ships' ballast tanks; and

BE IT FURTHER RESOLVED, that the National Wildlife Federation supports equally effective state legislation to regulate ballast water, including ships in the NOBOB condition in individual state waters to provide interim protection until such time as federal legislation is enacted to adequately protect all our Great Lakes, estuarine habitats, coastal and inland lakes and rivers.

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Mr. GILCHREST. Ms. Cangelosi, thank you for coming this morning and for all your work on this legislation.

**STATEMENT OF ALLEGRA CANGELOSI, SENIOR POLICY  
ANALYST, NORTHEAST-MIDWEST INSTITUTE**

Ms. CANGELOSI. Thank you for the opportunity to testify before the Subcommittees regarding the National Aquatic Invasive Species Act and the National Aquatic Invasive Species Research Act, NAISA and NAISRA.

All of the provisions in this legislation are critical to protecting the Northeast-Midwest Region and the Nation from further serious, expensive, and permanent damage caused by aquatic invasive species. I urge the Subcommittees to act quickly and pass them.

Of particular importance to our region are the provisions related to the prevention of organism transfers by the leading pathway—ships. The U.S. has law on the books to combat ship-mediated invasions, but Federal agencies have not aggressively implemented it nor, therefore, has industry.

In particular, progress toward development and use of treatment alternatives has been almost nonexistent, although Congress clearly stated it as a priority in the National Invasive Species Act of 1996.

One source of stalemate is the need for a numeric standard for treatment—the only effective approach to prevention, especially for the Great Lakes. Statute directs ships to undertake a management practice called “ballast water exchange” or a treatment that is at least as effective as ballast water exchange. But the biological effect of ballast water exchange is notoriously variable and difficult to measure. Establishing a numeric surrogate, therefore, is a policy call and one that the Coast Guard has been unwilling to make. Without that benchmark, however, investment in treatment by industry and product developers is at a standstill.

NAISA and NAISRA will allow the transition to ballast treatment to proceed and proceed rapidly. The bills set forth two phases—an interim phase during which ballast water exchange remains acceptable, but ships are encouraged to substitute treatments that are deemed equivalent according to a statutory benchmark; and a final phase during which all ships must meet an environmentally protective standard using best available technology. In the final phase, ballast water exchange may well become obsolete for many types of ships as more effective treatments become available.

The final phase is in fact the most important to ongoing environmental protection, while the interim phase is a preparatory period.

The legislation resolves the interim standard impasse by establishing 95 percent inactivation or removal of plankton as a benchmark for ballast water exchange effectiveness. This numeric surrogate is broadly accepted internationally, because under ideal conditions, 95 percent of near coastal water can be purged using the safest ballast water exchange technique. As such, it represents an upper limit of potential effectiveness of ballast water exchange.

The two concerns that are raised around the 95 percent treatment standard by agencies are either not relevant to the interim period or to statute. One is that 95 percent is not known to be environmentally protective. This is a very good reason for 95 percent not to be the final standard. But during the interim period, ships that do not use treatment will use the more heavily flawed ballast water exchange. Thus, the only relevant question in the interim period is whether it is at least as protective as ballast water exchange, and the answer is yes.

The second concern is that a standard expressed as a percent efficiency will be harder to monitor and enforce than a standard expressed as discharge concentrations or a size cutoff. These operational concerns are worth considering and may afford subtle improvements during the interim period, but they reside in the province of regulation rather than statute. The statute answers the primary question of the basis on which to select such a concentration limit or size, and that is the 95 percent benchmark.

The urge to perfect the interim standard in statute serves only to delay its implementation and consequently the development of treatments which can finally solve the problem.

Next, the legislation establishes a date-certain for an environmentally protective final standard to apply to all practices. This Nation needs and deserves this commitment. The bill provides agencies 4 years to define the standard and up to 8 years to promulgate it—ample time for research and preparation on all sides.

The legislation draws from our long experience with air and water pollution control and directs industry to meet the final standard using best available technology, economically achievable, based on a periodic review. This approach creates financial incentive for inventors to develop the most effective and economically achievable methods possible over time.

The legislation also wisely incorporates other aspects of the ship, such as hulls and anchor chains, into the purview of the final standard.

There are many other important provisions in this legislation which I summarize in my written testimony. Until now, damage to our resources by invasive species has 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 legislation has clearly benefitted from this debate. The result is a set of programs which will prevent and manage the problem effectively for the environment and efficiently for industry and government. This problem is not going away until Congress acts, and I urge your consideration of these bills and passage as soon as possible.

Thank you.

Mr. GILCHREST. Thank you very much, Ms. Cangelosi.

[The prepared statement of Ms. Cangelosi follows:]

**Statement of Allegra Cangelosi, Senior Policy Analyst, Northeast-Midwest Institute**

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 (Carlton, 2001). 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-na-

tive 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 United 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 implement 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.

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Mr. GILCREST. Dr. Mann, welcome.

**STATEMENT OF ROGER MANN, PROFESSOR, VIRGINIA  
INSTITUTE FOR MARINE SCIENCE**

Dr. MANN. Mr. Chairman, members of the Committee, it is a pleasure to be here and accept your invitation to provide testimony today.

My name is Roger Mann. I am a professor of marine science at the School of Marine Science, Virginia Institute of Marine Science. I have been a researcher in this field for about 25 years, and throughout that time, I have maintained an interest in the biology of non-native and introduced species.

I am currently a principal investigator on a federally funded project examining the impacts of a remarkable invading snail in the Chesapeake Bay, and I bring this one to you today just as an example. This is an Oriental snail that was accidentally introduced into the Black Sea some 60 years ago, and since that time, it has walked out of the Black Sea and into the Adriatic, and in doing so has caused decimation of local shellfish populations. It has the full potential to do the same here.

I bring this one and give it to the Chairman, and I ask him to use it whenever he sees fit to remind naysayers that invaders can be beautiful, but they are also very bad.

The arrival of non-native species into waters of the United States through ballast water and other vectors remains a significant threat to the integrity of native ecosystems and, through this, to their value as both sources of direct economic benefit and as recreational aesthetic resources.

I truly compliment the authors and sponsors of these bills for their timely and focused attention to these important matters.

In the limited time available today, I will focus my remarks on the proposed modifications in ballast water management, specifically their feasibility in implementation and prospects for effectiveness in controlling aquatic invasions.

Section 104 of 5396 addresses “Prevention of introduction of aquatic invasive species into the waters of the United States by vessels.” A significant portion of this section focuses on ballast water management and treatment systems.

Subsection (e)(1)(B) addresses “Ballast Water Management Standards and Certification Procedures,” the interim standards that we have been talking about. Two options are proffered for ballast water exchange—either at least one empty and refill, or 95 percent ballast replacement. These are admirable goals for reduction of organisms from distant sources that are subject to discharge into United States waters. And at this point, I support these as interim standards, although I am cognizant of the logistical difficulties that accompany compliance with such standards by a ship’s master under challenging sea states—I think we are all very much aware of this problem—and the fact that a simple dilution standard may not reduce the numbers of potential invaders in any one ballast tank below a critical level that may sustain the initial stages of an invasion in a receiving port. A number have already testified to that today.

A dilution standard is in contrast to longstanding approaches to regulations affecting drinking water, shellfish growing and harvest regions, effluent standards for commercial enterprises such as shellfish and seafood processing plants that employ absolute values rather than percentage reductions.

None of these qualifications, however, should deter the goal of compliance with ballast water exchange or dilution where operating conditions allow.

The ultimate approach to ballast water exchange, and one that I strongly support, is the development and employment of ballast water treatment systems designed specifically to reduce the number of included potentially harmful organisms. In developing the text of 5396, the authors have sought to provide parity with a 95 percent replacement approach by inclusion of the requirement that systems kill or remove “at least 95 percent of the live aquatic vertebrates, invertebrates, phytoplankton and macroalgae.”

Again, these are admiral goals. However, I believe this section of the text could be improved to encourage both the development of appropriate technologies and facilitate their testing prior to approval.

A number of innovative technologies are currently under development in the private sector. These reflect the continuing diversity and depth of talent that has made American industry a world leader in mitigating adverse environmental problems.

As examples, researchers are investigating using ultraviolet radiation, ozone disinfection, mechanical filtration and deoxygenation using nitrogen gas-purging and vacuum degassing—truly a broad variety. Each of these technologies has its strengths and promises with respect to control of ballast water communities.

The interim standard set by this bill must provide specific targets, not percentage reductions. Without these, the developers cannot progress with system design for eventual application in the shipping industry.

Depending on the technology employed, control of the identified groups is not attained with uniformity, just as the threat from

these groups may also not be uniform. The ability to control a significant threat from the majority of these groups should not disqualify or discourage the continuing development of the technology that at some point may control all.

For example, mechanical filtration in very large-scale practical application is a compromise between volume treated and size retention of particles. In the current context, a 50-micron standard might be attainable for very large volumes and be successful in retaining all the life history stages, including eggs, of the vast majority of aquatic vertebrates, invertebrates, and macroalgae—that is three out of your four targets. This list would include a very substantial number of notorious invaders that are currently creating ecological and economic problems in many locations.

By contrast, a 50-micron filter would do little to retain most phytoplankton simply because most of the members of that group are well below that size. Although they are undoubtedly widely distributed by ballast water, phytoplankton as a group have a proportionately lesser history as deleterious environmental agents when established in regions beyond their native ranges.

It is notable that an absentee from the specifics in this bill is the toxic dinoflagellates that cause red tide blooms—a group that may well represent a very serious challenge to any and all of the currently researched control technologies.

I respectfully offer two suggestions for consideration in minor text revisions for the bill. First, definitions for phytoplankton and macroalgae should be included to describe inclusive size ranges. Second, interim standards should be considered in terms of reduction in absolute numbers in defined size ranges—for example, 100 percent kill of all organisms in excess of 50 microns maximum dimension. Both will, I believe, assist the developers of treatment technologies and expedite the approval process for technologies as they reach maturity.

In closing, I wish to add two comments. I again offer my compliments on the details in 5396 addressing continual review and provision for improvement in standards as technology improves. We should not be handcuffed by the search for ultimate control tools, while good, although perhaps not perfect, technologies are within our grasp to address the ecological problem at hand. Incremental common sense dictates employment of the best available tools now, and better tools that come along.

Finally, both bills provide a sound basis for new and continuing research priorities on a broad range of issues and, importantly, conduits to deliver the associated results to the regulatory process. Knowledge is a powerful tool that we must pursue and share to detect, control and, where possible, eradicate invading unwanted non-native species.

This concludes my testimony. Thank you for the opportunity.

Mr. GILCHREST. Thank you very much, Dr. Mann.

[The prepared statement of Dr. Mann follows:]

**Statement of Roger Mann, Professor, School of Marine Science, Virginia Institute of Marine Science, College of William and Mary**

Mr. Chairman, Members of the Committee, it is a pleasure to be here today and accept your invitation to provide testimony to the Committee on H.R. 5395 and H.R. 5396.

My name is Roger Mann. I am a Professor of Marine Science at the School of Marine Science, Virginia Institute of Marine Science, College of William and Mary. I have been a researcher in the field of marine science for over twenty-five years. Throughout that period I have maintained an active interest in the biology of introduced (non-native) aquatic species. I have edited two major volumes on this subject, maintained an interaction with other researchers in this field including those appointed to the International Council for the Exploration of the Seas Committee on Introductions, was a member of the US Department of Agriculture Working Group on Biotechnology tasked with developing guidelines for research involving genetically modified organisms, and am currently the Principal Investigator on a federally funded research project examining impacts of a remarkable invading predatory marine snail in the Chesapeake Bay. The fact that this recent invader arrived on our shores through ballast water vectors makes my interest in today's subject of discussion even more pointed. The arrival of non-native species into the waters of the United States through ballast water and other vectors remains a significant threat to the integrity of native ecosystems, and through this to their value as both sources of direct economic benefit and as recreational and aesthetic resources. I complement the authors and sponsors of these bills for their timely and focused attention to these important issues.

In the limited time I have available I will focus my remarks on proposed modifications in ballast water management, specifically their feasibility in implementation and prospects for their effectiveness in controlling aquatic invasions. Further, I will briefly comment on the prospects for the proposed new programs and research priorities to provide new and improved tools in detection, control and eradication of invasive species.

Section 104 of H.R. 5396 addresses "Prevention of introduction of aquatic invasive species into the waters of the United States by vessels." A significant portion of this section focuses on ballast water management and treatment systems for control of potentially harmful organisms within ballast water. Subsection (e)(1)(B) addresses BALLAST WATER MANAGEMENT STANDARDS AND CERTIFICATION PROCEDURES—INTERIM STANDARDS. Two options are proffered for ballast water exchange, either (1) at least one empty and refill on the high sea or in an alternate exchange area, or (2) sufficient flow through exchange to achieve 95% ballast replacement. These are admirable goals for reduction of organisms from distant source(s) that are subject to discharge in United States waters. I support these targets, although I am cognizant of the logistical difficulties that accompanying compliance with such standards by a ship's Master under challenging sea states, and the fact that a simple dilution approach may not reduce the numbers of potential invaders in any one ballast tank below a critical level that may sustain the initial stages of an invasion in a receiving port. A dilution standard is a practical method in implementation and enforcement for ballast water exchange, although it is in contrast to long standing approaches to regulations affecting drinking water, shellfish growing and harvest regions, and effluent standards for such commercial enterprises as seafood processing plants that employ absolute values rather than percentage reductions. Finally, at the individual vessel level, compliance with flow through ballast replacement may be difficult depending on vessel configuration. However, none of these qualifications should deter the goal of compliance with ballast water exchange or dilution where operating conditions allow.

The alternate approach to ballast water exchange, and one that I strongly support, is the development and employment of ballast water treatment systems designed specifically to reduce the number of included potentially harmful organisms. In developing the text of subsections (e)(1)(B)(ii) and (e)(3)(A)(ii) the authors have sought to provide parity with a 95% replacement approach by inclusion of the requirement that treatment systems kill or remove "at least 95% of each of the live aquatic vertebrates, invertebrates, phytoplankton and macroalgae." Again, these are admirable goals that would reduce the numbers of potentially harmful organisms discharged at receiving ports; however, I believe this section of the text could be improved to encourage both the development of appropriate technologies and facilitate their testing prior to approval. A number of innovative technologies are currently under development in the private sector for application in ballast water control. These reflect the continuing diversity and depth of talent that has made American industry a world leader in mitigating adverse environmental problems. As examples researchers are investigating ballast water treatment technologies using ultraviolet radiation, ozone disinfecting, mechanical filtration, and deoxygenation using nitrogen gas purging or vacuum degassing. Each of these technologies has its strengths and promises with respect to control of ballast water communities. The interim standard set by this bill must provide specific targets, not percentage reductions. Without these the developers cannot progress with system design for eventual appli-

cation in the shipping industry. Depending on the technology employed, control of the identified groups—live aquatic vertebrates, invertebrates, phytoplankton and macroalgae—is not attained with uniformity, just as the threat from these groups may also not be uniform. The ability to control a significant threat from the majority of these groups should not disqualify or discourage the continuing development of a technology that does not control all of the groups. For example, mechanical filtration in very large scale practical application is a compromise between volume treated and size retention of particles. In the current context a 50-micron retention standard might be attainable for very large volumes and be successful in retaining all the life history stages, including eggs, of the vast majority of aquatic vertebrates, invertebrates and macroalgae. This list would include a very substantial number of notorious invaders that are currently creating ecological and economic problems in many locations distant from their home ranges. By contrast a 50-micron filter would do little to retain most phytoplankton simply because this group contains many representatives with individual sizes well below 50-microns. Although they are undoubtedly widely distributed by ballast water transport, phytoplankton as a group have a proportionately lesser history as deleterious environmental agents when established in regions beyond their native ranges. A notable absentee from the text of the bill are the toxic dinoflagellates that cause red tide blooms—a group that may well represent a very serious challenge to any and all of the currently researched control technologies.

I respectfully offer the following two suggestions for consideration in minor text revisions for the bill. First, definitions for phytoplankton and macroalgae should be included that describe inclusive size ranges for both categories. Second, interim standards should be considered in terms of reduction in absolute numbers in defined size ranges, for example 100% kill of all organisms in excess of 50 microns maximum dimension, in order to make them independent of variation in source of the ballast water. Both will, I believe, assist the developers of treatment technologies and expedite the approval process for technologies as they reach maturity.

In closing I wish to add two comments. I offer my compliments on the details in H.R. 5396 addressing continual review and provision for improvement in standards as technology improves. We should not be handcuffed by the search for ultimate control tools while good, although perhaps not perfect technology is within our grasp to address the ecological problem at hand. Incremental common sense dictates employment of the best available tools now, and better tools in due course. Finally, both H.R. 5395 and H.R. 5396 provide a sound basis for new and continuing research priorities on a broad range of invasive species issues, and conduits to deliver the associated results to the regulatory process. Knowledge is a powerful tool that we must pursue and share to detect, control and, where possible eradicate, invading unwanted non-native species from the waters of the United States.

This concludes my testimony.

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Mr. GILCHREST. Dr. Windle, thank you for coming.

**STATEMENT OF PHYLLIS N. WINDLE, SENIOR SCIENTIST,  
UNION OF CONCERNED SCIENTISTS**

Dr. WINDLE. Yes, thank you.

It is a pleasure for the Union of Concerned Scientists to be represented here today, and we very much appreciate the opportunity to be here.

If we are to conserve the Nation's resources and save our economy billions of dollars each year, we simply must make a better match between the problems caused by invasive species and the Federal and State responses to them.

H.R. 5395 and H.R. 5396 are important steps in that direction. We are especially pleased to see that these bills will now apply throughout the United States and to all kinds of organisms.

There are also a number of specific provisions that biological scientists have long advocated as especially important. These include efforts to identify the high-risk pathways by which organisms reach the country and to develop and deploy the methods to limit them. They also include monitoring programs to detect and track invasive

species new to the United States and the means to respond quickly to such newcomers. Also, these bills discuss and implement modest steps toward more careful assessments of organisms that are intended for intentional import, but before they are imported.

It is helpful that these bills include not just the authority to carry out these sorts of activities but also the research that is necessary to move the efforts forward to evaluate their progress and to keep them up-to-date.

It is simply not enough that these efforts are part of an Inter-agency National Management Plan on Invasive Species; nor is it enough that the Federal agencies say that they are already engaged in some of these activities already. We see two major reasons why this is the case.

First, the General Accounting Office has very recently documented serious concerns regarding the Federal agencies' implementation of the National Management Plan. We would add our own recognition that in the past, the United States Coast Guard has been much more capable of timely response in this area, and we also are disappointed to see continuing delays.

The second reason why we think we need these bills urgently is that many of the provisions in these bills were outlined in a general fashion in the 1990 legislation, yet they were never implemented. So many of these aspects that are a part of the legislation we are discussing today puts much-needed flesh on the bones of that 1990 law and ensures that we have a better track record to show 12 years from now than we do now for the 1990 legislation.

These bills have the broad support of a group of stakeholders and we, among others, will be pleased to work for their passage. But from our point of view, the bills also miss some key opportunities. We know that others in our stakeholder group will disagree, but we think these are areas that will necessitate our attention over the long term.

First, we are convinced that eventually, all organisms that are intended for import intentionally will be screened. The trends are in this direction, and we would like to see that the time for that to come is quick, with the fewest exemptions along the way.

Also, we would like to see us move very smoothly through this transition from the use of ballast water exchange to ballast water treatment, and we would like to achieve Federal standards quickly that are consistent with the most comprehensive approaches taken at the State level.

We also believe that the technical and scientific merits of Government-funded research protocols and contracts must be as high as possible. Scientists have always used ongoing peer review by independent experts to achieve this, and we would like to see that process applied more frequently in this area.

Where lack of funding limits our progress, we would like to see the agencies newly elevate this issue to a priority sufficient to complete the tasks that your bills lay before them or, if they cannot do that, we would suggest that the time has come to develop new means of generating revenue that is sufficient for this work—for example, the greater use of user fees.

At this point, more than 2,500 UCS scientists, members and activists representing every State in the Union have already faxed,

emailed, or written their congressional delegations alerting them to this upcoming reauthorizing process and asking that reauthorization happen quickly and with legislation that is broader than the National Invasive Species Act of 1996. We consider that this is a remarkable and substantial interest on the part of the public in a specialized topic that has had limited engagement with it in the past.

I would conclude with a cautionary tale. I first testified on the subject of invasive species in 1993 for what was then the House Merchant Marine and Fisheries Committee. I was working for a congressional research agency at the time, and they asked me specifically to address a risk that was new to their purview, which was the risk posed to our Nation's resources by the Asian black carp.

It was clearly on the basis of the research I did that this fish posed significant dangers to us, and it would have been logical to add it to the Lacey Act quite quickly.

The Fish and Wildlife Service's comment period on the Lacey Act addition of black carp just closed on September 30 of 2002. We have known the risks for at least 9 years now, and it is hard to understand these sorts of delays. It is not just the Coast Guard that can move forward with all deliberative speed.

We urge a very fast holding onto the prescriptions and deadlines in the bills we look at today. We urge you to keep assigning that required homework, and we thank you for your leadership.

[The prepared statement of Dr. Windle follows:]

**Statement of Phyllis N. Windle, Ph.D., Senior Scientist, Union of Concerned Scientists, Washington, DC**

*Where We Find Ourselves Today*

Our country is playing a huge game of ecological roulette with the Nation's resources. Until our policies get tougher, mostly luck determines whether the new species that arrive in the United States are useful, benign, or invasive—like the zebra mussel and northern snakehead fish. The two bills we are considering today—H.R. 5396 and H.R. 5395—are important steps toward that stronger policy.

In the 1990's, scientists and policymakers developed a much greater understanding of invasive species. We discovered, for example, that the most damaging single species easily cost us more than ten million dollars per year. Also, we learned that invasive species are the main contributor to the listing of about one-half of the Nation's threatened and endangered native species. Now a clear understanding exists that the spread of invasive species is one of the most serious environmental threats before us. We face a threat that is already changing the face of the planet.

Yet changes in federal policy have not kept pace with our new understanding of the issue. An exception is the area we're discussing today. With legislation first passed in 1990, revised in 1996, and now being considered again, Congress has sought to respond and adapt to this new reality for more than a decade. Yet we all acknowledge that the previous legislation—and federal agencies' implementation of it—has provided less help than we hoped. For instance, invasive species have continued to enter the Great Lakes via the ballast water of ships despite mandatory efforts to prevent it. Just last Friday, scientists predicted that 22 additional fish species from the Caspian and Black Seas could reach the Great Lakes via the ballast water of ships—and spread quickly.<sup>1</sup> They predicted that at least five of these species would become invasive.

The two bills before us today are not Republican or Democratic bills. Instead, they are the product of a bipartisan effort. We want to acknowledge the hard work of many members of Congress and their staffs. In particular, we would like to thank Mr. Gilchrest, Mr. Ehlers, and their staffs—as well as the staff of the Northeast Midwest Institute—for their roles in preparing these bills. Nor are these environ-

<sup>1</sup> Kolar, C.S. and D.M. Lodge. 2002. Ecological predictions and risk assessment for alien fishes in North America. *Science* vol. 298, pp. 1233–1236. See also: Recer, P. 2002. Alien fish may invade Great Lakes, Associated Press, Nov. 11, 2002.

mental bills or industry bills. Their content instead shows the continuing, good faith efforts of a broad group of stakeholders, as well as the compromises worked out among them.

*H.R. 5396 and H.R. 5395 Lay Out Many Positive Steps*

The Union of Concerned Scientists is pleased to endorse these bills. Early in 2002, we laid out a number of priorities that we felt would help the National Invasive Species Act protect the United States better—both environmentally and economically. The current bills are consistent with a significant portion of our priorities.

We are especially pleased that certain weaknesses in the 1996 law are being corrected. For example, it is crucial that this legislation, and its most stringent provisions, apply:

- throughout the United States; and
- to all kinds of invasive or potentially invasive aquatic organisms—regardless of their taxonomic category.

We also strongly support those elements of the legislation that address the full range of pathways by which we introduce and spread harmful aquatic organisms. Thus, we give our strong support to a number of specific provisions in these bills:

- identifying the highest risk pathways for introductions and the rapid development and deployment of methods to limit them;
- establishment of a monitoring program to detect and track new invasive species;
- ensuring that we have the means, such as contingency plans and specially trained teams, to respond quickly to these newcomers;
- and taking a modest step toward more careful assessment of the potential invasiveness of species proposed for intentional introduction before they are imported.

Each is essential if we are to make progress on this issue. And each must be backed by targeted research—which H.R. 5395 provides.

In addition, we look forward, under H.R.5396 to much-needed annual updates of the species listed under the Lacey Act and the Plant Protection Act. It is helpful to the States that additional elements can be included in their aquatic invasive species management plans. It is appropriate that matching funds be available for implementing these plans and that higher levels of funding be authorized. Also we anticipate the time when federal agencies will more strictly limit their own introductions. The lists of potential invaders will help all jurisdictions to be alert and better prepared.

It is true that these many of these elements are included in the National Invasive Species Council's National Management Plan.<sup>2</sup> And it is true that a number of federal agencies are already at work on similar tasks. Some may argue that, because these efforts are underway, they need not be put in law. But it is also true that the U.S. General Accounting Office just recently raised serious questions about the Council's implementation of the Management Plan.<sup>3</sup> Enacting key provisions into law will help ensure that federal agencies address each topic in a timely way—and provide the public with recourse if they do not.

For that matter, it is also true that a number of these same provisions were part of the 1990 Nonindigenous Aquatic Nuisance Prevention and Control Act. But without firm deadlines, requirements to report back to Congress, additional appropriations, and other means to encourage implementation, these general provisions were neglected. Thus is it our belief that many of the details in H.R. 5396 put flesh on the bones of the 1990 law. None of these provisions should come as a surprise to the relevant federal agencies. Indeed, if they had complied with the letter of the 1990 law, they would have a 12-year track record to show. This, in particular, makes us relatively unsympathetic to requests for delay.

Of course, since 1990, this legislation has been intended to be our best defense against further unintentional introductions of invasive species in the ballast water of ships. Unfortunately, experience has shown us that ballast water exchange is not effective. The time has come to move away from a primary reliance on ballast water exchange. Ballast water treatment should be our goal. We should be moving in that direction boldly, with immediate interim standards paving the way for more ambitious and stronger permanent ones.

We are deeply disappointed that the U.S. Coast Guard continues to delay development of such standards. In 1993, the congressional Office of Technology Assessment determined how quickly the Coast Guard, as well as the new federal Aquatic Nui-

<sup>2</sup>National Invasive Species Council. 2001. Meeting the Invasive Species Challenge: National Invasive Species Management Plan. Washington, D.C.

<sup>3</sup>U.S. General Accounting Office. 2002. Invasive Species: Clearer Focus and Greater Commitment Needed to Effectively Manage the Problem. Washington, D.C. GAO-03-1.

sance Species Task Force, was completing the tasks Congress assigned to them in the 1990 law. The Coast Guard's record was stellar. It issued guidelines, technical assistance, and regulations early or, at most, just a few months past the law's deadlines.<sup>4</sup> It is our hope that the Coast Guard can be stirred to replicate the urgency and responsiveness the agency showed then.

We appreciate many of the elements of H.R. 5395, The Aquatic Invasive Species Research Act, too. It aims to make the collection of information and its analysis more comprehensive. The research laid out in this bill also advances the state of scientific knowledge, e.g., on different ecosystems' vulnerability to invasion. The availability of scholarships for taxonomists will be helpful, too. As people become more aware of the harm caused by invasive species, especially to human health, the need will increase for environmentally sound tools for detecting, preventing, controlling, and eradicating aquatic invasive species will increase. It is helpful that both of these acts encourage their development.

It is also helpful that H.R. 5395 stipulates that certain research protocols, contracts for ecological and pathway research, and recommendations for restricting planned imports nonnative aquatic organisms will be subject to peer review. In the past, the technical merits of some federal efforts have been weak.<sup>5</sup> Peer review, by independent experts with no financial interest in the outcome of a decision should be a standard supplement to agencies' requests for federal comments in highly technical areas. We believe the requirement for peer review should apply to many of the elements in H.R. 5395 as well. In particular, attempts to develop screening methods need to have the input and review of academic experts and others outside the federal government. To help you consider the research we will need over a longer term, I have attached the recommendations of three expert groups of scientists.<sup>6</sup>

*A Larger Vision: Where We Need to Keep Working*

In all of the areas above, UCS sees many positive sides to these bills and we will work hard to ensure they are passed. At the same time, we fear that they miss some key opportunities. Not everyone agrees with us and we welcome even incremental steps. Over the longer term, though, we believe the Nation's resources deserve stricter protection.

From discussions of voluntary measures in the nursery and aquarium industries to the willingness of shippers to change their ballasting practices—all trends point in one direction. Governments, industries, and individuals are taking greater care to limit their movements of damaging species around the world. We are certain that, eventually, all intentionally introduced organisms will be effectively screened for invasiveness before import—with the most invasive or potentially invasive kept out. We would like to see that time come as soon as possible. And we would like it to be with the least possible number of exemptions for organisms now in trade. This last includes aquatic species in the live food trade—which brought the northern snakehead to Maryland this summer.

Also, we hope that federal standards for screening or for treating ballast water do not represent "a race to the bottom." We need federal standards that are at least consistent with the most comprehensive approaches taken at the state level.

While we are not generally sympathetic to calls for delay, neither are we advocates for unfunded congressional mandates. Eventually we must have formal provisions for generating sufficient revenue to ensure adequate funding not just for the new work we are discussing today, but also to undertake more ambitious efforts, e.g., to screen organisms prior to import.

*These Bills' Passage: in the First One Hundred Days*

What were once piecemeal efforts to alleviate local weed or pest problems have coalesced into a national strategy. This is largely because we have come to under-

<sup>4</sup>U.S. Congress, Office of Technology Assessment. 1993. Harmful Non-Indigenous Species in the United States. (Washington, D.C.: U.S. Government Printing Office) Table 6-1, p. 169, available online at <http://www.wvs.Princeton.edu/ota/>

<sup>5</sup>See, for example, National Research Council. 2002. Predicting Invasions of Nonindigenous Plants and Plant Pests (Washington, D.C.: National Academies Press)

<sup>6</sup>"Specific Recommendations on Research." Source: National Council for Science and the Environment. 2001. Recommendations for Improving the Scientific Basis for Decisionmaking. A Report from the first National Conference on Science, Policy, and the Environment. Washington, D.C., p. 15; "Research Questions About [Intentional] Introductions." Source: Ewel, J.J. et al. 1999. Deliberate introductions of species: research needs. *BioScience*, vol 49, no. 8, pp. 619-630; "Research Priorities for Invasive, Non-Native Species and Their Potential Impacts on Natural Populations and Communities of Ecosystems." Source: Source: D Antonio, Carla, Laura A. Myerson, and Julie Denslow, 2001. Exotic Species and Conservation, in *Conservation Biology: Research Priorities for the Next Decade*. M.E. Soule and G.H. Orians, eds. Washington, D.C.: Island Press, pp. 59-80.

stand that nearby weeds and pests are just the local face of a global problem. As this problem grows, so must our efforts to halt it. From that standpoint, we know we will need to update these bills in another five years, incorporating the newest scientific information and most recent evaluations of our efforts. But today we can make the long overdue changes and urgently needed improvements contained in H.R. 5396 and H.R. 5395.

The Union of Concerned Scientists is committed to taking these and other steps as soon as possible. More than 2,500 UCS members and activists—representing every state in the Union—have already faxed, emailed, or written their congressional delegations about this reauthorization. They asked that reauthorization happen quickly and that what was the National Invasive Species Act be broadened and strengthened at the same time. To us, this seems like remarkable and substantial interest in a highly specialized topic with limited public engagement.

Zebra mussels, nutria, and the seaweed caulerpa have not halted their spread for our elections. Therefore we hope that either this Congress passes these bills now or that the new Congress will pass them in its first 100 days. We look forward to helping you make that happen.

#### *A Final Parable*

I first testified regarding invasive species in 1993 for what was then the House Merchant Marine and Fisheries Committee. I represented a congressional research agency at the time and the Subcommittee specifically asked me to address the risks posed by the proposed import of the Asian black carp.<sup>7</sup> It was clear from my quick reading of the scientific literature that this species posed a substantial risk to the nation's aquatic resources. Addition to the Lacey Act's list of prohibited species would have been a logical step. That was 1993. This fish is still not listed on the Lacey Act. On September 30, 2002, almost exactly nine years later, the official public comment period ended for the Fish and Wildlife Service's proposal to make this fish subject to the Lacey Act. Is there anyone here who believes that ten years is a timely or adequate response to the dangers posed by a particular invasive species? I ask you to remember this example as we consider how quickly H.R. 5396 and H.R. 5365 should turn the wheels of government.

[An attachment to Dr. Windle's statement follows:]

#### **Priorities for Invasive Species Research from Three Expert Groups**

GROUP I. "SPECIFIC RECOMMENDATIONS ON RESEARCH." SOURCE: NATIONAL COUNCIL FOR SCIENCE AND THE ENVIRONMENT. 2001. RECOMMENDATIONS FOR IMPROVING THE SCIENTIFIC BASIS FOR DECISIONMAKING. A REPORT FROM THE FIRST NATIONAL CONFERENCE ON SCIENCE, POLICY, AND THE ENVIRONMENT. WASHINGTON, D.C., P. 15.

1. In order to inform rapid response capabilities and long-term management needs, the federal government should support existing programs and establish new programs to quantitatively assess ecosystems before, during, and after biological invasions.
2. Research to identify invasive pathogens and vectors needs to be expanded, as does research on the taxonomy, systematics, and technologies needed to detect and respond rapidly to invasions of these organisms.
3. Research and development on methods and technologies of control and elimination needs to be increased, with specific emphasis on finding solutions that are environmentally sound.
4. To better inform economic and policy decisions, there is a significant need to continue existing research and initiate new research to:
  - Determine the vulnerability of ecosystems to invasion and the role and effects of multiple stress factors;
  - Understand the human dimensions (causes and consequences) of invasive species
  - Determine the ways and degrees in which invasive species disrupt ecosystem services;
  - Identify:
    - The industries and other social forces responsible for facilitating the major pathways on invasion;

<sup>7</sup>Mylopharyngodon piceus

- The actions (scientific, technological, policy, etc.) through which they can minimize invasion;
- The ways to inform them of these options;
- How to use voluntary incentives and/or policy measures to ensure effective response.”

GROUP II. “RESEARCH QUESTIONS ABOUT [INTENTIONAL] INTRODUCTIONS.” SOURCE: EWEL, J.J. ET AL. 1999. DELIBERATE INTRODUCTIONS OF SPECIES: RESEARCH NEEDS. BIOSCIENCE, VOL 49, NO. 8, PP. 619–630.

Several research questions need to be answered to help ensure that proposed introductions are done wisely and safely.

*Guarding against risks without sacrificing benefits:*

- How can the potential benefits and costs of introductions best be evaluated in economic, environmental, and social terms?
- Should all introductions be regulated?
- How different must organisms or recipient ecosystems be from those assessed previously to warrant independent assessment?
- When is it appropriate to assess and regulate taxa other than species?
- What are appropriate ecological and political boundaries for regulation?

*Alternatives to introductions:*

- How and when can indigenous organisms be domesticated so that they can substitute for proposed uses of nonindigenous organisms?
- How can the retention of indigenous species and natural food webs be integrated into agroecosystems so that the risk of pest problems is minimized?

*Purposeful introductions:*

- What common guidelines can be developed for deliberate introductions of all kinds of organisms?
- Have screening procedures differed for introductions that proved successful or harmful?
- How can the potential for nonindigenous organisms to disrupt ecosystem processes be assessed and reduced?
- Can the demand for introductions be reduced by improving the effectiveness of introductions that are attempted?

*Reducing negative impacts:*

- When can reduction of human-caused disturbance within natural areas be used to control nonindigenous species impacts?
- Can subtle, indirect effects of potential introductions be predicted?
- Can enough be learned from the population growth lags, booms, and crashes of previously introduced organisms to make useful generalization?
- Should special guidelines accompany release of sterile forms, which may pose less risk than fertile organisms?
- Can protocols be developed to predict when an introduced species will hybridize with natives and what the ecological and economic consequences of such hybridization might be?
- Should special guidelines related to invasion and hybridization potential be added to those that already regulate release of genetically engineered organisms?

GROUP III. “RESEARCH PRIORITIES FOR INVASIVE, NON-NATIVE SPECIES AND THEIR POTENTIAL IMPACTS ON NATURAL POPULATIONS AND COMMUNITIES OF ECOSYSTEMS. SOURCE: SOURCE: D ANTONIO, CARLA, LAURA A. MYERSON, AND JULIE DENSLOW, 2001. EXOTIC SPECIES AND CONSERVATION, IN CONSERVATION BIOLOGY: RESEARCH PRIORITIES FOR THE NEXT DECADE. M.E. SOULE AND G.H. ORIAN, EDS. WASHINGTON, D.C.: ISLAND PRESS, PP. 59–80.

*Note:* A question mark (?) indicates a top research question. An asterisk (\*) indicates a research priority that needs an answer within next ten years, or it will be too late for many species or natural communities.

*Investigate Pathways of Introduction:*

- \*1. What are the critical pathways of introduction of new species, and how do they differ in contributing harmful nonindigenous species? For example:
  - \*• Introduced plant pathogens can have devastating consequences for entire ecosystems. What are the most important pathways for their arrival, and how do they subsequently spread?

- \*• Introduced insects may also strongly affect forested ecosystems and may carry pathogens. What are the most common pathways for harmful nonindigenous insect species to arrive in new locales, and how does the likelihood of their successful establishment scale with volume of trade?
- \*?2. What are acceptable levels of risk of entry of known potential invaders, how well do protocols established to prevent accidental introductions really work and how can protocols be improved?
- 3. How do minimum viable population sizes of invaders vary among species, ecosystems, and establishment circumstances? Are there useful generalizations to be made here that might help development of monitoring and screening strategies?
- \*?4. Under what circumstances do intentional introductions for commercial purposes contribute to the introduction and spread of harmful invasive species? Can we develop reliable risk assessment protocols to screen intentional introduction for potential invaders, particularly harmful ones?

*Investigate the Process of Invasion and Spread*

1. What traits characterize species with high potential for rapid spread beyond their site of introduction?
2. What are the characteristics of natural communities that affect their resistance to invasion? How does propagule pressure interact with resistance, and under what circumstances can we expect propagule pressure to overwhelm resistance?
- ?3. How will the spread of non-native species be affected by other global changes, such as chemical pollution, climate change, altered disturbance regimes, and alteration of biogeochemical cycles? For example:
  - Will nitrogen deposition increase rates of plant invasions by favoring fast-growing non-native species?
  - Will changes in storm frequencies and intensities affect the persistence of native populations and potentially favor disturbance-loving exotic species?
  - Will increasing environmental stresses such as air- or water-borne pollutants make native species more susceptible to introduced diseases?
- \*4. Why are tropical ecosystems less invaded by nonindigenous species than their temperate counterparts? Will increasing fragmentation of tropical habitats and propagule pressure from exotic species alter this pattern?
5. What is the relationship between neighborhood-scale species interactions that affect invader success and landscape-level patterns of invasion and impact?
- ?6. Why are there often long time lags between establishment and the explosive growth and spread of introduced populations? Are there commonalities among species in their invasion patterns relative to the occurrence of time lags?
7. How does genetic diversity influence rates or patterns of invasion?
- \*8. How do human activities and cultural patterns-*e.g.*, road construction, land-use patterns, traditional uses of plants, and visitation to reserves affect the introductions and spread of invasive species?

*Assess Impacts*

- \*?1. What is the potential for introgression of introduced genes to native species, and under what circumstances is this likely to cause a change (either positive or negative) in fitness (and hence ecological performance)? How does the likelihood of such introgression vary among mating systems and life history characteristics of introduced taxa?
2. What traits of exotic species increase the danger of genetic threats to native species? What ecosystem characteristics are associated with high rates of genetic introgression?
3. Which species traits (or combinations thereof) are most likely to threaten local persistence of native species or create difficult-to-reverse impacts on ecosystem processes?
4. Does the arrival and establishment of one or a few non-native species influence the establishment of further alien species?
- ?5. How can knowledge of species traits be overlain or interfaced with ecosystem traits to predict species impact?
6. What kinds of higher-order effects-*e.g.*, on other trophic levels or on community processes-are associated with interspecific interactions involving introduced species?

7. How do species richness, functional diversity, and trophic complexity influence the impact of an invader?
- \*8. Under what circumstances are impacts of an invasive species likely to be reversible? Are ecosystem effects longer lasting or farther reaching than competition or predation effects? Are impacts due to competition or predation more likely to cause population declines or extinction among native species?

*Consider Genetically Modified Organisms*

- \*1. Under what circumstances might GMOs or their genes be able to spread beyond points of introduction?
- \*2. Under what circumstances might the spread of GMOs or their genes into wildland habitat pose a threat for native species or ecosystem structure and function?
- \*3. What criteria are needed to develop protocols for release and risk assessment associated with GMOs?

*Study Control, Restoration, and Their Interactions*

- \*1. How do we develop priorities for exotic species removal, control, or use?
2. Under what circumstances does control or removal of an invasive species lead to a less desirable condition?
3. Under what circumstances is the introduction of exotic species warranted for restoration or for biological control of invasive non-native species?

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Mr. GILCREST. Thank you, Dr. Windle.

We have some in-House work; that is why they are calling us. But I think we have a little time to proceed with some questions for the panel.

Vern or Judy, if you need to go, I can yield to you first if you have any questions for the panel.

Mr. EHLERS. I will try to be brief on this one. It is for Ms. Cangelosi and Dr. Mann.

Both of you support the interim standard for ballast water treatment in your testimony, but you differ on what the standard should look like. Dr. Mann, if I understand you right, you believe the interim standard set by this bill must provide specific targets and not percentage reductions. And Ms. Cangelosi, you support the 95 percent reduction standard in H.R. 5396.

I just wonder if both of you could briefly and succinctly describe the pros and cons of these approaches and why you have different positions.

Ms. CANGELOSI. Thank you, Mr. Ehlers.

The fact is in terms of my outlook on it, I do not believe that they are mutually exclusive. The question is more on what do we base the interim standard, and in statute now, although it has not been implemented, that parameter is equivalence to ballast water exchange.

So 95 percent is a known way of characterizing or benchmarking ballast water exchange effectiveness, because that is measured in terms of the efficiency of volumetric exchange.

I think Dr. Mann and I would both tend to agree that if we needed to set a size limit that might capture 95 percent of the zooplankton, it could well be around 50 microns, and that could well be a great way to operationalize a statutory direction to use 95 percent as a benchmark.

If it is disengaged from 95 percent, however, that leaves the floor open for people to nominate different sizes, and I am one of the advisors to the IMO delegation, and I watched that happen in London

in September, and where they came out was 100 microns because that seems more technologically achievable.

The fact is that 100 microns might preclude 60 percent of the zooplankton, and therefore, without the 95 percent, we are left with little reason to demand the equivalency.

So my concern is more about what is appropriate to statute versus what is appropriate to operationalizing that statute.

Thank you.

Mr. EHLERS. Dr. Mann?

Dr. MANN. In general, I think we have good agreement between our approaches. My concern with the 95 percent number, as with any dilution, is that if you do not know where you started, how do you know where you are going to end.

If I fill up my ballast tank in Saint Croix or in Guam, and then I have to reduce it 95 percent, I get a number. If I fill it up in Bramerhaven or Lagos, and I reduce it by 95 percent, I get a very different number.

From the point of view of looking at how we have set standards in the past for such things as drinking water, effluents that I am more familiar with and things that I have dealt with over my years, a number is a good tool to look for. I understand that at this point in time, operationally, a number is difficult. Ninety-five percent is a great place to start—do not get me wrong—95 percent is a great place to start. But if I am looking around at the private sector where individuals are trying to develop treatment technology, really, if you give them a number, they are a lot better off. Engineers function better when you point them at numbers rather than when you point them at percentages.

If you are going to have these engineers be part of teams that are investing considerable amounts of private capital with the idea of eventually enjoining the shipping industry and accepting this as a suitable application, I think you have to give them a standard to start with fairly quickly. Otherwise, they are proverbially shooting in the dark.

I think that the 50 micron one that I have chosen, if you look across the vast range of invertebrates, vertebrates, fishes, whatever, and you try to pick a number that will capture the vast number of their life history stages—and typically, you choose eggs, because they are the smallest; fertilized eggs are the smallest smoking gun that you have in this equation—if you can capture all of those, you are in good shape.

So 50 microns was my choice. I notice that it has actually been brought up by others who have sat at this table, and as an exercise when I received this copy of this bill last week, I gave it to my graduate student class with two questions—what is wrong with the bill, and how would you fix it?

The graduate student class who had never seen this before said: Percentages are a problem. Why don't we use 50 microns?

So I am not at all against 95 percent. I would like us to start to move to a number, because I think it will truly accelerate the rate at which alternate treatment technologies can be developed.

Mr. EHLERS. And would you agree or disagree with the Coast Guard's statement that the provisions in the bill are neither enforceable nor scientifically supportable?

Dr. MANN. I think that is a matter of looking at the technologies as to how you want to develop them. If I were asked to go and look at a ship that had a 50 micron limit on it, and this thing is sitting outside Hampton Roads, and I have 5 or 6 hours to look at it and, say, test the water in the ballast tank—if you take samples of water out of the ballast tank, and you pour it through a 50 micron mesh—and these are commercially available—there are things called vital stains. Vital stains are very easy to use. You drop them on living organisms—typically, the one that we use is a stain called “neutral red”—if it is live, it stains red; if it is dead, it does not stain. You take your plankton, you pour it onto a 50 micron mesh, you stain it, you look at it under a microscope. If there is red stuff under there, it is live; if there is no red stuff, it is all dead.

I think from a point of view here—and I would like to complement something that Greg Ruiz said here—there is a true diversity of expertise that we need to bring together like a jigsaw puzzle to make this work. I think a lot of it is sitting in this room or certainly in the first generation of individuals whom we can touch outside this room.

I do not think it is that difficult to do this. We have not quite asked ourselves how do we do it. But I think these things are enforceable if you are going to use size limits.

Mr. EHLERS. Thank you very much.

Mr. GILCHREST. Thank you, Vern.

To follow up on Vern’s questions, we are looking—I guess this panel, and I suppose the previous panel, all agree that standards need to be set, and it sounded like they said and you are saying that a size standard is better than a percentage standard.

So I have two questions. One is can we have a size standard in the interim, before the final standard is promulgated, whenever that is; and if we use 50 microns, do we have the technology—Dr. Mann, you just seemed to describe that we have the technology right now to use a size standard—which would be better for an interim—a percentage or a size standard—and if we did use a size standard, what would 50 microns miss, or are we looking for just 50 microns?

Ms. CANGELOSI. Thank you.

The interim standard is a tiding-over period for the final standard, which in the legislation can be promulgated as soon as 4 years after the enactment of the Act, while the interim standard is promulgated 18 months after the enactment of the Act.

I believe that these questions of what will it take to protect the environment are relevant to the final standard because everyone will need to meet the final standard.

Mr. GILCHREST. So you are saying the final standard should be a size standard?

Ms. CANGELOSI. I think that would definitely be the way to go.

Mr. GILCHREST. But a percentage standard is all right now, though, in the interim?

Ms. CANGELOSI. Yes.

Mr. GILCHREST. Because it would be easier?

Ms. CANGELOSI. In the interim period, I rather doubt that we are going to have extensive use of the standard—hopefully, more than we have right now—but most ships will still use ballast water ex-

change. And that gets to the question of technological achievability. That is not relevant to the interim period, either, because treatment is simply an option. A ship may do ballast water exchange, or if it wants to and can meet that baseline level that ballast water exchange affords, it can substitute a treatment.

So we hope that it will be reaching, that it will be a standard that will cause the industry that creates treatments to reach, and therefore I think 95 percent, which might have an equivalence to 50 microns, is a good place to start.

Thank you.

Mr. GILCHREST. Thank you.

Dr. Mann?

Dr. MANN. I think that the 95 percent is a good place to start with the interim. You have some stiff deadlines here, lots of them all stacked up—

Mr. GILCHREST. Do you think the deadlines are practical, that they are meetable, doable?

Dr. MANN. That is a difficult question because I know very little about the practicality of operating the shipping industry. I am not trying to duck the question; it is a very good question.

Mr. GILCHREST. Outside the shipping industry, the technology could be developed, available?

Dr. MANN. I think if you are looking for the technology that is going to get you to a final standard, which I also think should be a size standard, in 4 to 5 years, from what I know of it, yes, I think there are some good people who can do that.

There are options for review here. In terms of the interim standards for the 18 months, 95 percent is a great place to start.

Mr. GILCHREST. Now, the size standard which can be developed in a few years, as we pass through the interim standard, are the treatment technologies—ultraviolet radiation, ozone disinfecting, mechanical filtration, deoxygenation using nitrogen, gas purging or vacuum degassing—are those technologies that are on the cusp of being developed, available, so that you would not have—I am assuming if you use these technologies, you do not need ballast water exchange.

Dr. MANN. All of these are intended to avoid the need for ballast water exchange. They are all proprietary technologies, and the developers of them will only share so much of the information because they are all in competition with one another.

None of them is perfect, and I think that even in 4 years, none of them is going to be perfect, but I think they will be very good at hitting certain of these size ranges, and that is part of the problem with the way in which we look at sizes versus 95 percent reductions. I have given you an example where I think you could hit 95 percent or 100 percent of three of your target areas. Phytoplankton includes a very large number of very small organisms, and there is a good chance that phytoplankton will go through most if not all of these.

Mr. GILCHREST. How about the toxic dinoflagellates that you mentioned in your testimony?

Dr. MANN. Toxic dinoflagellates are just a remarkable challenge. This group of organisms have complicated life cycles, they have more than one stage in their life cycle, and included in these are

cysts, and these cysts are designed over evolutionary time to sit in the sediment under just awful conditions for long periods of time until just the right conditions for initiation of a bloom occur.

So if you can find something that is going to take out the toxic dinoflagellates, you have a remarkable technology. The toxic dinoflagellates, I think we are still a way from getting to that. I think some of these other technologies have much greater promise in shorter time period to getting to some of the organisms that are bigger.

So you have a multiple number of moving targets here with different technologies that probably work better with some than the other. All of them have prospects for a spectrum. I do not know at this point in time that any of them have the prospect to take out everything, and that is part of the problem.

Mr. GILCHREST. Thank you.

Ms. CANGELOSI. If I may add that we are also looking at very different subject vessels between a passenger vessel, a container ship, a seaway-size cargo carrier, and then an oil tanker and transoceanic bulk cargo carriers, and the list goes on. The legislation very wisely applies the best available technology, economically achievable, by class of ship and by age of ship, quite clearly, and the shipping industry is very willing to make this statement. Putting technologies onto a new ship at the drawing table stage is much more feasible and economically achievable right now than a retrofit is for many classes of ships.

So the bill, I think, accommodates to the very diverse range of subject vessels and will drive technology, just the private sector's interest to be the one ahead to develop the methods for those different classes of ships that will approach the goal.

Mr. GILCHREST. I see. Did the IMO adopt a 100 micron size?

Ms. CANGELOSI. No, it did not. It was at the urging of the U.S., appropriately—

Mr. GILCHREST. That they did not.

Ms. CANGELOSI. —that the final standard was set as a size-based standard. The interim standard has bifurcated two possibilities right now—95 percent or a size to be defined. The U.S. position was not to define that size in September, but they did at 100 microns as a proposed size.

Mr. GILCHREST. I would assume that if the U.S. adopts a 50 micron size in the next few years, that the IMO will adopt that micron size—at least for their ships coming to our port.

Ms. CANGELOSI. It certainly would detract from the effectiveness of an international agreement if the U.S. could not sign onto it. I do not believe the U.S. group has a position on 100 microns, but I know that they were not initially favorable toward it.

Mr. GILCHREST. I would assume that whatever standard we have—and I hope that would be the best standard—the international maritime community wanting to trade with us would have to meet that standard, so then the standard would be set for the international community.

You were saying that the interim standard is enforceable, the 95 percent standard, and someone on the other panel said it would be difficult to enforce. Could you give us some idea of why the interim

standard of 95 percent is enforceable when the Coast Guard thinks it might not be enforceable?

Ms. CANGELOSI. I think the difference is that the Coast Guard is thinking of the long-term standard, and in the case of the long-term standard, we definitely want to just take samples of discharge.

In a short-term period, if they can rely on Congress to assure that that final standard goes into place—and we are just talking about an interim period—actually, the way that they currently approve technologies in the maritime area is through a type approval process that occurs either apart from the vessel or on the vessel, but it is a before-and-after study that is done in a discrete period of time, and if it shows the appropriate level of effectiveness, the assumption is made that as long as that technology, that system, is working effectively, it is good to go, and the ship is approved. Then they just do proxy measures on the ship to make sure that the red light and the green light are coming on at the right times.

I do not think that that is the right way to go in the long term. I think we need to take discharge samples. But in the short term, it is probably what we are looking at, and in that case, 95 percent lends itself very well.

Mr. GILCHREST. Thank you.

Dr. Chavarria—and I will have to go with my other colleagues, and I apologize for the quick ending of this portion of the hearing—but Dr. Chavarria, do you have any comment—I cannot read the handwriting of the staff here—that is a problem we have; they need a little bit more—maybe they should type it out—terrestrial plants. Do you see—what is the question, John? Is it harder to control aquatic species as opposed to terrestrial species?

Dr. CHAVARRIA. No. I think I would put them in the same category, completely in the same category. In a way, you might think it is easier to deal with terrestrial plants because of the fact of movement; with aquatic species, the water moves a lot of these species. But in the long term, we have seen, for example, with giant salvinia or water hyacinth that these plants have taken over a lot of places.

Mr. GILCHREST. Thank you.

Dr. Windle, do you have any further comment on the discussion that we have been having?

Dr. WINDLE. I guess I would say that in the aquatic habitats, I suspect that there are fewer pesticides that are registered for use than against terrestrial organisms, so we may have a narrower toolkit to work with. But I think we are all encouraged in the last few years about the successful control programs that have happened and the successes in a few instances of eradication and looking forward to that continuing.

Mr. GILCHREST. The last question—in an ideal world—I guess we are all shooting for the ideal, the best protection—should the U.S. stop importing all exotic species for recreational purposes, pet purposes, bait purposes—you name it—just say that is it, we are not going to bring in any more invasive species—so we will not have any problems in Crofton with snakeheads or whatever?

Is there any comment? I see some heads nodding in the audience, saying yes, that is a good idea—I do not know if they are on your staff or not.

Dr. WINDLE. I guess I would say no, of course not. We rely too much on nonindigenous germplasm and other non-native species that are completely safe in terms of being noninvasive as well. So for American agriculture, which is based almost exclusively on non-native organisms, and for our gardens and for our pets, I think the overwhelming majority of the organisms that we introduce are safe, but we just must be much more careful about the ones that we do import.

Mr. GILCHREST. So we should aggressively pursue things like the snakehead fish and Vietnamese worms?

Dr. WINDLE. Yes—and aggressively pursue the process of assessing them and screening them before we bring them in.

Thank you.

Mr. GILCHREST. Thank you.

Ms. Cangelosi?

Ms. CANGELOSI. Thank you. We definitely want to stop or otherwise restrict the importation of invasive organisms. The trick is determining which of the non-native are invasive and which ones are not, and that is indeed a big trick. But I am glad that the legislation gets the agency started to develop a protocol for attempting to do that and for reviewing and revising it as we learn more.

Mr. GILCHREST. Thank you.

Thank you all very much. Your testimony has been very valuable.

Dr. Mann, were you going to leave that Oriental snail here?

Dr. MANN. Yes, sir.

Mr. GILCHREST. I will come down and get it.

Thank you all very much. The hearing is adjourned.

[Whereupon, at 12:30 p.m., the joint hearing was concluded.]

