THE GREAT LAKES REGIONAL COLLABORATION STRATEGY: CAN IT BE IMPLEMENTED TO RESTORE AND PROTECT THE GREAT LAKES?

(109–96)

HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED NINTH CONGRESS

SECOND SESSION

SEPTEMBER 13, 2006

Printed for the use of the
Committee on Transportation and Infrastructure

U.S. GOVERNMENT PRINTING OFFICE

30–666 PDF WASHINGTON : 2007

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2250 Mail: Stop SSOP, Washington, DC 20402–0001

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

DON YOUNG, Alaska, *Chairman*

THOMAS E. PETRI, Wisconsin, *Vice-Chair*
SHERWOOD L. BOEHLERT, New York
HOWARD COBLE, North Carolina
JOHN J. DUNCAN, JR., Tennessee
WAYNE T. GILCHREST, Maryland
JOHN L. MICA, Florida
PETER HOEKSTRA, Michigan
VERNON J. EHLERS, Michigan
SPENCER BACHUS, Alabama
STEVEN C. LATOURETTE, Ohio
SUE W. KELLY, New York
RICHARD H. BAKER, Louisiana
ROBERT W. NEY, Ohio
FRANK A. LOBIONDO, New Jersey
JERRY MORAN, Kansas
GARY G. MILLER, California
ROBIN HAYES, North Carolina
ROB SIMMONS, Connecticut
HENRY E. BROWN, JR., South Carolina
TIMOTHY V. JOHNSON, Illinois
TODD RUSSELL PLATTS, Pennsylvania
SAM GRAVES, Missouri
MARK R. KENNEDY, Minnesota
BILL SHUSTER, Pennsylvania
JOHN BOOZMAN, Arkansas
JIM GERLACH, Pennsylvania
MARIO DIAZ-BALART, Florida
JON C. PORTER, Nevada
TOM OSBORNE, Nebraska
KENNY MARCHANT, Texas
MICHAEL E. SODREL, Indiana
CHARLES W. DENT, Pennsylvania
TED POE, Texas
DAVID G. REICHERT, Washington
CONNIE MACK, Florida
JOHN R. 'RANDY' KUHL, JR., New York
LUIS G. FORTUÑO, Puerto Rico
LYNN A. WESTMORELAND, Georgia
CHARLES W. BOUSTANY, JR., Louisiana
JEAN SCHMIDT, Ohio

JAMES L. OBERSTAR, Minnesota
NICK J. RAHALL, II, West Virginia
PETER A. DEFAZIO, Oregon
JERRY F. COSTELLO, Illinois
ELEANOR HOLMES NORTON, District of Columbia
JERROLD NADLER, New York
CORRINE BROWN, Florida
BOB FILNER, California
EDDIE BERNICE JOHNSON, Texas
GENE TAYLOR, Mississippi
JUANITA MILLENDER-MCDONALD, California
ELIJAH E. CUMMINGS, Maryland
EARL BLUMENAUER, Oregon
ELLEN O. TAUSCHER, California
BILL PASCRELL, JR., New Jersey
LEONARD L. BOSWELL, Iowa
TIM HOLDEN, Pennsylvania
BRIAN BAIRD, Washington
SHELLEY BERKLEY, Nevada
JIM MATHESON, Utah
MICHAEL M. HONDA, California
RICK LARSEN, Washington
MICHAEL E. CAPUANO, Massachusetts
ANTHONY D. WEINER, New York
JULIA CARSON, Indiana
TIMOTHY H. BISHOP, New York
MICHAEL H. MICHAUD, Maine
LINCOLN DAVIS, Tennessee
BEN CHANDLER, Kentucky
BRIAN HIGGINS, New York
RUSS CARNAHAN, Missouri
ALLYSON Y. SCHWARTZ, Pennsylvania
JOHN T. SALAZAR, Colorado
JOHN BARROW, Georgia

SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

JOHN J. DUNCAN, JR., Tennessee, *Chairman*

SHERWOOD L. BOEHLERT, New York
WAYNE T. GILCHREST, Maryland
VERNON J. EHLERS, Michigan
STEVEN C. LATOURETTE, Ohio
SUE W. KELLY, New York
RICHARD H. BAKER, Louisiana
ROBERT W. NEY, Ohio
GARY G. MILLER, California
HENRY E. BROWN, JR., South Carolina
BILL SHUSTER, Pennsylvania
JOHN BOOZMAN, Arkansas
JIM GERLACH, Pennsylvania
TOM OSBORNE, Nebraska
TED POE, Texas
CONNIE MACK, Florida
LUIS G. FORTUÑO, Puerto Rico
CHARLES W. BOUSTANY, JR., Louisiana, Vice-Chair
JEAN SCHMIDT, Ohio
DON YOUNG, Alaska
(Ex Officio)

EDDIE BERNICE JOHNSON, Texas
JOHN T. SALAZAR, Colorado
JERRY F. COSTELLO, Illinois
GENE TAYLOR, Mississippi
BRIAN BAIRD, Washington
TIMOTHY H. BISHOP, New York
BRIAN HIGGINS, New York
ALLYSON Y. SCHWARTZ, Pennsylvania
EARL BLUMENAUER, Oregon
ELLEN O. TAUSCHER, California
BILL PASCRELL, JR., New Jersey
RUSS CARNAHAN, Missouri
NICK J. RAHALL, II, West Virginia
ELEANOR HOLMES NORTON, District of Columbia
JOHN BARROW, Georgia
JAMES L. OBERSTAR, Minnesota
(Ex Officio)

CONTENTS

TESTIMONY

PREPARED STATEMENTS SUBMITTED BY MEMBERS OF CONGRESS

PREPARED STATEMENTS SUBMITTED BY WITNESSES

SUBMISSIONS FOR THE RECORD

Page

ADDITIONS TO THE RECORD

THE GREAT LAKES REGIONAL COLLABORATION STRATEGY: CAN IT BE IMPLEMENTED TO RESTORE AND PROTECT THE GREAT LAKES?

September 13, 2006,

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT, WASHINGTON, D.C.

The subcommittee met, pursuant to call, at 2:00 p.m., in Room 2167, Rayburn House Office Building, the Honorable John J. Duncan, Jr. [chairman of the subcommittee], presiding.

Mr. DUNCAN. Good morning. We are going to go ahead and call this hearing to order. I understand that Ms. Johnson is on her way.

I want to welcome everyone to our hearing on the Great Lakes Regional Collaboration Strategy. In this hearing, we will look at how the Strategy is serving as a framework for restoring and protecting the Great Lakes.

Today we will hear from several important participants in implementing the Strategy: the Environmental Protection Agency, the Fish and Wildlife Service, the Army Corp of Engineers, the Great Lakes region's governors and mayors, and the academic community.

The Great Lakes are a high priority to our Members from Minnesota, Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania, and New York, particularly in the districts that border the Lakes. However, the Great Lakes are also very important to our entire Nation. With 6 quadrillion gallons of water, the Great Lakes account for 18 percent of the world's fresh water supply and 95 percent of the U.S. fresh water supply, 95 percent of the U.S. fresh water supply. Over 33 million people live in the Great Lakes region, representing over one-tenth of the U.S. population and one-quarter of the Canadian population. The Lakes are the water supply for most of these people.

The Great Lakes help support $200 billion a year in economic activity in the region, including 50 percent of the U.S. manufacturing output, 30 percent of all U.S. agricultural sales, and transportation of 50 million tons of waterborne cargo, half of which is exported overseas. Recreational benefits in the Great Lakes region amount to over $35 billion in economic activity and over 246,000 jobs.

Like many ecosystems around the Country, the Great Lakes have been impacted by industrial growth, urban development, and agricultural and commercial activity. While most areas of the Great Lakes can be used safely for swimming, recreation, and as a source

of drinking water, the Lakes do not fully support aquatic life and it is not always safe to eat the fish caught in the Great Lakes. These water quality problems have a variety of causes. Part of the problem is from ongoing wastewater discharges, urban and agricultural runoff, and air pollution, the same problems faced by lakes, rivers, and bays all around the Country.

The Great Lakes present a unique environmental challenge. Because they are nearly enclosed water bodies, with limited outflow, toxic substances have built up in the Lakes, sinking to the bottom and contaminating lake sediments. In 2002, this Subcommittee and full Committee moved legislation introduced by Congressman Ehlers, our colleague, legislation entitled "The Great Lakes Legacy Act," to help jump-start remediation of contaminated sediments in the Great Lakes. President Bush signed this legislation into law in November of 2002. The Legacy Act is one of many tools available for addressing ecosystem restoration in the Great Lakes.

Invasive plant and animal species also are impacting the Great Lakes. There are at least 25 major non-native species of fish in those bodies of water. Zebra mussels invade and clog water intake pipes, costing water and electric generating utilities $100 to $400 million a year in prevention and remediation efforts. It is said that invasive species are discovered at the rate of one every eight months.

Efforts to improve Great Lakes water quality and restore the health of the Great Lakes ecosystem are proceeding through cooperative efforts with Canada as well as through the efforts of numerous Federal, State, local, and private parties. The EPA, the Army Corps of Engineers, Fish and Wildlife Service, National Oceanic and Atmospheric Administration, U.S. Geological Survey, Natural Resources Conservation Service, Great Lakes States, local communities, industry, and a lot of other parties are involved. With so many parties involved in trying to restore the Great Lakes, coordination of the effort can sometimes be difficult.

To improve coordination, on May 18th, 2004, the President signed an Executive Order creating the "Great Lakes Interagency Task Force." The Executive Order called for the development of outcome-based goals like cleaner water, sustainable fisheries, and system biodiversity. The President called on the Task Force to ensure Federal efforts are coordinated and targeted toward measurable results. The Task Force, under the lead of the EPA, brings together 10 Federal agencies responsible for administering more than 140 different programs in the Great Lakes region, to provide strategic direction on Federal Great Lakes policy, priorities, and programs for restoring these great bodies of water.

In December 2004, under the leadership of the Federal Great Lakes Interagency Task Force, the Great Lakes States, cities, tribes, non-governmental organizations, and other interests formed a group now known as the Great Lakes Regional Collaboration. The Collaboration was formed to develop a strategic plan to restore and protect the Great Lakes. In December of 2005, the Collaboration released a Strategy recommending eight critical areas to address to restore these areas. These eight areas include coastal health, toxic pollutants, areas of concern, nonpoint source pollution,

invasive species, habitat and native species restoration, information research, and sustainable development.

I look forward to discussing the Strategy's recommendations and hearing from the witnesses how the various Federal, State, local, and other parties plan to implement these proposals.

Let me now turn to the Ranking Member, Ms. Johnson, for any remarks she may wish to make.

Ms. JOHNSON. Thank you very much, Mr. Chairman.

This Subcommittee has had a long history of oversight on the ecological and environmental health of the Great Lakes. Over the past three decades, the Subcommittee has held numerous hearings and has investigated and proposed legislation to address Great Lakes water quality impairment, contaminated sediments and other sources of pollution for the Lakes.

While some improvements have been made, after almost 20 years of effort, we have not seen significant progress toward the long term sustainability of the Lakes. In fact, according to scientists, quite the opposite is true. The Great Lakes are hovering near the tipping point, toward total ecosystem breakdown.

Today's hearing will focus on the recently-developed strategy to address the continued environmental stressors to the Lakes, as well as on coordinating Federal, State and local efforts to restore and protect this vital natural resource.

As the then-General Accounting Office noted in a 2003 report, more coordinated efforts and funding are needed. Otherwise, the Nation will witness further degradation within the Great Lakes community. Unfortunately, this Administration has chosen to abandon the more difficult task of funding restoration efforts. While recent efforts to develop a strategic plan for restoration and protection of the Lakes should be applauded, without a corresponding commitment to fund these efforts, the Collaborative Strategy will little more than another dusty restoration plan on the shelf.

One has to question whether this Administration has used the roll-out of the Collaborative Strategy to divert attention away from its failure to fund restoration efforts. For example, the Administration lauds its decision to increase funding for certain programs, such as the Great Lakes Legacy Act, but fails to mention the even larger decreases in programs such as the Clean Water State Revolving Fund, that are of equal if not greater importance to overall restoration efforts. In the end, it is clear that this Administration has chosen to walk away from any real commitment to Great Lakes restoration efforts.

Unfortunately, Mr. Chairman, these restoration efforts in the Great Lakes have been made more difficult by a recent Supreme Court decision which at least confuses the scope of the Clean Water Act, and at worst severely limits its protective reach. Although the real world impact of the Rapanos case is still an open question, one thing is certain: limiting the scope of waters protected by the Clean Water Act will result in more pollution, more fish kills, more beach closings, more degraded habitat and increased risk of flooding from the destruction of the wetlands.

According to EPA's wadeable streams assessment, roughly 50 percent of the waters that potentially drain into the Great Lakes already have high to medium impacts from the nutrients from the

riparian disturbance and excessive sediment. Presumably, some of the Supreme Court would advocate the elimination of protection for these already impaired waters and simply hope that these waters and the Great Lakes restore themselves.

Mr. Chairman, if the reasoning contained in Justice Scalia's opinion prevails, we will be able to point to June 19th, 2006, as the day when Federal efforts to protect water quality ceased to exist. If this were true, perhaps those prophetic statements on waters being as clean as they will ever be may come to pass. I hope that for our sake and for the sake of future generations that this does not happen.

Clearly, significant challenges remain in this Nation's efforts to restore and protect the Great Lakes. I am pleased that this Subcommittee will expose these issues and hope that the witnesses invited to testify will be able to identify the successes as well as the failures in these efforts, and on ways we can improve our efforts.

I welcome the witnesses here today and look forward to their testimony. Thank you.

Mr. DUNCAN. Thank you very much, Ms. Johnson.

This Subcommittee has been interested in the Great Lakes for quite some time. And as both Ms. Johnson and I mentioned, we passed the Great Lakes Legacy Act and we dealt with that in 2001 and 2002, then we held two hearings in May of 2004 and then a field hearing, a meeting at Mayor Daley's request in June of 2004 in Chicago.

But certainly the member of the entire Congress who has been most active in regard to Great Lakes issues and has always done the most to bring some of these matters to our attention is our colleague, Congressman Ehlers, from Michigan. I would like to call on him at this time for any statement he wishes to make.

Mr. EHLERS. Thank you, Mr. Chairman, and thank you very much for holding this hearing. Thank you also for your statement which you just made, because in fact you and this Subcommittee have been the most active, as you said, of any committee or subcommittee in the House.

I would also like to take just a moment to disagree slightly with my good friend from Texas, the gentlewoman from Texas, about her comment on the Administration. As the Chairman remarked, when we passed the Legacy Act, I was very pleased that the President, every year since then, has in his budget recommended maximum funding for that program, funding equal to the authorization. Unfortunately, our Appropriations Committee has not done as well. But the President certainly did his share.

The other fact I would like to mention, that the Administration has been very active in, I worked with Governor Leavitt when he was Director of the Environmental Protection Agency and since then have worked with Steve Johnson, who now has that task. Through their efforts, the President had issued a call for a Great Lakes Regional Collaboration with an executive order. That has been carried through and is one of the most outstanding guidances we have at this point, and is a subject for our hearing.

I am extremely pleased that today we are talking about Great Lakes protection and restoration. A great deal has happened, as I just said before, since the last hearing we had on this topic in 2004.

It has been a very busy and most productive time. I am eager to hear from our witnesses about what they have been doing recently, and more importantly, about the next steps they have planned. I am also interested in hearing about what role Congress has to play in this. As you know, I have introduced a bill to try to implement all the recommendations of the Great Lakes Regional Collaboration. I am very anxious to have that bill passed.

I have modeled it after the same process that we used for the Chesapeake Bay and for the Everglades. I think those have been successful efforts. Many of you have been involved in both of those and we are trying to model the Great Lakes approach under that.

The Federal, State and local officials and policy makers, as well as advocates and experts involved in the Great Lakes Regional Collaboration have done a tremendous job of setting out a comprehensive strategic action plan for making all the waters of the Great Lakes swimmable, potable and fishable, all the time, everywhere. My staff and I were very closely involved in the work of the Regional Collaboration. I am eager to see its recommendations implemented as soon as possible.

That is why I introduced H.R. 5100, the bill I just mentioned, which will put in place many of the legislative changes that are necessary to improve and expand Federal programs to clean up and protect the Lakes. This bill has more than 50 co-sponsors, including several members of this Subcommittee. I hope we can take up that bill soon, Mr. Chairman.

The longer we wait to implement the recommended changes, the more expensive and more complicated the solutions become. This is particularly true in two areas: preventing further introduction of aquatic invasive species, as the Chairman has just mentioned, and also cleaning up contaminated sediments in areas of concern. I am very interested in hearing from the witnesses on these two critical issues.

I also want to emphasize here at the outset of the hearing that the Regional Collaboration Strategy should be used as it was intended, not just as a wish list of program changes and funding levels, but as a strategic action plan to guide resource allocation, policy decision making and priority setting. That is why we have structured my bill as indicated.

Finally, Mr. Chairman, let me bring one other matter to the Committee's attention. During the August recess, I received a letter from Peter Wege, a philanthropist in West Michigan who has been very active in Great Lakes policy. The Wege Foundation was instrumental in founding and supporting the Healing Our Waters Coalition, an alliance of more than 80 environmental and conservation organizations in and around the Great Lakes Basin. Mr. Wege sent to me a letter from another old friend, former President Gerald Ford. As you know, he represented the same area in and around Grand Rapids, Michigan that I now have the pleasure of representing. The Great Lakes are dear to him and he recognizes their national and international importance. President Ford wrote in his letter that the Great Lakes enriched his life and that he shares my commitment to restoring and protecting the Lakes for our children and grandchildren.

I would like to request that it be made an order to submit a copy of the letter from President Ford for the record.

Mr. DUNCAN. Without objection, so ordered.

[The referenced information follows:]

Wege Foundation

P.O. Box 6388
Grand Rapids, Michigan
49516-6388

Telephone
616.957.0480

Via Telefax

August 8, 2006

The Honorable Vernon Ehlers
1714 Longworth House Office Building
U.S. House of Representatives
Washington, DC 20515

Dear Vern:

I recently wrote to former President Ford informing him about the Healing Our Waters-Great Lakes Coalition and your leadership role in the Congress on Great Lakes restoration. I thought you would enjoy seeing the President's response, which I've enclosed, especially his very kind words about you. Please feel free to share this letter with your colleagues and others working on this important project.

Thanks, again, for your outstanding leadership in working to protect and restore the Great Lakes.

Sincerely yours,

Peter M. Wege

Encl: Letter from President Gerald R. Ford

GERALD R. FORD

July 26, 2006

Dear Peter:

Thank you for your letter updating me on the pending initiative to restore the Great Lakes and on the "Healing Our Waters Coalition" you founded. I appreciate the leadership you and the Wege Foundation are providing on this critically important issue.

Like you, with our shared roots in West Michigan, I understand the national and international importance of the Great Lakes. The Great Lakes sustain the economies of eight states, provide drinking water for millions of people, are a wonderful recreational resource and, of course, are renown for their natural beauty. The Great Lakes have enriched my life as they have so many others and I share your commitment to restoring and protecting them for our children's and grandchildren's future.

I also share your vision that restoring the Great Lakes must be a collaborative effort between governments at all levels, businesses, and citizen's groups. And I'm pleased to learn that another long-time friend from West Michigan, Vern Ehlers, is leading efforts in Congress to bring needed federal attention and resources to this cause. It's a great team you've helped assemble to restore the Great Lakes. Please convey to all of them my thanks and my best wishes.

Sincerely,

Gerald R. Ford

Peter M. Wege
Wege Foundation
PO Box 6388
Grand Rapids, MI 49516

Mr. EHLERS. Thank you, Mr. Chairman. I yield back.

Mr. DUNCAN. Thank you very much, Congressman Ehlers.

We are pleased to have, as I mentioned earlier, a very distinguished panel of witnesses. Representing the Great Lakes and St. Lawrence Cities Initiative is the Honorable Gary Becker, who is the Mayor of Racine, Wisconsin. Representing the U.S. Environmental Protection Agency is the Honorable Benjamin H. Grumbles, Assistant Administrator for Water, a graduate of this Subcommittee who has moved on to bigger and better things. Representing the U.S. Army Corps of Engineers is Brigadier General Bruce A. Berwick, the Commander of the Great Lakes and Ohio River Division from Cincinnati. Representing the U.S. Department of the Interior is Mr. Charles Wooley, who is the Deputy Regional Director of the Great Lakes-Big Rivers Region of the U.S. Fish and Wildlife Service. He has come from Minneapolis. Representing the Council of Great Lakes Governors is Mr. Todd Ambs, the Water Division Administrator for the Wisconsin Department of Natural Resources, from Madison, Wisconsin. And finally, representing the University of Michigan, or from the University of Michigan, is Dr. Donald Scavia, Professor and Associate Dean of the School of Natural Resources and Environment and Director of the Michigan Sea Grant at the University of Michigan in Ann Arbor.

Gentlemen, it is a real privilege to have each of you here and I thank you for taking time out of your very busy schedules to be with us. Almost every committee and subcommittee asks the witnesses to limit their statements to five minutes. I know it is hard sometimes to do that, so I give the witnesses in this Subcommittee six minutes. But in consideration of other witnesses, if you see me start to wave this gavel, then that means to bring your statement to a close, because we do, as I say, you have other witnesses, and in addition, some of the Members wish to get to the questions.

We also proceed in the order the witnesses are listed in the call of the hearing. That means Mayor Becker, we will start with you.

TESTIMONY OF THE HONORABLE GARY BECKER, MAYOR, CITY OF RACINE, WISCONSIN, AND VICE CHAIR, GREAT LAKES AND ST. LAWRENCE CITIES INITIATIVE; THE HONORABLE BENJAMIN H. GRUMBLES, ASSISTANT ADMINISTRATOR FOR WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY; BRIGADIER GENERAL BRUCE A. BERWICK, COMMANDER, GREAT LAKES AND OHIO RIVER DIVISION, U.S. ARMY CORPS OF ENGINEERS; CHARLES WOOLEY, DEPUTY REGIONAL DIRECTOR, U.S. FISH AND WILDLIFE SERVICE, U.S. DEPARTMENT OF THE INTERIOR; TODD AMBS, WATER DIVISION ADMINISTRATOR, WISCONSIN DEPARTMENT OF NATURAL RESOURCES; DONALD SCAVIA, PROFESSOR AND ASSOCIATE DEAN, SCHOOL OF NATURAL RESOURCES AND ENVIRONMENT, DIRECTOR, MICHIGAN SEA GRANT, UNIVERSITY OF MICHIGAN

Mayor BECKER. Good afternoon, Mr. Chairman and members of the Committee. I am Mayor Becker from Racine, and I am here today in my capacity as Vice Chair of the Great Lakes and St. Lawrence Cities Initiative. I appreciate the opportunity to testify before you today concerning the Great Lakes restoration and pro-

tection and more specifically, how we can work together to implement the Great Lakes Regional Collaboration Strategy that was released in December of 2005.

The Great Lakes are a resource of tremendous value to the people of our Country and of Canada. The Cities Initiative is an organization with over 80 participating cities. Chicago Mayor Daley is our founding chair and Toronto Mayor Miller serves as our current chair. The goal of the Cities Initiative is to advance water quality, water conservation and waterfront vitality by being an active participant in Great Lakes decision-making by developing and sharing local best practices and by being strong advocates for the long term restoration and protection of the Lakes.

Since 2003, when Mayor Daley established the initiative, we have been actively engaged with the Bush Administration, Great Lakes governors, tribal leaders, business leaders and a wide range of advocacy groups on these issues. In May of 2004, President Bush issued an executive order to develop a regional plan for the Great Lakes Basin. The Great Lakes Regional Collaboration Strategy released in December 2004 is the product of that executive order. The Strategy represents the most comprehensive statement ever developed about the problems faced on the Lakes and what it will take to solve them over the long term.

Equally important, the Strategy represents the very first consensus strategy from all relevant stakeholders in the Great Lakes region about the current and future needs of the Lakes. While the estimated cost to fully implement the Strategy is $20 billion, mayors and governors recognize that that is an expenditure that will need to be spread over a number of years. Accordingly, when the Strategy was released, mayors and governors asked the President and Congress for an initial investment of $300 million to focus on the top priorities and address the most urgent problems.

In addition, mayors and governors requested several other steps to help advance the restoration and protection of the Great Lakes, including enactment of the Comprehensive Aquatic Invasive Species Legislation, with a special emphasis on ballast water and a more streamlined approach to Federal wetlands protection. The mayors appreciate that some Members of Congress have shown interest in moving forward on some of the aspects of the Great Lakes restoration and protection. I thank you for holding this hearing today.

In addition, various members of Congress have pushed hard for action. However, no legislation has been enacted, and with the exception of the Legacy program, no additional Great Lakes funding is on the horizon.

The mayors are disappointed that there has not been more progress from the EPA and other Federal agencies in terms of supporting forward movement on the Collaboration. Moreover, the Great Lakes Interagency Task Force, which was established by the executive order to coordinate Federal Great Lakes policy among numerous Federal agencies, still has not taken any substantive action. We are also very concerned about other Federal actions that are wholly inconsistent with the Strategy, such as the proposal to continue cutting the Clean Water State Revolving Fund.

However, the lack of Federal movement has not slowed the momentum of Great Lakes mayors, governors and tribes in working toward Great Lakes restoration and protection. Cities are spending hundreds of millions of dollars annually in capital and operating expenses to improve the Lakes and its watershed.

Activities are being undertaken in cities across the basin, as mayors do our part to increase the value of this natural resource for the enjoyment of our citizens. Mayors want to continue as full partners with Federal, State and tribal governments in the effort to restore and protect the Great Lakes.

In summary, the Cities initiative remains strongly committed to its initial request to the President and Congress for a $300 million investment to begin work toward implementation of the highest priority items in the Strategy. The Cities Initiative also remains committed to working toward passage of comprehensive invasive species legislation and other priority Great Lakes bills consistent with the Strategy.

We have a unique opportunity with the Collaboration to make a significant departure from business as usual toward a consensus approach. The Cities initiative wants to make sure we do that so future generations will look back with gratitude and say that all levels of government made a positive change for the Great Lakes by working together to restore and protect them. I hope we do not wait until the levees break, so to speak, before we act.

Thank you for holding this important hearing and for the opportunity to provide testimony.

Mr. DUNCAN. Thank you very much, Mayor. Fine statement.

How long have you been the Mayor?

Mayor BECKER. Three and a half years, sir.

Mr. DUNCAN. Three and a half years. My father was city law director for three and a half years and then mayor for six years. And those nine and a half years were from the time I was 8 or 9 until I was 17. I sort of grew up at City Hall. I found out how tough it is, how difficult it is. I believe being mayor of a city is one of the toughest jobs in the Country. I also found out that, I think everybody and his brother wanted to be a fireman or a policeman. Then the day after they went on the force they wanted a promotion or a raise or both.

[Laughter.]

Mayor BECKER. Well, obviously things are not any different in Tennessee than from here.

[Laughter.]

Mr. DUNCAN. Thank you very much.

Administrator Grumbles.

Mr. GRUMBLES. Thank you so much, Mr. Chairman, for the opportunity to be here before the Committee. It is an honor representing EPA. It is also an honor to follow the Mayor and to be part of this panel. It requires people at all levels of government and the private sector working together. So this is a very constructive effort, this hearing, on progress that we are making.

The Great Lakes is a priority of this Administration. We have taken several important steps. The President, when he issued the executive order, made it very clear that there would be a Federal Interagency Task Force and that we would focus on improving the

delivery, better coordination and collaboration, streamlining and effectiveness to accelerate the pace of environmental restoration and protection, while maintaining our Country's economic competitiveness.

Also, an incredibly important part of that executive order was to promote the concept of this Great Lakes Regional Collaboration. The success of the effort depends on all the partners, governmental, non-governmental, Federal, State, local, tribal and working also in complementary fashion with our important partners in Canada, because this is an international treasure as well.

I would like to focus in on a few things in the amount of time I have, Mr. Chairman. Some of the specific follow-ups to the executive order, the Interagency Task Force and the Regional Collaboration, the Strategy, the blueprint, if you will, for further progress. I want to focus in on three specific areas that represent fundamental progress and a reason to be encouraged.

The Task Force is working, we meet periodically. The charge for us is to improve the delivery, look for streamlining. A perfect example of that is in the wetlands arena, streamlining of process and improved protection of wetlands. One of the near-term actions that this Administration is committed to on a regional basis in the Great Lakes is to improve, to look at the nationwide permit 27, modifying it or having an alternative regional general permit to help good Samaritans have less red tape and get to restore wetlands more effectively and efficiently. So that is an important result of the Interagency Task Force.

Another effort of the Task Force is to focus on sustainability and strategic actions. So we meet periodically and we identify using the Regional Collaboration Strategy as a guide, as an overall guide. We identify priority projects for scarce resources to be applied towards.

The Regional Collaboration resulted in a blueprint on December 12th, 2005. Congressman Ehlers was there and was in a way a master of ceremonies, bringing people together. That was a historic document. There was a lot of important work to do. All of the partners agreed that it could serve as an overall guide, and that is what we are using it as.

I want to focus on three things, Mr. Chairman, and three very important areas that various agencies under the Administration are focusing on and others as well. One of those is contaminated sediments. As you know, and the leadership of this Committee has shown on the Great Lakes Legacy Act, you know that one of the most important priority areas is to remove those contaminated sediments, to get progress going. We have five projects that have received funds. The President has made it a priority, is seeking full funding. We want to work with Congress to get those funds appropriated. I was just in Ashtabula yesterday and it is a tremendous sight, Mr. Chairman, to finally see after over a decade of talk to see real progress, where the dredging is 24/7, they are moving 550,000 cubic yards of sediment out of the harbor. They are cleaning it up, they are making progress, they are cutting red tape. That has been a charge through the executive order and also following the requirements of the Great Lakes Legacy Act. That is a priority area.

Another priority area, near-term action that the Administration is fully committed to is on wetlands, wetlands throughout the Country, but also wetlands in the Great Lakes. The goal of the Administration is to move beyond no net loss and to gain wetlands. The way to do that is to continue to use the Clean Water Act. We have aggressively defended it as a tool before the Supreme Court. We will continue to do so.

But it is also to use cooperative conservation. Therefore, through the Great Lakes Regional Collaboration, we have committed as one of our near-term actions to restore, improve and protect 100,000 acres of wetlands in the Great Lakes and work with the States to have an additional 100,000 acres on their part, so we can see 200,000 acres. We recognize that acreage is one part of the equation, value, quality of those wetlands is another important one.

We have established a subcommittee to track and monitor for progress, to work with the private sector to put a priority on wetlands in the Great Lakes, to restore them, recognizing that they are a key component, they are like nature's kidney. They help not only provide habitat for waterfowl and a healthier environment, they also protect against flooding and the threat of loss of life. They help the economy.

The last area, Mr. Chairman, that is a priority among the agencies, because we are using the Strategy as a guide, is invasive species. Congressman Ehlers has been a leader in this effort in particular. We recognize that that is a threat to the economy and the ecology of the Great Lakes, and more work needs to be done at the Federal level. The Coast Guard and other agencies are working together using the guide as a blueprint.

We are committed to improving our efforts. One specific example in just the last year, EPA issued a document guide for response, rapid response, when you detect an invasive species, to try to cut it off at the pass and reduce the adverse impacts. But between the Asian carp and the zebra mussels and the water fleas and various other types of invasive species, that is a priority area.

So Mr. Chairman, just to conclude, I would say that the President's budget for 2007 puts a priority on sediment remediation. Other agencies put a priority on cleaning up and reducing runoff. We look forward to working with the Congress on finding sustainable ways and advancing the Strategic Plan and the partnership among our colleagues in the Great Lakes.

I would be happy to respond to questions when you have them, sir.

Mr. DUNCAN. Thank you very much, Administrator Grumbles. As you know, we have gotten into other aspects of your testimony, even not in regard to the Great Lakes particularly, but particularly on the invasive species problem for instance, and other things as well.

General Berwick.

General BERWICK. Mr. Chairman, distinguished members of the Committee, good afternoon. Thank you for the opportunity to testify before you on the activities of the U.S. Army Corps of Engineers that contribute to the protection and restoration of the ecosystem of the Great Lakes.

The Great Lakes ecosystem is a nationally significant national resource. And Mr. Chairman, I congratulate you on the numbers. I had never heard 6 quadrillion gallons before, but that is a remarkable number, although I am very familiar with the percentages.

It is the world's largest freshwater ecosystem, and also provides millions of U.S. and Canadian residents with water for consumption, transportation, power, recreation and other uses. The Corps is working together with other Federal agencies, the Canadians and the affected States, tribes, local governments and stakeholders groups to help protect and restore this ecosystem. The Assistant Secretary of the Army for Civil Works, Mr. John Paul Woodley, Jr., is the Department of the Army's representative on the Great Lakes Interagency Task Force.

The Strategy to restore the Great Lakes which was produced by the Great Lakes Regional Collaboration addresses eight of the nine priority issues identified by the governors of the Great Lakes States. These eight issue areas cover a wide range of environmental concerns, including invasive species, contaminated sediments, loss of fish and wildlife habitat and aging wastewater infrastructure. The Corps of Engineers has a variety of programs and projects in the Great Lakes that provide for both economic development and aquatic ecosystem restoration. I will briefly mention two of these.

The Corps of Engineers is operating the electrical barrier on the Chicago Sanitary and Ship Canal with the goal of preventing, if possible, the migration of the Asian carp and other invasive fish species between the watersheds of the Mississippi River and the Great Lakes. We are continuing to operate the demonstration barrier, which was constructed in 2002, and we are constructing a permanent barrier. This project has been challenging for technical reasons, but we recognize its importance. I am committed to doing everything I can to keep that line of defense in place and to doing it safely.

In addition, the Corps has launched an initiative which focuses specifically on wetlands and aquatic habitat. Earlier this year, the Assistant Secretary of the Army for Civil Works, Mr. Woodley, announced the selection of the Great Lakes Habitat Initiative Project for $1 million in 2006 funding. This two-year Great Lakes Habitat Initiative is an example of the type of integrated planning that can help bridge the gap between general recommendations for the protection and restoration of the Great Lakes and site-specific actions. This initiative will identify on-the-ground projects for habitat protection and restoration, develop performance metrics for prioritization, create comparable cost and benefit data and link projects with existing Federal, State, tribal, local and other sources.

The Corps is pleased to have had the opportunity to appear before you to provide an overview of our activities on the importance of the ecosystem of the Great Lakes. We value highly the water resources of the Lakes and the partnerships we have formed. We look forward to continuing those partnerships.

Mr. Chairman, again, thank you for this opportunity, and I will be pleased to answer your questions when the time comes. Thank you very much, sir.

Mr. DUNCAN. Thank you very much, General Berwick.

Mr. Wooley.

Mr. WOOLEY. Thank you, Mr. Chairman and members of the Subcommittee. I am Charlie Wooley, Deputy Regional Director of the U.S. Fish and Wildlife Services Midwest Region.

I am pleased to appear before you today to discuss the Great Lakes Regional Collaboration Strategy and how it can be implemented to restore and protect the Great Lakes. My statement will address the Agency's collaborative role in implementing the strategy. Fish and Wildlife Service survey data indicate that fishing, hunting and wildlife watching generate nearly $18 billion in annual revenue in the Great Lakes region. In collaboration with others, the Fish and Wildlife Service addresses natural resource issues that affect the fish, wildlife and habitats of the Great Lakes basin, as well as the 35 million people that live there.

As the only Federal agency whose mission is to conserve, protect and enhance fish, wildlife and their habitats, the Service is uniquely positioned to serve the natural resources of the Great Lakes basin and provide leadership on the Great Lakes governors' priorities in the areas of habitat and species, aquatic invasive species and information and indicators. Within the Great Lakes, habitat loss is a tremendous concern. The Great Lakes region has lost more than half of its original wetlands, 60 percent of its forest lands. And the region only has a small remnant of other habitat types, such as savannahs and prairies.

The Administration strongly supports wetland restoration efforts as evidenced by the President's commitment to restore, enhance and protect 3 million acres of wetlands nationwide over 5 years. The Federal Government and our many, many partners, including the Fish and Wildlife Service, will join in a shared effort via the Regional Collaboration process to develop wetlands restoration plans that will enhance and protect a total of 200,000 acres over the next several years in the Great Lakes Basin.

Now, you may ask, what is the Fish and Wildlife Service's role in wetlands restoration? Well, the Service brings to bear a range of programs that contribute directly to restoration of fish and wildlife species and their habitats within the basin. For example, in 2005, the Service awarded $2.1 million in North American Wetlands Conservation Act grants to restore, protect and enhance approximately 4,000 acres of wetlands in the Great Lakes basin.

In 2005, the Service awarded $4 million in National Coastal Wetlands Conservation grants for partners to acquire over 1,800 acres of wetlands along Lake Superior and Lake Michigan. Through settlements under the Natural Resource Restoration Program, the Service has restored and enhanced 955 acres of wetlands and protected almost an additional 900 acres of wetlands in Indiana, Michigan and Wisconsin. Additionally, in the Fox River, Wisconsin area, the Service and Wisconsin Department of Natural Resources restored and enhanced over 4,600 acres of wetlands and associated uplands and protected an additional 5,000 acres in this area.

The Service's partners for Fish and Wildlife Service program in 2005 and through 2006 have restored 270 individual wetlands restorations, totaling approximately 10,000 acres in the Great Lakes basin over the last year and a half.

Let me switch gears for a minute, please. An excellent example of collaboration in action is the work of Ohio EPA, Fish and Wildlife Service and U.S. EPA's Great Lakes National Program Office are doing to remediate contaminated sediments via the Great Lakes Legacy Act funding and restore injured natural resources in the Ashtabula River in Ohio. The Fish and Wildlife Service has received a settlement for injuries to natural resources within the Fieldsbrook Superfund site, the source of contamination to the Ashtabula River. Those funds are being used to implement restoration projects along and near the river, which will compensate the public for those natural resources lost at the Fieldsbrook site, in conjunction with the removal of contaminated sediments out of this river by EPA utilizing Legacy Act funding. This is a fabulous example of cooperation and collaboration, right in front of our eyes.

More than 160 non-native aquatic species are established in the Great Lakes. And during the last several decades, populations of non-native species have been discovered at an average rate of one every eight months. The Great Lakes Regional Collaboration's aquatic invasive species action plan is an excellent example of how to prevent new introductions of aquatic invasive species into the Great Lakes and how to eradicate, control, contain and limit impacts of aquatic invasive species already introduced. Prevention of invasive species introductions and control of established populations of invasive species are critical to sustaining and enhancing ecosystem integrity. We utilize the Binational Sea Lamprey Control Program administered by the Great Lakes Fishery Commission to do this.

Successful restoration strategies for the Great Lakes must also include informed decision making. The Great Lakes Fish and Wildlife Restoration Act, initially authorized by Congress in 1990, has enabled the Service to develop partnerships with a wide range of Federal, tribal, State and local governments and private entities, as well as with Canada, to create a basin-wide program to monitor the ecological health of the Great Lakes.

Since 1998, 72 restoration projects totaling $6.6 million, including $4 million in Federal funds, have been implemented under the authority of the Restoration Act. More than 60 organizations have contributed matching funds and expertise, and countless aquatic species, such as lake trout, sturgeon, walleye and perch, as well as wildlife, have benefitted.

In closing, Mr. Chairman, thank you for the opportunity to testify in front of you this afternoon. I will be glad to answer any further questions.

Thank you, sir.

Mr. DUNCAN. Thank you very much, Mr. Wooley.

Mr. Ambs?

Mr. AMBS. Good afternoon, Chairman and members of the Committee. Thank you for the opportunity to speak today.

I come to you from the Freshwater Belt of the Nation, the Great Lakes. I am happy to be here. I am testifying today on behalf of the Council of Great Lakes Governors and its chair and my boss, Wisconsin Governor Jim Doyle.

I want to take a couple of moments to talk about something that hasn't been talked about yet today. On December 13th, 2005, ten

governments of our water belt, eight States and two Canadian provinces, came together with a shared vision to announce a remarkable agreement. On that day they signed the Great Lakes St. Lawrence Sustainable Water Resources Agreement, and the governors endorsed the companion Interstate Compact. These agreements reflect a unique commitment to shared goals and objectives and reflect the leadership and collaborative spirit of the eight Great Lakes governors.

These agreements also provide unprecedented protections for the Great Lakes by banning water diversions with limited exceptions, initiating water conservation programs in each State and promoting the sustainable use of our water resources. Now the effort has moved to the State houses for legislative action that will put in place the authorities needed to formalize the interstate compact. Once State legislative actions are completed, we will together approach Congress with a request for consent to formally enact the compact.

I mention this because it is an incredible collaborative effort. It is the result of cooperation that fundamentally poses the concept that we should treat the Great Lakes basin as if it is all one ecosystem and that in fact what people do with their water in Duluth can in fact have an impact on people in Detroit and Cleveland and Toronto and Buffalo, and they ought to have a say in that. We have been able to pull that off. We have it on paper. It is a tremendous collaborative effort.

As a Great Lakes boy, somebody who was born and raised in Michigan, who spent 12 years in Ohio and now 10 years in Wisconsin, I can tell you in my lifetime I have not seen such a collaborative effort. This effort on the Great Lakes quantity was one of nine priorities that the governors identified in 2003, that the mayors quickly embraced, and which became the cornerstones of a second landmark event that we have been talking about today, the release of the Regional Collaboration Strategy to protect and restore the Great Lakes.

This compact I just spoke of is one priority. But the other eight are contained in the Collaboration.

We have talked about the plan being released. It is not a State strategy, an agency strategy, a city strategy, a tribal or advocacy strategy. It is a plan to move us toward our shared restoration vision. More than 1,500 people, representing many additional thousands, put it together.

But this strategy will not be fully implemented in one or even ten years. Again, no single agency nor single government can succeed without the full support and shared investments of all of our partners. If we begin to do it now, if we don't act now, the problems become bigger and more expensive. Contaminated sediments don't go away, they just get more expensive to remove. The same contaminants spread throughout the lake beyond a confined harbor become impossible to manage and solutions unaffordable.

We applaud the efforts of Congress in a number of areas: to institutionalize the collaborative process, recent Senate action to increase the authorization level in the Great Lakes Fish and Wildlife Restoration Act, the Legacy Act, which has been talked about before. However, as previously identified in a joint letter from the

Council of Great Lakes Governors and the Great Lakes and St. Lawrence Cities Initiative, we need the shared investment from Federal partners to be stable and long-term.

As the budget process began, we asked the President to support a request of $300 million to jump-start the implementation of Strategy recommendations. Unfortunately, it appears so far that our message and the voices of our region's citizens are not being heard. We know and hear about difficult fiscal circumstances. We see that there are priority issues receiving additional funding support. We need additional support at the Federal level.

So what is it that we need to change? Four key areas. We need stable, long-term funding commitments. We need more efficient delivery systems. One example could be block grants, to get funding to projects quicker. We need national programs where none currently exists, contaminated sediment management and exotic species being a couple that have already been referenced. And we need to eliminate duplication, overlapping programs and inefficiencies.

You have seen and heard how this region mobilized to respond to the President's executive order. The people who live and work in the Great Lakes States are counting on all of the levels of government to come together and work on their behalf. The many thousands who invested their time and energy into this Strategy development at the request of their government expect that the governments will respond with meaningful restoration efforts.

We need the continued support of Congress to attain the necessary long-term stable funding. We need the support of Congress to try more efficient ways with reduced transactional costs to move money into implementation. We need the support of Congress to work together in a "regional collaboration of national significance" as directed by the executive order. We need the support of Congress to help restore faith in government for the citizens of the eight Great Lakes States who supported the restoration actions identified in the Regional Collaboration Strategy.

Thank you again for this invitation to appear before you today. I look forward to attempting to answer any questions that you might have at the appropriate time.

Mr. DUNCAN. Thank you very much, Mr. Ambs.

Dr. Scavia.

Mr. SCAVIA. Mr. Chairman, members of the Subcommittee, I thank you for the opportunity to testify today. My name is Don Scavia, and I come here in several capacities. In addition to being Professor of Natural Resources and Environment and Michigan Sea Grant Director at the University of Michigan, I am also the science advisor to the Healing Our Waters Coalition that has been referred to recently, and supported by Mr. Wege from Grand Rapids.

Before joining the Michigan faculty, I served in NOAA as a research scientist for 29 years, and research manager. I worked 15 years on the Great Lakes, 14 years at the national level. It provides me with both a regional and a national perspective on the significance of the Great Lakes, the need for restoration and the role for science.

One thing I did notice is, testifying as an academic as opposed to a Fed, no one sits behind you.

[Laughter.]

Mr. SCAVIA. My written testimony focuses on four areas: the need to act now to protect these resources; the need to identify priorities; the need for a strong science-based restoration; and the critical role for an independent voice that Great Lakes universities can provide. My oral statement focuses on these first two issues.

A significant portion of my testimony is drawn from a white paper entitled Prescription for Great Lakes Ecosystem Protection and Restoration: Avoiding the Tipping Point of Irreversible Changes. The report is included as part of my written testimony. This white paper has been endorsed by over 200 scientists coming from every State in the Great Lakes basin, as well as scientists from California, Florida, Maryland, Hawaii, Colorado, and Tennessee. In fact, over one-third of the endorsements come from outside the Great Lakes basin, indicating that the Great Lakes and its restoration are an issue of national significance.

Our first point is that it is critical to act now. There is widespread agreement among scientists in the Great Lakes that they are impacted by a wide range of stresses, and that key areas are undergoing rapid changes where these stresses are interacting. The Prescription paper points out that the Great Lakes may be nearing a tipping point beyond which the ecosystem would move to a new condition, one that is less desirable from a recreational, commercial and aesthetic perspective, and more importantly, one from which it may be very difficult, if not impossible to recover.

Food web disruptions are a prime example with regard to this tipping point. For example, NOAA has demonstrated the dramatic and rapid disappearance of the once-abundant bottom-dwelling animal called Diporeia. The dramatic declines are likely linked to the invasions by the zebra and the cargo mussels and may be one of the clear signs that the Lakes are moving into a new regime where these mussels maintain high populations and prevent any substantial recovery.

For example, the abundance of the critical member of the Lake Michigan food web declined from over 5,000 individuals per square meter in 1994 to less than 300 per square meter in 2005. And Dave Jude, a colleague of mine from the University of Michigan found for the first time enormous quantities of quagga mussels in Lake Michigan at depths where only a few have been found before. At a 100 meter depth, he pulled up almost 400 pounds of quagga mussels in just a 10 minute bottom trawl. So many members of the fish community depend on this Diporeia species that their replacement with this lower food quality mussels may result in tipping the entire ecosystem toward a whole new food structure, far less valuable to society.

The problem with ecological tipping points, though, is you can't be sure you have reached it until it is too late. So we urge a precautionary approach to avoid passing that critical point by acting now to support high priority restoration and protection efforts. So our second point is about setting priorities. The Strategy and Collaboration does a really good job of identifying major problems besetting the Great Lakes, recommending concrete solutions, identifying programs to implement those solutions and recommending funded need for those programs to be successful.

The Prescription paper recognizes four categories of efforts. The first is prevention. That includes efforts to stop new invasive species, new chemicals, new physical modifications from adding stresses to the already stressed Great Lakes. The second category is protection. That includes efforts to protect areas that currently possess the characteristics that we are striving for in restoration.

The third category is restoration itself. That focuses on repairing the buffering capacity or the resiliency of the Lakes themselves. It will be impossible to eliminate all stresses, and even when it is possible, it will likely take decades to achieve. So we must restore the Lakes' natural buffering capacity to be able to cope with the stresses. And the highest priority project should address near-shore regions, tributaries, watersheds and the connecting waters, because these provide effective buffers between the human enterprise on land and the valuable resources of the Lakes.

The fourth category is to monitor and assess progress. Because without effective monitoring and assessment, it will not be possible to know if the resources spent on the other three categories are producing the desired result or simply being wasted. The collaboration strategy lists a wide range of efforts in each of these categories, and some estimates of the overall cost of implementation reach $20 billion over the next decade. While we support those efforts and the appropriations needed for implementation, it is clear that priorities must be set within each category, because the Nation can neither afford to pay for all this all at once nor wait for the future funding.

We have been working with the Healing Our Waters Coalition and others to help identify priorities, and we suggest the following criteria. First, does the project improve or protect ecosystem resiliency, functioning and sustainability? In many places, this neutral buffering capacity has been lost, and one of the highest priorities is to re-establish it.

Second is, do the projects address all the relevant stresses. While progress has been made in addressing some key stresses on the Lakes, the interactions of these stresses have now complicated the Lakes' recovery and to be most effective, projects need to take into account cumulative impacts and interactions.

Three, do the projects address clearly documented impacts? The highest priority should be those projects that demonstrate clear connections between proposed actions and ultimate impacts. And finally, is there a plan to measure, assess and communicate results? Many if not most protection and restoration efforts are likely to take a long time and therefore need to be designated with an adaptive framework. To be adaptive, they need to have a clear plan to monitor activities and results, assess progress and potentially make adjustments to maximize their likelihood.

I would like to close by highlighting two significant impediments that must be overcome before progress can be made: lack of funding and inflexible implementation. Even with priorities set and the willingness of all stakeholders to work together, the lack of funding remains an enormous impediment to making progress. I understand the overall efforts for restoration funding are quite significant. But it is time for the Great Lakes to receive support commensurate to the national significance. This is particularly true when

one compares not only the range of stresses that impact the Lakes, but their enormous size and their contribution to the economy.

Finally, we do need to have an adaptive capacity, which means we have to have a science base for the monitoring and the effort that goes forward.

Thank you for the opportunity to testify, and I look forward to answering your questions.

Mr. DUNCAN. Just so you won't think I am too bad, I let you run a minute and 15 seconds over the six minutes.

Mr. SCAVIA. I see that, Mr. Chairman, thank you.

[Laughter.]

Mr. DUNCAN. All the other Members, with the exception of me, have to get to a Science Committee meeting. I told Ms. Johnson I would let her go first, and then I will come to the others as soon as we can.

Ms. JOHNSON. Thank you very much, Mr. Chairman.

As I expressed in my opening statement, I am pleased with the overall efforts to develop a comprehensive plan for the Great Lakes restoration. But I remain concerned about whether this plan will ever be implemented. After hearing the witnesses that are working with the plan, I wonder if you feel optimistic or whether you feel it might be a wasted opportunity.

What specific actions are your respective agencies taking to implement the Great Lakes Regional Collaborative Plan?

Mr. GRUMBLES. Congresswoman, I will just start and say, we view the plan as an overall guide. So some of the specific actions we are taking, one is, we are working with our partners, we all agreed to an implementation framework. That is an infrastructure, a process to track and follow through and progress on actions that all of us are taking.

The second thing is that the Administrator, Steve Johnson, Administrator of EPA, designated Gary Gulezian, who is behind me, the Director of the Great Lakes National Program Office, to specifically track and monitor Federal agency actions that advance the Strategy.

The third thing I would mention is that each of the different areas, each of the eight major categories of themes of recommendations, we do have specific near-term Federal agency actions that we have committed to take and that we are on track to completing. So we are focused on that and committed to the Regional Collaboration and getting results such as through the Great Lakes Legacy Act, cleaning up the sediment sites and seeking the funding at the Federal level to do just that.

Ms. JOHNSON. It is my expectation that you are probably already putting together the President's budget request for fiscal 2008. Is that right, that would include this plan?

Mr. GRUMBLES. Congresswoman, our agency, like other agencies, is working internally on developing their recommendations for a 2008 budget, that is correct.

Ms. JOHNSON. My colleague said here, which happens all the time, that the requests have come over, it has been the Appropriations Committee that has cut the funds. How much has the Appropriations Committee cut each time?

Mr. GRUMBLES. Congresswoman, the most accurate and responsive approach for me to follow up on that would be to say that we can provide you with specific numbers on items, comparing items in the President's budget request with the Appropriations Committee's or what Congress ended up appropriating. A good example is in the areas of concern where for the second year in a row, the Administration has requested virtually full funding for the Great Lakes Legacy Program and Congress has made progress and has appropriated more each of those years, but still falling short of the full funding requested.

Ms. JOHNSON. Has this interfered with the implementation of the plan?

Mr. GRUMBLES. We feel that, specifically with the Great Lakes remedial actions on the areas of concern, we feel that we have specific work plans, we have a Great Lakes Legacy rule. We are moving forward with the dollars that we have. We do have a surplus in the fund right now for the Legacy Act, but we also have a lot of work in the future in the pipeline that we know we can get done. So we are committed to the Great Lakes Legacy Act.

Ms. JOHNSON. When you start working on the restoration, and you don't have the funds, will the delay cause some roll-back in some of the progress you have made?

Mr. GRUMBLES. We think that the most important component of accelerating environmental protection is working together. As other witnesses have pointed out, it is a shared responsibility. Many of the projects, in fact most of the areas recommended, or the areas in the blueprint for action contemplate a variety of shared responsibilities. So we think the key, when there are budgetary constraints, and there are significant budgetary constraints, we want a realistic plan and to move forward to see real results. So we work with our partners to leverage the scarce dollars.

So that is the key, improved coordination and improved leveraging.

Ms. JOHNSON. Thank you very much.

Mr. DUNCAN. Thank you very much, Ms. Johnson.

I might just explain to the witnesses, I sit on seven subcommittee and three different full committees. Four of those subcommittees are having meetings that started at 2:00 o'clock today. I think that because, there must be half the subcommittees in the Congress meeting at this time. Unfortunately, this is the fewest number of Members that I have ever had at a subcommittee meeting that I have chaired. But I do think this is a very important topic, the status of the Great Lakes, and I do appreciate all of you being here. There are many other Members, I think, who realize the importance of what we are talking about. But I want to go at this time to Mr. Gilchrest, he did not have a chance to give an opening statement, for any comments or questions that you might have at this time.

Mr. GILCHREST. Thank you very much, Mr. Chairman. I want to thank you for holding the hearing, along with the Ranking Member. I also want to thank Vern Ehlers for his lifelong commitment to this issue and the Great Lakes. I think he enjoys living in the belt. I have never heard it called that before, that is interesting.

I read a book maybe 20 years ago and I can't remember the name of the author, but he was connected with Gerald Ford, I think maybe even worked for Gerald Ford when they were beginning the whole Great Lakes program. The title of the book was Making of An Environmental Republican. It was fascinating. If you can Google that up somewhere and take a look at it, it is interesting. Because it was the first time I had ever heard of problems with persistent toxic chemicals and their disruption, not only in the ecosystem, but in the endocrine system of species within the ecosystem. So it was really fascinating.

Just a quick couple of comments, because I have learned some things that I want to now initiate with the Chesapeake Bay program, which I think will be helpful in this way. A hundred years ago, we did not know what human activity did to the degradation of nature's design and how it disrupted that process. We know about it now, in extraordinary ways, we know about it. So we have this magnificent level of science that we haven't known before.

But people, to some extent, and I see that in my district, outside that arena of scientific information, who are in fact the people that make the decisions about land use at the local level, the town level, the county level, municipalities, have this monstrous certainty that more is better. Consequently, much of the problem with the Chesapeake Bay and the Great Lakes is a direct result of the local land use decisions as far as degradation from persistent toxic chemicals, from stormwater runoff, from sewage treatment plants, from a whole plethora of things that result from local land use.

Now, we can connect like we are doing here today, with invasive species, with the Federal Government, the Clean Water Act, air deposition, those kinds of things we can collaborate on. But it is the idea now to integrate the information, I am glad to see the Mayor, Mr. Becker here today. Because to some extent you have seen this in communities near where you are that feel more construction, more development. What is a non-tidal wetlands? Are we still dickering about the makeup of the soil, or the plant or the hydrology? What about forested buffers?

But it is those answers, prevention, hold on to what you have, protection, don't let it be degraded any further, restoration, bring back the buffers, the forested buffers and non-tidal wetlands, and then monitor that. So Dr. Scavia, your idea of prevention, protection, restoration, monitor and assess progress is for each local community to take a look at the big picture and the Great Lakes is connected across that huge, beautiful belt.

I apologize for my lecture, but I go through the same kinds of things with the Chesapeake Bay. I think what we know now about nature's design, we know that if we do the right things, human activity can be compatible with nature's design and people will see a cleaner Great Lakes 10, 15, 100 years from now than the see right now.

I want to thank Vern for all his efforts in that arena. And I have to exit myself. But the staff is going to listen closely to your recommendations and follow up.

Thank you, Mr. Chairman, Mr. Ehlers.

Mr. DUNCAN. Thank you very much, MR. Gilchrest.

Dr. Ehlers.

Mr. EHLERS. Thank you, Mr. Chairman. I give my thanks to Mr. Gilchrest, too. He has been one of the heroes of the environmental movement, particular as it relates to water resources.

I agree with the comment by Mr. Grumbles earlier that Legacy Act funding that the Administration has proposed every year has been right where it should be, right at the top, and unfortunately, the Congress hasn't done as well. But at the same time, I am very disappointed that the Administration has taken the position that it will only undertake those recommendations of the Collaboration that can be done within existing budget projects. We simply cannot accomplish what we need to do as outlined in the goals and objectives of the Regional Collaboration Strategy teams with the current funding. As I said in my opening statement, the solutions to the many problems facing the Great Lakes, contaminated sediment, sewer overflows, loss of habitat and so forth, will only become more expensive, more complicated and more daunting the longer we wait.

So my question here for the Federal witnesses is, can we expect that the Administration's position will change as you develop your budget proposal for the coming fiscal year? We can just go right down the line. We will let you go first, Ben.

Mr. GRUMBLES. Thank you, Congressman.

The hard work that was put together in this unprecedented infusion of ecology and democracy in putting together that Regional Collaboration Strategy, that overall blueprint, was one that we continue to see the value in. We agree with other partners that it could be used as an overall guide.

We did want to stress at the time that we are focused on using the resources that we have, having a blueprint, so that in recognizing what are priorities areas, given the fiscal constraints or the out-years, we would have the document, have something that help us all focus in on key areas.

The contaminated sediments is an example where we are seeking new resources, additional resources, more funding. The last estimates we have indicate that the Federal agencies collectively have been providing half a billion dollars for direct water quality benefits in the Great Lakes among the various programs. So for us, the key, without knowing what future budgets will entail, and I certainly can't make predictions, Congressman.

I think for us the key was to focus in on the areas that we know within our current budgetary resources we can take action, specific actions and to really look for areas to better leverage and to cut process and red tape to get more with the dollars we have, but to also have out there, as a result of the Collaboration and the partnership, a blueprint for future action if there are additional resources, both governmental and non-governmental, and looking at various levels and sectors of government, to have a real blueprint. I think that is a key part to not lose sight of.

Mr. EHLERS. Let me just comment on that. I am a great fan of zero-based budgeting. What I see, it seems to me what you are saying is all your funding is already budgeted and you are going to try and squeak out what you can to deal with this new area. What I am asking for, and not a commitment now, but just asking you to do, by that I mean all governmental agencies, just look at the

whole program and say, this is the world's greatest water ecosystem. We now have a program of what to do about it. What can we reduce elsewhere in the agency that is a lower priority than dealing with the world's greatest water ecosystem?

Mr. GRUMBLES. Right.

Mr. EHLERS. Let's get the others in before my time expires. General Berwick?

General BERWICK. Thank you, sir.

I, like Administrator Grumbles, am not in a good position to forecast future budgets. But I will cite a couple of things that give me some reason for optimism. One is as a result of the activity of the Collaboration, some real national attention has been focused on the challenge of the fish barrier in the Sanitation Canal. In fact, Administrator Johnson last December specifically highlighted that and indicated a willingness to work with our agency and with Congress to try to bring about further redundancy in that barrier. So I am encouraged by that.

I was also encouraged by our successful competition to have $1 million for the Great Lakes Habitat Initiative that the Corps of Engineers is undertaking, which will specifically look at wetlands and implementable projects. So I thought that $1 million doesn't sound like much, but since that is study money, that is seed money, that is quite significant.

Then along the same lines, in terms of developing synergy, I am encouraged by the activities at Ashtabula, where work is currently underway under the auspices of the EPA to remove contaminated sediments. But we are prepared to follow closely behind that and develop synergy by doing some navigation dredging, which will remove further contaminated sediments, and we are able to use the same placement facility and therefore get significantly more work done.

So I think there are some good things that are happening with regard to resources. Thank you, sir.

Mr. EHLERS. My point on this, just very quickly, one thing I have learned many times in my life, acting quickly can save a lot of money that you will have to spend otherwise. It makes sense to act quickly when the situation develops. I have just been totally dismayed, and I am not totally blaming you, the Congress bears some fault for this, too, at how long it has taken and how difficult it has been to put up the carp barrier. Now, that is a non-brainer. And we are talking about a couple million dollars here, you heard the testimony. It is an $18 billion a year system that we are dealing with. And right now, just from the zebra mussels alone, we are spending $2 billion a year just in the Great Lakes ecosystem. Nationwide, it is a cost of $13 billion a year dealing with the invasive species and the aquatic invasive species. The Asian carp could easily wipe out the fishery in the Great Lakes.

So we are worried about how we can fund a couple million dollar project. But we have $18 billion hanging there as the penalty if we don't do it right. That is the point I am trying to make here. Let's really prioritize these and go back and look at some of the other things we have and say, are they really as important as saving $18 billion a year? Or I should say preserving the $18 billion a year industry.

My time has expired. I would love to have Mr. Wooley's comments, if you can do it very, very briefly.

Mr. WOOLEY. Very quickly, Congressman Ehlers. Last Thursday in Traverse City, Michigan, the Fish and Wildlife Service dedicated and christened a 100 foot long vessel called the Spencer Barrett. That vessel, sir, will be used to increase lake trout stocking in Lake Michigan and Lake Huron. It will also be utilized to assess lake and fish populations, particularly stocked fish populations in Lake Michigan and Lake Huron. I think it is a great example of the Fish and Wildlife Service contribution to the collaborative nature of this work, and it is certainly identified in the collaborative report that we need more of that stocking assessment data. So that is an example, sir, from the Fish and Wildlife Service's viewpoint. Thank you.

Mr. EHLERS. I appreciate that, because as you know, the zebra mussel and the goby are really entering the fishery in the Great Lakes. That is a potential huge economic loss. My apologies for running over, Mr. Chairman. Thank you.

Mr. DUNCAN. Well, thank you very much, Dr. Ehlers. I would just ask the panel as a whole, since Dr. Ehlers ended up just mentioning the money and how much we could save, but also, I have noticed that in the Collaboration that we are told that they really need to do what needs to be done, probably $20 billion over the next five years. That is $4 billion a year.

Where is the money going to come from? Anybody got any suggestions? Mayor?

Mayor BECKER. We always look to the Federal Govenrment.

[Laughter.]

Mayor BECKER. Understand, cities haven't been sitting back doing nothing as the Collaboration was formed and worked through and the thousands of hours of work done. Cities have been moving ahead throughout the whole process. I believe the city of Toronto is investing their own city dollars. This isn't any province or national dollars, $25 million a year, just in the city of Toronto, on their shores over the next 20 years, $25 million per year, a half a billion dollars they have set out to plan.

In Racine, we have totally rebuilt our wastewater plant, our water intake plant. We have built wetlands. We have continued to move ahead on planning and ideas to do more.

We again, as Congressman Ehlers said, what can be more important? It is every group ahead of you, I realize, is the most important group, and as it should be, they are advocates for their issues. But truly, as I said in the opening comments, we have heard people talk about that tipping point. That is probably in pretty good relation to the levee breaking in New Orleans, that once you go beyond, now you are going to spend a whole lot more trying to bring those Lakes back to where they are in balance as opposed to letting them go in the first place.

So if you want, I can put together a list of $4 billion in cuts for you. But as Congressman Ehlers said, I think we have to look at our priorities. I know we don't do zero-based budgeting. But there certainly have to do things that the Federal Govenrment can step up and play their part like the local and the State governments have right along to complement each other, really work together.

Because you can talk about a collaboration, but a collaboration without a lot of money and resources makes it very difficult to do. It is better than no collaboration and things will get done better. But certainly we all need the resources to move ahead.

Mr. DUNCAN. Well, I will get on into some other questions. But I do think that those of you who are serious about this and involved in it, and I think most of you are, you need to come up with suggestions or proposals about where the money is going to come from. One of the most interesting things in Dr. Scavia's testimony that I read, he said the view from the majority of the science community is that we know enough now to take action to restore and protect the Great Lakes.

The reason I found that to be so interesting is that most Members of Congress, we don't always get it, but we want action. And we get sick and tired of all these things being studied, studied, studied, studied, studied for years. So we would almost get the impression everything has been studied that could possibly be studied. There comes a time when you have to take action and do something. I was pleased that that was in his testimony.

But I also know that we are discussing now, some of our staff is meeting right now about the Water Resources Development Act. And while that bill passes overwhelming in both the House and Senate, it may end up being in the end difficult to pass or difficult to get the funding for everything that is in there. That is a bill that probably is going to end up $13 billion or $14 billion for the water needs of the Nation as a whole.

So while I regard the Great Lakes as very important and want to do as much as we can, we need almost as a first step to determine where the money is going to come from. And that is something that those who are directly involved in this really need to take a hard look at. And Administrator Grumbles wants to comment on that, and that is fine. You go ahead and comment on that.

But I also want to ask you, the Great Lakes Office in the EPA was established, I am told, in 1987. I am wondering, over this past 20 years, you mentioned going to Ashtabula yesterday. In what area have you seen the most progress, and in what area are we having the least progress, are we falling the shortest in?

Mr. GRUMBLES. Thank you, Mr. Chairman. I just wanted to mention on the question about funding and where does it come from, I think everyone agrees that it has to come from a variety of sources, and certainly not just governments and not just the Federal Government, but the private sector, the corporate community. One of the things that I think is very exciting, Todd mentioned it with respect to the compact and the water quantity and the work that the States and provinces in the Great Lakes are pursuing is, it embraces the ethic of water efficiency and water conservation.

I wanted to mention that one of the ways EPA feels very strongly that you can reduce the costs on wastewater and drinking water infrastructure, maintenance and construction, is by coming up with more efficient ways that save water and reduce the energy and water demands on infrastructure. So our new program that is modeled on Energy Star, the WaterSense Program that will have labels available so the public can choose products that actually work as well as competing products, but are 20 percent more water effi-

cient, is going to have a significant impact and will reduce the demands on the local infrastructure systems. Because they don't have to use as much energy to run them and will also reduce occurrence of sewer overflows, which is a real threat in the Great Lakes. But sustainable infrastructure, innovative financing and water efficiency are key.

On your question about the Great Lakes National Program Office, Gary Gulezian is a real resource for the agency and for the Great Lakes region-wide. I will ask him, he can provide more specifics for the record for you, Mr. Chairman, and your Members.

But I know that one of the areas where we have seen progress over the years is first of all, toxics. There has been a lot of work and accomplishments that have been made over the last decade, last couple of decades. Tremendous amount of work that remains. But the awareness and the goals that people in various levels of govenrment are working toward, toward the virtual elimination of toxics, is an important one. It is a threat to the ecosystem and to public health.

But there has been progress made because of the awareness and specific actions, the strategies to reduce persistent bioaccumulative toxics, for instance, PCBs or others, which is a key culprit of a lot of the legacy contaminated sediment sites that we are putting a priority towards.

Mr. DUNCAN. Thank you very much, Mr. Grumbles. I really do think you do a great job in a very difficult position. I also knew, and everybody in here knew that the funding for all this work is going to have to come from a variety of sources, as you said. And everybody is for things like innovative financing. That is a good high-falutin term and everybody is in favor of things like that.

But I think it would be a good idea for the people who are in charge of this and the EPA is supposed to be the lead agency, get everybody together and sit down and say, let's come up with some specific plans and details about who is going to come up with what money and what kind of schedule and so forth. So we actually start getting some things done.

General Berwick, along that line, I chaired the Aviation Subcommittee for six years and I sit on the Highway Subcommittee. All these things that we deal with in this Committee, we have heard, this is my 18th year on this Committee and I enjoy the work on this Committee, I think it is very important. But we always hear that all these infrastructure projects, of whatever type, water, highways, aviation, whatever, that they take three or four times as long as they really need to because of all the rules and regulations and red tape, particularly the environmental rules and regulations, and that these projects are taking on average 10 years, 12 years, where they could be done in 2 or 3 or 4 years if we streamlined the process. And you know about that, we are trying to do that, trying to make some improvements in the Highway Bill.

But when you make these projects cost three or four times as much, it doesn't hurt the wealthy, but it hurts the poor and the lower income and the working people. And I can tell you this, everybody says we are in a global economy, and all these countries that are coming on the strongest, particularly China, boy, they

don't take long to do these projects. They get them approved and they do them.

What I am getting at is, is the Army Corps doing anything about streamlining and improving the permitting process so that we can start getting these projects that need to be done along the Great Lakes and in the Great Lakes done in a little faster way?

General BERWICK. Sir, we are absolutely taking a look at that at a national level from a number of different perspectives. We are excited at the prospect of trying to streamline that process and move it more swiftly.

In doing so, we are also mindful of the fact that many of these projects are indeed very complex. So there is a balance that needs to be struck between going faster and making sure that we have the right solution before we launch too quickly. So there is a balance there that we are pursuing. But there is no question that streamlining is being very carefully looked at, and in particular in the regulatory arena there is a very specific look at trying to advance the opportunity to get permits more quickly.

Mr. DUNCAN. I agree with you that a balance needs to be struck. That is my point. Because I think that we are out of balance right now. And when we have rules and regulations that make projects take three or four times as long as they should, and take 10 or 12 years when they could be done in 3 or 4 years, that is not a good thing.

Mr. Wooley, what is the Fish and Wildlife Service doing primarily about the aquatic invasive species, and specifically what I am asking about, one of the things, did you hear General Berwick say that there are technological or technical difficulties with the barrier?

Mr. WOOLEY. Yes, sir. We have worked very, very closely with the Army Corps of Engineers and the State of Illinois over the last four years on that project. We have provided, when requested by the Corps, technical assistance. We have done an awful lot of electrofishing and survey work in the area where the barrier is in the Illinois River, supporting the Corps, supporting the State of Illinois on that project, sir. We have also brought in at times, when requested, electrical expertise that we have gathered as we utilize what is known as electrofishing techniques there to assist the Corps in assessment work.

Mr. DUNCAN. I'm sorry, what fishing technology?

Mr. WOOLEY. It is called electrofishing.

Mr. DUNCAN. Electro?

Mr. WOOLEY. Yes, sir.

Mr. DUNCAN. Tell me about that.

Mr. WOOLEY. It is a means where we just put a controlled amount of electricity into the water and we are able to assess fish populations by utilizing that method. That gives us the ability to survey, to look at the efficiency of the electrical barrier. It is a very good assessment tool fishery biologists use throughout the Country, sir.

So our work with the Corps in the State of Illinois has been one of providing technical assistance and providing some fishery management expertise when requested, sir.

Mr. DUNCAN. How big is that problem? I just heard Dr. Ehlers talk about the $13 billion that is being spent nationwide and the possible savings of $18 billion if we get some of this done. What do you say about all that?

Mr. WOOLEY. It is a very, very important issue in the Great Lakes, sir. The impacts that just sea lamprey have on lake trout populations currently is costing the taxpayer about $15 million a year. That is a shared project between the United States and Canada where we control sea lamprey populations in the Great Lakes.

It is working. It is very labor-intensive and it takes a lot of coordination between the two countries to make it work. So there is a small but significant example, sir, of how controlling exotics is paramount in the role of the mission that the Fish and Wildlife Service has working with the Great Lakes Fishery Commission.

Mr. DUNCAN. All right. Thank you very much.

Mr. Ambs, you are here representing the Council of Governors from the region, the State governments. From your point of view, are the local governments doing as much as they should be doing in handling their pollution or waste from their stormwater and wastewater runoffs, their sewage runoffs, discharges?

Mr. AMBS. Yes, I do think the local governments are going to great lengths to address those issues. The challenge that we have, as I think you well know, is that 30 years ago when the Clean Water Act went into place, we had a lot of Federal money that helped set those systems up. Now, 30 years later, the same level of commitment to maintain that infrastructure has not, is still not there.

So the concern is, while local governments are going to great lengths, and frankly, in many cases, having to raise water rates significantly to pay for those infrastructure improvements, and while State governments are stepping up, we see unfortunately a backsliding at the Federal level of a few things like the current proposal to cut a lot of funding for the State revolving loan fund.

I think one of the excellent questions that you have asked and certainly excellent comments of other members of the Committee, when you look at this, look at what the local governments can do, the States can do, and then tie it into what the Feds can and should do and use it to prioritize, I think we have a very specific blueprint for action. We recognized that the $20 billion figure over 10 years actually was a big number. We broke it down, along with the mayors and other collaborators a $300 million item over one fiscal year, with specifically identified places where strategically spending money could really pay benefits.

And it is not just Federal money. We are asking for, as an example in that blueprint, $28 million more for wetlands restoration. But if we get that $28 million more from the Feds, State govenrment, local govenrment, tribes, non-governmental organizations, a whole range of folks have promised to match that money. If the Feds can come up with $28 million, we will figure out a way to come up with $28 million and to address the very critical infrastructure needs that we have.

It is also not just a funding issue. The last comment I would make in terms of what the Feds can do, we are glad the Federal Interagency Task Force is formed, but we are eagerly awaiting

them to identify places where they can have more efficient delivery of services. And we are also hoping that we can see some action on things that don't require a lot of additional money but certainly require some action.

And aquatic invasive species is right at the top of the list. It is a critical problem. You talk about a tipping point. We have 165 exotic species in the Great Lakes. It is not only a question of the fishery, it is a question of the economic vitality of the region. And we have, for example, in the State of Wisconsin, the second highest number of out of State anglers come into Wisconsin, second only to Florida. It is a critical piece of our economy.

And if we don't do something about the impact of aquatic invasives on just Lake Michigan, it is going to have a huge impact. So a few thoughts, Mr. Chairman.

Mr. DUNCAN. Let me say this. We have heard over the years, nothing but good comments, I think, in this Subcommittee and this Committee about the State revolving loan funds program. Yet in both Democratic and Republican administrations, that program seems to not be real popular. And what I am wondering about is if the program is as important and as good as people from State and local governments tell us, and water agencies and so forth from around the Country, perhaps it might be a good idea of groups like your Council of Governors got in touch with OMB and people like that and other people in the various administrations and let them know of the work that has been done through that or with those State revolving loan funds. Might be something to think about.

Dr. Scavia, you mentioned an ecological tipping point. Would you go into that a little bit more and how close are we, how urgent do you feel these needs are, or these problems are?

Mr. SCAVIA. Sure. As I mentioned in my testimony, the problem with the tipping point is you don't know until you have passed it. So we are very concerned about it. I think some of the examples of the approach of the tipping point include the following. One is this loss of this animal that all the fish species in the Great Lakes really depend upon. The loss of that species and its replacement by the zebra mussels and the quagga mussels has been described as the difference between eating a Big Mac or eating a Big Mac with the styrofoam shell on it.

The fish in the Great Lakes are already coming up thinner, less weight than they had been in the past, and we are very concerned that eventually that fishery may in fact collapse in one way or another. A second example is the Asian carp. If the Asian carp does get into Lake Michigan, it is a voracious top predator and it may decimate the population in very short order, completely shifting that population.

There is another dimension I think is important. That is backsliding.

Mr. DUNCAN. Backsliding?

Mr. SCAVIA. Backsliding. Thirty or 40 years ago, the poster child for the Great Lakes was Lake Erie.

Mr. DUNCAN. I usually hear that at Baptist churches.

[Laughter.]

Mr. SCAVIA. Lake Erie was the poster child, Lake Erie was dead, the Cuyahoga River was burning. That was the beginning of a lot of actions that have taken place. A lot of money was spent to build sewage treatment plants and to take care of the loads into the Lakes. A lot of progress was made. Lake Erie got a lot better. The dead zone went away or got very much smaller.

It is back. The dead zone is now back and it seems to be growing again. The question is, it is because of increased population and inability to maintain the infrastructure that was put in place 30 years ago? Or is it the combination of those loads and now the introduction of the zebra mussel? There is concern that the zebra mussel is now changing the dynamics of the material in the Lakes that is actually stimulating the growth of that dead zone again. So we may be backsliding in the sense of losing progress that we have made in the Lakes as well as moving toward the tipping point.

Mr. DUNCAN. Thank you very much. I emphasized to all of you not running over your time and I have gone way over my time. But I usually try to stick a little closer to the time limits if we more Members. But I like to get as many of the witnesses to participate as possible, and hopefully gain as much knowledge as possible from each of you and you have each been very helpful and very informative.

Dr. Ehlers has a couple more questions or comments.

Mr. EHLERS. Thank you, Mr. Chairman. First, a few comments. You mentioned in one of our previous hearings that Americans now pay $8 billion a year for bottled water. We could clean up the Great Lakes ecosystem in three years with the amount of money that people pay for bottled water. The issue is priorities and what is important to people. Clearly clean water is important to them. But putting the money into bottled water is not necessarily the most efficient way of dealing with achieving clean water.

I think what had made the Legacy Act work so well, aside from the good work this Committee did on perfecting that bill, is that we included sharing of expenses in that bill. As you recall, 35 percent comes from the local communities or non-profit groups or industries, what have you. And because communities are eager to get their particular area cleaned up, in my experience none of them have had any trouble raising that local match, the 35 percent.

So we get a good deal for our money from that program. And that is partly why it has been so successful.

I did want to ask a question. One of the primary goals of the executive order and the regional collaboration, as we have heard, is coordination across programs and levels of government. It is not just about funding, although we have talked about that. But the real issue is trying to get everything together so we can work well. This is not true just in instances where your agency decided to undertake a project or decided to change course in an existing project.

But I am curious, are your agencies incorporating the Strategy's recommended goals, milestones and tasks into your short range and long-range planning. Are you really grabbing hold of what the Collaboration came up with and incorporating it into your plans? This time we will go the other way and begin talking, just the Federal witnesses. Mr. Wooley?

Mr. WOOLEY. Congressman Ehlers, absolutely we are doing that from the Fish and Wildlife perspective. I can cite two examples, sir. One is we have utilized the collaboration and the weekly phone calls that we have with our Federal partners to be more efficient in the Great Lakes. An example is we are doing some assessment over in the Detroit River where we are utilizing Fish and Wildlife Service employees and dollars, but utilizing an EPA vessel in the Detroit River to do that assessment in concert with EPA and the State of Michigan. So there is efficiencies, coordination and effectiveness there.

The second example is the Ashtabula River example that I cited earlier in my testimony, where we are doing that in concert with the State of Ohio and with GLNPO, the EPA Great Lanes Program Office in Chicago, taking our tool, utilizing it collectively, cooperatively with the State and with EPA to make a more efficient restoration occur in the Ashtabula River. So those are two examples, sir, that I can cite, just off the top of my head.

Mr. EHLERS. Thank you. General?

General BERWICK. Congressman, my short answer would be yes, absolutely. I see one of the great advantages of this collaboration as the beginning of discussions and the opportunity to search for synergy and efficiencies and especially amongst our Federal partners, but even a larger circle beyond that. It has been very helpful in that regard.

Mr. EHLERS. Okay, that is what I suspected. I know the EPA is already doing it, so we don't have to ask them. I am just very pleased it is accomplishing that, because I think that is one thing that the President hoped to accomplish, and I really, really admire him for putting this Collaboration together.

But the fact that it is paying off I think is indicative of that, it was a very worthwhile effort.

One other thing that came out of this when we were discussing this with all the tribes, the Governors, the mayors, et cetera, a great deal of concern, and it is in the report and also in the GAO report that preceded this. There are many strategies and coordination efforts ongoing. There is no one organization that is coordinating restoration efforts. And during the collaboration discussion at one point I argued for a Great Lakes czar, it is a favorite term around here, even though it comes from another country. That of course is not included.

But I want to ask you, any of you who wish to respond, where is the locus of direction coming from? I know you are working together, but is there some overarching direction coming from one agency or another? I will open that to anyone. Mr. Grumbles.

Mr. GRUMBLES. I would like to mention a couple of things, Congressman. One of them, there is a tremendous amount of effort and collaboration and there will be progress, continued progress in implementing the Great Lakes Regional Collaboration. In our EPA, because of the President's executive order and history of the Great Lakes National Program Office, I think we are in a position through the Administrator and also through Gary Gulezian, who has been designated within the EPA organization as the czar to manage progress on the regional collaboration.

The other point to make, though, Congressman, as you know, probably better than anyone, there are other forums and mechanisms, too, particularly the international one. And our partners in Canada are very much a part of the Great Lakes Water Quality Agreement and the review process. That is equally important and provides an opportunity to coordinate actions on an international level, whereas this Great Lakes Regional Collaboration is more of what can we do among the Federal agencies and working with our partners.

But we do recognize, as you stated, the importance of having some accountability and a focal point to help measure and monitor for progress.

Mr. EHLERS. I appreciate your doing that. Because my reading of Section 118 of the Clean Water Act clearly gives the EPA the authority to do it. And I just want to emphasize, I think it is extremely important for you to do that.

Yes, Mayor?

Mayor BECKER. Thank you, Congressman. I agree. I think all parties to the Collaboration need to make a more significant commitment to the implementation from the top leadership on down. If you don't have the senior leadership involved, it is very hard to move it forward.

One of the things we would like to see is that there would be a much clearer set of expectations of actions and some sort of time line. One of the things I always do with my staff before we leave a meeting is who is going to do what and when are you going to get it done. And I understand this is a much bigger project than most.

But if you don't have specific things laid out and set up to do, it is very hard to do. The more agencies you have, the harder it is. I would very much support having a Great Lakes czar. One of the things the mayors' group did, there used to be the Great Lakes Cities Initiative and the International Association of Mayors. We merged that, we had basically two groups of mayors doing the same thing. Not that would ever happen in the Federal bureaucracy, I am sure.

But we merged them into one to make our voices as one, to have one agenda to drive forward. So any time we can get specific things with time lines, I think you have much more ability to hold people accountable for moving the Collaboration Strategy forward.

Mr. EHLERS. Thank you very much. I was hoping that was developing and I have heard areas that it is developing. I am glad to hear that it is that extensive.

One last point I want to make is, so that we can continue this, and I always think long-term, the bill that I have authored, people are swallowing hard at $20 billion, et cetera. That is a press-generated figure. The point is simply, we are not asking for a $20 billion authorization. But two years from now, we are going to have a new President. The President is going to appoint new administrators to the EPA and other agencies. I want to make sure that this continues on and that the pattern is in statute and developed, so that it will be a blueprint for the ages, not just for the Bush Administration.

So I am very interested, Mr. Chairman, in having my bill come out. And I recognize we are not going to get all that money all at once. That is fine with me. We have to take it bits and pieces. But we have to establish that pattern for the future. That is the whole purpose of my writing the bill. Not changing what the Collaboration has come up with, but just instituting it in statute so that it is going to be there for the future as well.

I thank you very much, and thank you, Mr. Chairman, for your patience.

Mr. DUNCAN. Thank you, Dr. Ehlers. Dr. Ehlers has a good memory. My Tennessee grandfather was a subsistence farmer and a Presbyterian minister. But I heard my father say, and I knew my grandfather well, I was in high school when he passed away, but I heard my father say Papa Duncan probably never made $100 cash money any one month in his life. They had 10 kids and an outhouse and not a whole lot more. I did express amazement in here, express that I thought my grandfather would have been amazed at how much people are paying for bottled water now. They pay a lot more than they pay for gasoline, for instance.

But I will tell you that my other grandfather spent the last 28 years of his career as a professor and writer at the University of Iowa. He and my grandparents, though, were both born and raised in Illinois. They actually had a little tiny cabin on Lake Michigan. So I have had a lot of relatives, I had an aunt and uncle and three cousins in Wisconsin, aunt and uncle and six cousins in Indiana, near Chicago, so I've had a lot of people in the region or close to the areas that some of you have been discussing here today.

I thank you very much. To me at least it has been a very interesting and informative hearing. I thank you very much for taking time out to be with us.

That will conclude this hearing.

[Whereupon, at 3:58 p.m., the subcommittee was concluded.]

Testimony by Mr. Todd Ambs
Water Division Administrator for the Wisconsin Department of Natural Resources
on behalf of the
Council of Great Lakes Governors
before the
U.S. Committee on Transportation & Infrastructure,
Subcommittee on Water Resources & Environment

September 13, 2006

Mr. Chairman and members of the Committee, thank you for the opportunity to appear before you today to discuss our shared efforts to protect and restore the Great Lakes. My name is Todd Ambs and I am the Water Division Administrator for the Wisconsin Department of Natural Resources. I am testifying today on behalf of the Council of Great Lakes Governors.

As President Bush noted in his 2004 Executive Order, the Great Lakes are a national treasure. Because of their size, human population, the fact that they are boundary waters shared with Canada and the interstate implications of fish and wildlife populations, management of these resources requires the three C's of collaboration, cooperation and coordination. I am pleased to report today that we have achieved success in the planning phases by fully following these three C's.

Some statistics reflect the complexity and significance of the region while illustrating an essential fact--the restoration and protection of the Great Lakes is of vital national interest to the United States.

The Great Lakes constitute the largest surface freshwater system in the world. More than 35 million Americans receive the benefits of drinking water, food, a place to work and live, and transportation from the Great Lakes.

Our national economy depends on the Great Lakes. The Great Lakes States account for 30 percent of the total US Gross Domestic Product. The Great Lakes are a key national transportation network. U.S.-flag vessels annually ship over 125 million tons of cargo between Great Lakes ports. Fishing, boating, hunting and wildlife-watching generate almost $53 billion in annual revenues in the Great Lakes region. One-third of all the boats registered in the United States are in the Great Lakes States and boating alone supports over 250,000 jobs.

Unfortunately, and despite significant and ongoing investments by all levels of government, the Great Lakes remain degraded and continue to be threatened. And, these threats promise to increase in the future.

The magnitude of the institutional challenges alone is daunting. To succeed in developing joint efforts, we first had to find a method of engaging eight States, multiple tribal governments, thousands of local governments and multitudes of interest groups. In some instances, we also needed to work closely with the two Great Lakes Canadian Provinces and the Canadian federal government. Despite these institutional challenges, and as a result of a lot of hard work, we now have two regionally developed blueprints for action to address threats to the Great Lakes. The two blueprints are:

1. The Great Lake-St. Lawrence River Basin Sustainable Water Resources Agreement (the Agreement), developed by the Great Lakes Governors in partnership with the Premiers of Ontario and Québec, and the companion Great Lakes—St. Lawrence River Basin Water Resources Compact (the Compact) that is the mechanism the Governors will use to fulfill the promises in the ten-party Agreement; and,
2. The Great Lakes Regional Collaboration's Strategy to Restore and Protect the Great Lakes.

Both of these plans for action are landmark achievements for large-scale resource management. Because of geographic scale, population, environmental complexities and the number of different jurisdictions, both efforts required the strong commitment of the Governors to fully engage all interests and attempt something that had never been done before at this kind of scale. Large collaborative efforts like these are not without risks. Yet, leadership and sincere interest in collaborative approaches promoted the positive atmosphere that led to the successful conclusions noted above.

I would first like to talk about the Agreement and the Compact. The history behind the Agreement and Compact is long, dating back to the Great Lakes Charter in 1985. When events not anticipated by the Charter occurred, specifically the proposal to export water in bulk from Lake Superior to Asia, the Governors and the U.S. Congress responded immediately to develop new approaches that would protect the lakes and preserve the related aquatic systems.

To fulfill their stewardship responsibilities, the Governors, through the Council of Great Lakes Governors, initiated a dialogue with the Premiers of Ontario and Québec which resulted in the Charter Annex Agreement of 2001 (the Annex) being signed by all ten Great Lakes Governors and Premiers. The Annex specified the intent of the ten jurisdictional leaders to create a new water management accord through an open public process within three years. Even though numerous new Governors and Premiers joined the discussions during that period, the regional commitment remained unchanged. A first draft water management plan was released in 2004 with a second draft released in 2005. After two rounds of public meetings and thousands of responses to issues of concern, the final Agreement and Compact were approved on December 13, 2005. This Agreement, the first of its kind in the world, demonstrates that the leaders of the waterbelt are serious about their stewardship role and committed to the need for shared goals, objectives and common protocols for water project reviews and decisions. This Agreement also provides unprecedented protections for the Great Lakes by banning water diversions with limited exceptions, encouraging water conservation and efficiency, and promoting the sustainable use of our water resources.

Now the action will shift to each Statehouse in the region, as the legislatures take the actions needed to enact the Compact. Legislation has already been introduced in Illinois, Ohio and New York, and passed the New York General Assembly. Other States will follow suit. After each State has passed enacting legislation, our attention will turn to Congress. We will ask that Congress provide its consent to the Compact, which will make the Compact a fully enforceable agreement among the States.

I would next like to talk about the Great Lakes Regional Collaboration Strategy. The Strategy is the result of many years of hard work by the Great Lakes Governors and our partners in the Collaboration. The process began when, at the request of the Great Lakes Congressional delegation, the Great Lakes Governors developed priorities for restoration and protection:

- Promoting the sustainable use of water resources;
- Protecting human health;
- Controlling pollution from diffuse sources;
- Reducing persistent bio-accumulative toxics;
- Stopping the introduction and spread of non-native aquatic invasive species;
- Protecting coastal wetland and wildlife habitats;
- Restoring Areas of Concern;
- Improving information collection and dissemination; and,
- Adopting practices that protect the environment along with the recreational and commercial value of the Great Lakes.

In 2004, President Bush issued his Executive Order. This action led to the launch of the Great Lakes Regional Collaboration. The goal of this Collaboration was to develop a strategy to protect and restore the Great Lakes. The Collaboration used the Governors' priorities as its organizing principle.

Over approximately one year, the Great Lakes Governors joined with representatives of the Administration, Congress, Mayors and Tribes to develop the Great Lakes Protection and Restoration Strategy. Over 1500 representatives of a wide cross-section of governmental and non-governmental stakeholder groups participated in creating this Strategy, resulting in its broad-based support.

We now have priorities that we all agree on and we have a broadly-supported Strategy to realize them. Through the Strategy, the region is now speaking with one voice. What is needed now is the will to act, the means to act and the leadership to guide those actions if we are to realize our vision and reach our goals.

The Great Lakes Governors are already committing significant resources to the protection of our Great Lakes. As you may know, the 2003 report by the Government Accountability Office documented the fact that State and local spending on Great Lakes programs far exceeds the investment by the federal government.

Unfortunately, significant challenges remain to achieving our broader objectives. Funding is a consistent obstacle and we recognize that securing investments of the magnitude called for in the Strategy challenges all of us at all levels of government. Nevertheless, the Governors are committed to continuing to work with our region's Mayors, Members of Congress, Tribal leaders and others toward our shared goal of securing large-scale, long-term and stable federal funding to implement the Strategy's recommendations. We are seeking federal funding as a supplement to the State, local and Tribal investment already taking place. While we remain committed to doing our share, we cannot accomplish many urgently needed restoration goals without more federal participation. As the Strategy's recommendations illustrate, some needs can only be addressed through the commitment of large-scale, long-term funding.

We are encouraged by the recent Senate proposals to increase funding authorization for federal, State and Tribal fish and wildlife projects. We also support the recent Senate proposal to institutionalize the organization of the Regional Collaboration process, and

the related federal Interagency Task Force, to maintain the means for working together and for assessing programs and delivery systems to gain efficiencies.

Along with new funding, we also seek improvements to the system by which funds are distributed. Too frequently, Congressional expectations are not achieved. One reason for this is that available funds for addressing a threat are diminished significantly by multiple transaction costs as funds move through agencies towards real implementation. In addition, there are numerous competing programs that often work at cross-purposes. To reduce these overhead "losses," we encourage Congress to assess the viability of block grant approaches for any new funds which can be committed to support the recommendations of the regional collaboration strategy.

Together with the Mayors, we previously identified FY2007 funding and other near-term actions (attached) that we believe are necessary to jumpstart the implementation of the Strategy. An increase of $300 million from FY2006 will leverage other monies, bring significant returns and lead to measurable progress. We again ask that Congress seriously consider this request in light of the significant benefits that these investments will mean for the region and the nation. The following is a summary of the Great Lakes Governors' and Mayors' top recommendations:

Passage of a strong, effective bill to control nuisance aquatic invasive species and prevent the Asian Carp from entering the Great Lakes.

The Great Lakes Governors have urged Congress to quickly reauthorize and fund the National Aquatic Invasive Species Act. Great Lakes stakeholders echo that request, and further emphasize the need for a strong bill, such as S. 770, H.R. 1591 and H.R. 1592, which include provisions that address the specific challenges faced by the Great Lakes. We applaud the recent bill that authorizes the Army Corps of Engineers to use existing funds to maintain and operate the current temporary Asian Carp dispersal barrier on the Chicago Sanitary and Ship Canal. However, there remains a need for stable, long-term federal funding for the operation and maintenance of both the temporary dispersal barrier and the permanent barrier that is still under construction. The Great Lakes Governors

have already contributed monies to overcome federal funding shortfalls, in addition to the significant amounts committed by the State of Illinois. The federal government must now do its part to ensure that the Great Lakes remain protected from Asian carp.

Increased federal funding for wastewater infrastructure to improve water quality and reduce beach closings. The need is great when it comes to sewers and related infrastructure. As you may recall, U.S. EPA's gap analysis showed a $525 billion shortfall between current levels of spending and the projected need for water infrastructure investment over the next 20 years. Clearly, this need cannot be met without the increased participation of the federal government.

One of the major threats to human health across the nation, as well as in the Great Lakes and their tributaries, comes from combined sewer overflows (CSOs), which discharge untreated sewage during heavy rainfalls. Costly as they are, CSOs are only one of the water infrastructure challenges faced by local communities. From aging wastewater treatment plants to failing on-lot septic systems, the most advanced nation in the world is struggling to manage its sewage. America deserves better than unsanitary conditions that hearken back to the disease-ridden days of long ago. Increased funding for the State Revolving Loan Funds that finance wastewater projects would be a good step toward meeting our infrastructure needs. Unfortunately, these funds have been cut in recent years and, again this year, the President's budget calls for further cuts. We hope to work with you to reverse this trend.

Appropriate funding for the Legacy Act to clean up toxic sediments. The Great Lakes Governors commend President Bush for his inclusion of a $49.6 million request in Great Lakes Legacy Act funding. The Great Lakes Governors support the President and urge Congress to appropriate these funds.

The Legacy Act specifically addresses residual contaminants in the Areas of Concern where contaminated sediments perpetuate problems such as fish deformities and

limitations on fish consumption. Legacy Act spending can make a very positive difference.

Restore 200,000 acres of wetlands. We applaud the President's commitment to begin work to restore 200,000 acres of wetlands in the Great Lakes Basin. To meet that goal, we ask that $28.5 million be appropriated to begin restoration work immediately. The States remain committed to working with other non-federal partners to provide an additional $28.5 million to complement the cost-share toward this end. And, to ensure that we efficiently use the resources we are given, we ask that you join us in encouraging the Great Lakes Federal Interagency Task Force to review all federal agencies' wetland management programs to develop a consolidated wetlands restoration and protection approach.

Encourage sustainable development through the remediation of waterfront brownfields. The philosophy of sustainability overlays all the recommendations in the Strategy. To promote this ethic of sustainable development, we continue to urge that Congress direct USEPA to apportion $50 million in their brownfield grant program to remediate waterfront brownfields. The remediation of these brownfields and their reintegration into the region's economy will serve as a model of sustainable development.

In closing, Mr. Chairman and members of the committee, our pledge to you is that we will continue to work with you to ensure that the investments we ask Congress to make in the Great Lakes are put to good use. We must restore this ecological treasure. That will be our legacy for future generations.

Thank you, Mr. Chairman.

March 10, 2006

The Honorable George V. Voinovich
Hart Building 524
Washington, D.C., 20510

Dear Senator Voinovich:

Thank you for your leadership in our shared efforts to restore and protect the Great Lakes. This objective is of vital national interest to the United States. The Great Lakes are a national treasure constituting the largest surface freshwater system in the world. More than 35 million Americans receive the benefits of drinking water, food, a place to work and live, recreational opportunities and transportation from the Great Lakes. Our national economy depends on the Great Lakes. Nearly 29% of our nation's gross domestic product (GDP) is produced by the Great Lakes States, which includes approximately 60% of all U.S. manufacturing.

Unfortunately, there are threats to the Great Lakes Basin now and they promise to increase in the future. As the result of a year-long process initiated by President Bush through an Executive Order, the Great Lakes Governors and Mayors recently joined with representatives of the Administration, Congress, and Tribes to unveil a Strategy to restore and protect the Great Lakes. Over 1500 governmental and non-governmental stakeholders worked together to create this Strategy, resulting in its broad-based support. The Governors' and Mayors' goal is now to secure large-scale, long-term funding to implement the Strategy's recommendations and to enact management reforms to ensure that resources are efficiently used to address our highest-priority needs.

As the President noted in his Executive Order, "...over 140 Federal programs help fund and implement environmental restoration and management activities throughout the Great Lakes system." But, too frequently and despite best efforts, these Federal programs are poorly coordinated and inadequately focused on agreed-upon priorities. The Executive Order sought to improve coordination by creating the Great Lakes Interagency Task Force. Although further progress is needed, we support Congressional action to codify the Executive Order and institutionalize the Great Lakes Interagency Task Force. More generally, we support a sustained, outcome-oriented collaborative process to more effectively consolidate Federal resources.

In addition, we believe that alternative resource delivery mechanisms should be pursued over the long term to ensure the greatest return on our investments. An annual appropriation toward this end should be directed to support Great Lakes restoration and protection efforts as envisioned under S 508, "The Great Lakes Environmental Restoration Act," and HR 792, "Great Lakes Restoration Act of 2005." Furthermore, spending priorities should be determined at the State and local level using the Strategy as a guide. We applaud the bills' sponsors and cosponsors and join their call to provide long-term, large scale funding through a reformed process.

As we work together to implement these long-term reforms, we also recognize that specific actions can and must be taken in the interim to advance the Strategy. Therefore, on December 12, 2005, we asked the President to support a series of broadly-supported near-term actions to protect and restore the Great Lakes. A copy of the letter is attached. These proposed actions were developed in consultation with members of Congress and Tribal representatives. All of the near-term action items contained in our letter to the President are of vital importance. Action is needed now to finally achieve significant improvements on these well documented and widely supported recommendations. Some of these requested actions have been stalled in debate for far too long:

- Authorizing the U.S. Army Corps of Engineers to complete and operate two permanent dispersal barriers in the Chicago Sanitary and Ship Canal; and, appropriating $6 million to implement this action in order to prevent the Asian carp and other invasive species from entering the Great Lakes. This investment is a fraction of the value of the Great Lakes fishery.

- Achieving broader protection against the introduction and spread of aquatic invasive species through congressional passage of the National Aquatic Invasive Species Act, as reflected in SB 770 and HR 1591 and HR 1592.

- Supporting the President's request for the Great Lakes Legacy Act to be funded at $49.6 million– if not the full $54 million authorized level.

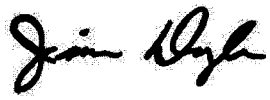
- Supporting the President's commitment to begin work to restore 200,000 acres of wetlands in the Great Lakes Basin by appropriating $28.5 million to begin restoration work immediately. The States remain committed to working with other non-federal partners to provide an additional $28.5 million cost-share toward this end. To ensure these resources are used efficiently, we also ask that you join us in encouraging the Great Lakes Federal Interagency Task Force to review all federal agencies' wetland management programs to develop a consolidated wetlands restoration and protection approach.

- Appropriating $50 million in additional funding for USEPA's brownfield grant program. These funds should be used for remediation projects in shoreline communities.

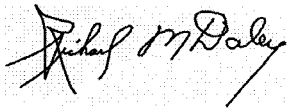
We also want to ensure that existing and proven core programs, such as the Clean Water State Revolving Loan Fund; the Coastal Zone Management Program; and, the Great Lakes Fishery Commission's Sea Lamprey control program are funded at fully authorized levels. Continuing programs like these is critical to maintaining the gains made through past investments.

The time for planning has ended and the time for action has begun. We look forward to working with you as we take that action. Should you or your staff have any questions, our staff contacts are David Naftzger, Executive Director of the Council of Great Lakes Governors at (312) 407-0177 and David Ullrich, Executive Director of the Great Lakes and St. Lawrence Cities Initiative at (312) 201-4516.

Sincerely,



The Honorable Jim Doyle
Governor of Wisconsin
Chair, Council of Great Lakes Governors



The Honorable Richard M. Daley
Mayor, City of Chicago
Chair, Great Lakes and St. Lawrence Cities Initiative

Attachment

December 12, 2005

The Honorable George W. Bush
The White House
1600 Pennsylvania Avenue NW
Washington, D.C.

Dear President Bush:

Again, thank you for your continued leadership in our shared efforts to protect and restore the Great Lakes. As a direct result of your Executive Order creating a federal Great Lakes Interagency Task Force and promoting a regional collaboration of national significance, we have made significant strides that could help to protect this national treasure.

We are pleased that, thanks to the dedicated efforts of more than 1500 stakeholders and experts from across the region, we now have a comprehensive assessment of Great Lakes restoration and protection needs. We also have a clear set of consensus recommendations for meeting these needs. And, the Collaboration's recommendations illustrate that some of these needs can only be addressed through new or additional resources at the federal, state, tribal or local levels.

As we stated in our November 1 letter, we share the goal of accomplishing greater results with existing resources. We also share the overwhelming view of our Collaboration partners that federal resources must be increased in the FY2007 budget to better restore and protect Great Lakes.

Please find attached a proposed list of near-term action items that, if implemented, could substantially improve our long-term ability to protect and restore the Great Lakes. This list has been developed by our region's Governors and Mayors in consultation with members of the Great Lakes Congressional Task Force and representatives of Great Lakes Tribes.

Serious problems continue to negatively impact the region's health and welfare. The ecological stability of these unique world class resources and the strength of this nation's economy cannot be resolved by maintaining the status quo. We must make additional

investments in the short term and build on these commitments over time. Above all, we agree that there will be an ongoing need to continue working together.

Your Executive Order has helped to bring us together as never before. We have renewed our region's optimism and believe that we can work together to overcome our shared challenges. We ask that you help us deliver on the promise of our shared efforts by partnering to support these near-term actions. We look forward to a continued dialogue with you and your staff to move these ideas into action.

We would ask that a meeting be scheduled among our staff and yours in order to develop a workplan toward our shared goals. Our staff contacts are David Naftzger, Executive Director of the Council of Great Lakes Governors, at (312) 407-0177 and David Ullrich, Executive Director of the Great Lakes and St. Lawrence Cities Initiative at (312) 201-4516.

Sincerely,

Jim Doyle Bob Taft Richard M Daley

Governor Doyle Co-Chair Council of Great Lakes Governors	Governor Taft Co-Chair Council of Great Lakes Governors	Mayor Daley Chair Great Lakes and St. Lawrence Cities Initiative

Great Lakes Regional Collaboration
Near Term Action Items

Invasive Species

Invasive species pose one of the most serious threats to the stability of the Great Lakes ecosystem. An average of one new species is discovered in the Great Lakes ecosystem every eight months, and once present, eradication is impossible. Prevention is vital to stemming ecosystem impacts from the introduction of new invasive species.

Federal: The federal government must move swiftly under its existing authorities to require improvement for ballast water management, including practices for those ships declaring no ballast on board, to forestall the introduction of new invasive species to the Great Lakes.

We ask that injurious carp species be listed under the Lacey Act.

Congress should pass and the President should sign the National Aquatic Invasive Species Act (Senate Bill 770/HR 1591 and 1592). Enactment of NAISA is one of the key legislative objectives of the Great Lakes Regional Collaboration. Passage of comprehensive federal legislation such as NAISA would address many of the key recommendations developed by the participants in the Collaboration, and is critical to our overall restoration goals. The bill should include:

- $8 million for Great Lakes state-specific management plans. It is vital that these funds be distributed to the States and Tribes to implement existing plans approved by FWS.

- $11.25 million to prevent introduction of AIS by vessels (includes $6 million to USCG Sec 1101, $2.5 million to EPA Sec 1101, $2.75 million to Task Force Sec 1101).

- $6 million to the US Army Corps of Engineers to complete and operate permanent dispersal barriers in the Chicago Sanitary and Ship Canal.

- $1 million for model regional, state, and local rapid response contingency strategies.

State/Tribe/Local: The States will continue to implement state-specific plans, approved under the Non-indigenous Aquatic Nuisance Prevention and Control Act, to prevent and control invasive species. Tribes will also implement control measures within areas of their authority. States, Cities and Tribes will implement

educational and regulatory efforts relative to invasive species targeted to those entities whose activities are most likely to pose a risk of AIS introductions.

The States estimate that they are devoting more than $3.5 million annually to the control and prevention of invasive species in the Great Lakes. Industry and municipalities in the Great Lakes basin spend roughly $70 million annually on removing zebra mussels from water intakes.

Coastal Health

Elimination of sewage overflows to the Great Lakes and their tributaries is a region-wide need and the most direct means of improving coastal health. Beach closures are one of the most obvious markers of degraded coastal conditions

Federal: CSOs and SSOs are the greatest impediment to improving coastal health. The federal government, in cooperation with the States, should ensure that all CSO/SSO communities have completed a long-term control plan (LTCP) within the next five years and are making adequate progress in implementing it.

The cost of correcting CSOs and SSOs is burdensome to local communities and to the ratepayers who support their wastewater infrastructure. We ask that Congress provide a total of $50 million in the FFY 2007 budget to provide interest rate subsidies or other forms of assistance for CSO/SSO projects in the Great Lakes basin. The Council of Environmental Infrastructure Financing Authorities supports interest rate subsidies over direct grant funds.

The Collaboration asks that an additional $2 million be provided under the Beach Act to enable Great Lakes States and Tribes to standardize, trial, and implement a risk-based approach to beach/coastal assessment. Beyond that, we seek to maintain current funding levels: $1.75 million for the Great Lakes States and $50,000 for eligible tribes.

State/Tribe/Local: We note that SRFs include a state match requirement, and that local governments will incur billions of dollars in costs to address CSOs and improve infrastructure.

Areas of Concern

Passage of the Legacy Act provided for the first time a dedicated source of funding for remediation of contaminated sediments in the Areas of Concern. However, appropriations have never reached authorized levels.

Federal: The Collaboration asks that the FFY 2007 budget contain the authorized funding level of $54 million, an increase of $24 million over the current appropriation. Congress should reauthorize the Legacy Act and include in it the

provisions recommended by the Collaboration to make use of the Act's funding more efficient and effective.

Restoration of the AOCs is necessarily driven at the local level, through plans developed by States, Tribes, local officials, and concerned citizens. Unless this capacity is nurtured at the local level, progress on AOC restoration will be limited. While States and NGOs have continued to support Remedial Action Plan groups, federal support has dwindled, with negative effect. The Collaboration requests that $10 million be appropriated to support state and local AOC/RAP programs in the Great Lakes States, an increase of $8 million over the current appropriation. and that GLNPO receive $1.7 million for program administration, of which $1.2 million exceeds the current appropriation.

State/Tribe/Local: The Collaboration notes that all Legacy Act projects require a non-federal cost share, to which States and local governments often contribute. For example, Ohio is prepared to contribute $7 million to the Ashtabula River project currently under consideration for Legacy Act funding.

The States will take the lead on the establishment of a State-Federal-Local-Tribal coordinating Committee.

Toxic Pollutants

Progress in protecting and restoring the Great Lakes will only be achieved and maintained to the extent that the introduction of toxic pollutants is controlled. While certain persistent toxic substances (PTS) have been significantly reduced in the Great Lakes Basin ecosystem over the past 30 years, they continue to be present at levels that pose threats to human and wildlife health and warrant fish consumption advisories in all five lakes. More recently, researchers have documented the presence of additional chemicals of emerging concern that may also pose threats to the Great Lakes.

Federal: The federal government should restate its commitment to implement the Great Lakes Bi-national Toxics Strategy, and should evaluate its implementation schedule for opportunities to accelerate its efforts.

We ask that the FFY 2007 budget include an additional $2 million to be distributed to the States to expand the toxics reduction program in the Great Lakes Initiative.

The Administration and Congress are asked to provide $1 million in FFY 2007 in ongoing funds to support the continuation of tribal fish tissue contaminant analysis programs and related community education programs. Congress is asked to appropriate an additional $100,000 in the FFY 2007 budget to facilitate tribal participation in the mercury stewardship program described below.

Emerging chemicals of concern are little understood, but pose a potentially serious threat to aquatic life and wildlife in the basin. The Collaboration asks that Congress provide $100,000 for monitoring of these new chemical contaminants.

State/Tribe/Local: States,Tribes, and local governments recognize that much of the work to reduce toxic pollutant loading into the Great Lakes will necessarily occur at the local level. The Great Lakes and St. Lawrence Cities Initiative will work with tribes and others on toxic reduction efforts, including such things as household hazardous waste collections, pesticides and fertilizer use reduction, and mercury product and waste collections.

The Great Lakes States, Cities and Tribes will develop a basin-wide mercury product stewardship strategy, aimed at managing mercury wastes and reducing the use of mercury-containing products. The Great Lakes Pollution Prevention Roundtable will lead this effort.

States, Tribes and municipalities will identify garbage burning practices in their jurisdictions and through education and regulation seek to reduce the incidence of this practice, which is the primary source of dioxins and furans into the Great Lakes ecosystem.

The Collaboration recognizes the need to protect human health through consistent and easily accessible messages on fish consumption. The States and Tribes will improve their fish consumption advisory programs, particularly regarding sensitive populations such as tribal communities.

Habitat and Species

Preservation of the diversity of species in the Great Lakes basin can be significantly advanced through protection and restoration of wetlands and restoration of the Great Lakes tributaries. These activities are also key to the full implementation of international agreements on management of migratory birds and of the Great Lake fisheries resources.

Federal: The Collaboration asks that the FFY 2007 budget provide $28.5 million to existing Fish and Wildlife Service programs to restore 100,000 acres of wetlands, toward the Collaboration goal of eventual restoration of 550,000 acres. States, Tribes, local governments and NGOs would raise an additional $28.5 million in non-federal matching funds.

To maximize the use of existing funding for wetlands protection and restoration, the Collaboration proposes that the Federal Interagency Task Force review all federal agencies' wetland management programs and develop a consolidated approach.

Because Great Lakes tributaries are key spawning and nursery areas for

Great Lakes fish populations, species recovery plans are dependent on protecting existing high quality tributaries and restoring other tributaries with the potential to support targeted species. These activities are site-specific, based on watershed hydrologic and physical habitat needs. The Collaboration has set a near-term protection and restoration goal of ten tributary streams. We ask that Congress pass the Great Lakes River Restoration Act and appropriate $40 million in the FFY 2007 budget for Fish and Wildlife Service programs to be directed to key tributary stream restorations.

State/Tribe/Local: The Collaboration recognizes the importance of preserving existing wetlands, and recommends that each State review its existing wetland management programs to determine (1) their effectiveness in preserving existing high-quality wetlands in the basin and (2) the success of mitigation projects in the basin. States, Tribes, and local governments will continue to use existing authorities to preserve wetlands, in particular high quality wetlands in the near shore areas of the Great Lakes.

As noted above, States, Tribes, local governments and NGOs would raise an additional $28.5 million in non-federal matching funds to achieve the target of restoring 100,000 acres of wetlands in FFY 2007 and an additional $10 million in non-federal match for tributary restoration.

Nonpoint source pollution

Nonpoint source impacts vary greatly in frequency and severity across the Great Lakes. Impacts have been particularly severe in the coastal wetlands and tributaries that once buffered the Lakes from environmental damage.

Federal: Although there are existing programs to deal with sedimentation and nutrient enrichment, the current needs outstrip existing program capacity. The Collaboration asks that the FFY 2007 budget include an additional $66 million to increase enrollment in buffer strip programs.

Urban streams are particularly vulnerable to nonpoint source pollution impacts. The Collaboration asks that Congress appropriate $18 million in the FFY 2007 budget for hydrology improvement projects in urbanized areas where runoff from development and the associated impairments directly affect natural waterways and their confluence with the Great Lakes or connecting waters.

State/Tribe/Local: The States estimated their spending on nonpoint source pollution control programs at nearly $1.4 million annually in 2004.

Indicators and Information

Accountability demands that the Great Lakes restoration effort be able to determine baseline conditions and assess the results of restoration projects and investments. In addition, the capacity to assess trends is needed to observe long term change and detect the emergence of new issues (e.g. new exotic species).

Federal: The SOLEC process to develop indicators should be completed for a full suite of 80 indicators, with particular attention to the use of indicators that will measure the success of the measures recommended in this Strategy. The Collaboration asks that $800,000 be provided in the FFY 2007 budget toward this end. A "top ten" list of indicators should be developed and reported to the public on an annual basis.

The Federal Interagency Task Force should review monitoring programs among its member agencies to ensure effective and efficient gathering and reporting of data, and should coordinate the States and Tribes to optimize the effectiveness of monitoring investments throughout the region.

State/Tribe/Local: The States estimate their annual spending on monitoring and analysis in the basin at $525,000. They stand ready to review these programs with the federal government to eliminate duplication of effort and maximize the scope of the data gathering and reporting effort.

Sustainability

The philosophy of sustainability overlays all the recommendations developed through the Collaboration process. The positive result of investment in restoration projects can only be maintained over time if sustainable practices become more widespread. Many of the recommendations in the Collaboration's Strategy reflect a sustainable approach.

Federal: In the near term, the Collaboration suggests that federal agencies and the States review their prioritization formulas for brownfield grant and loan programs and for SRF loan programs to determine whether projects that reflect sustainable practices or advance sustainable principles can be awarded a higher priority for funding and/or a more favorable interest rate. In addition, Congress should earmark $50 million in USEPA's brownfield grant program for waterfront brownfields.

State/Tribe/Local: Michigan, Pennsylvania, Ohio and New York have created environmental bond funds that provide hundreds of millions of dollars for brownfield restoration and other sustainable practices.

States, local governments and Tribes have many programs which promote sustainable practices. These activities should continue, and be supplemented over the long term by the sustainable development approach contemplated in the Strategy. For example, local governments should be encouraged to adopt plans for growth that incorporate sustainable practices.

Tribal Overarching Issues

There are 35 federally-recognized Indian Tribal Nations whose reservations are located in the Great Lakes Basin and/or who may retain treaty guaranteed rights to hunt, fish or gather within the Great Lakes Basin in areas ceded to the United States in various treaties. Tribal communities rely upon healthy, fully-functioning Great Lakes ecosystems to meet subsistence, economic, cultural, spiritual and medicinal needs.

The Tribes count upon the United States to honor its treaty obligations and trust responsibilities to adequately fund tribal natural resource and environmental management programs. Tribal environment and natural resource management programs are particularly vulnerable to budgetary reductions. The loss of what might be considered a small amount of funding to others usually constitutes a large percentage of a particular tribal program and results in a correspondingly large reduction in services to tribal communities, if not *de facto* elimination of the program involved.

The Collaboration asks the Administration and Congress to maintain base funding levels for tribal programs to ensure that the Tribes are able to provide for the health and welfare of their communities as well as to remain effective partners in Great Lakes protection and restoration efforts. Such funding should ensure tribal capacity to undertake research and monitoring that takes into account the consumption patterns and risk exposures of tribal members who engage in subsistence life ways, who use natural resources for medicine and in ceremonies, and whose livelihood is based upon natural resources.

Collaboration member Tribes also have identified the prevention and control of invasive species, the reduction and prevention of toxic pollutants (particularly mercury), and habitat protection and restoration as both near term and long term priorities.

U.S. HOUSE OF REPRESENTATIVES
Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment

TESTIMONY OF
The Honorable Gary Becker
Mayor, City of Racine, Wisconsin
and Vice Chair, Great Lakes and St. Lawrence Cities Initiative

September 13, 2006
Washington, D.C.

Good afternoon Mr. Chairman and members of the Subcommittee. My name is Gary Becker and I am the Mayor of Racine, Wisconsin. I am here today in my capacity as the Vice Chair of the Great Lakes and St. Lawrence Cities Initiative ("Cities Initiative"). I appreciate the opportunity to testify before you today concerning Great Lakes restoration and protection, and more specifically on how we can work together to implement the Great Lakes Regional Collaboration Strategy that was released in December 2005.

The Great Lakes are a resource of tremendous value to the people of our country and Canada, the states and provinces that border the lakes, the tribes and first nations of the area, and the many cities, towns and other local governments in the basin. The Cities Initiative is an organization with over 80 participating cities in equal numbers from the United States and Canada. Chicago Mayor Richard M. Daley is the Founding Chair of the Cities Initiative and Toronto Mayor David Miller serves as the current Chair. The goal of the Cities Initiative is to advance water quality, water conservation and waterfront vitality by being an active participant in Great Lakes decision-making, by developing and sharing local best practices, and by being strong advocates for the long-term restoration and protection of the Great Lakes.

Since 2003 when Mayor Daley established the Cities Initiative, we have been actively engaged with the Bush Administration, Great Lakes Governors, Great Lakes Tribal Leaders, Great Lakes business leaders and Great Lakes advocacy groups on Great Lakes issues.

177 North State Street, Suite 500, Chicago, Illinois 60601 ~ (312) 201-4516 phone ~ (312) 553-4355 fax
www.greatlakescities.org

Mayor Daley represents the Cities Initiative on the Executive Committee for the Great Lakes Regional Collaboration, the effort launched by the President's May 2004 Executive Order on the Great Lakes. Mayor Daley and I, along with many other mayors, have been actively involved in the Great Lakes Regional Collaboration since the effort began and we continue to remain involved as the Collaboration moves forward.

The Great Lakes Regional Collaboration Strategy released in December 2005 was the product of the Collaboration. The Strategy represents the most comprehensive statement ever developed about the problems faced on the Great Lakes and what it will take to solve them over the long-term. Equally important, the Strategy represents the ***very first consensus strategy from all the relevant stakeholders in the Great Lakes region*** about the current and future needs of the Lakes. A consensus strategy is exactly what the Administration and the Congress had asked us to develop.

While the estimated cost to fully implement the Strategy is $20 billion, Mayors and Governors recognize an expenditure of that magnitude must be spread over a number of years. Accordingly, when the Strategy was released in December 2005, Mayors and Governors asked the President and Congress for an initial investment of $300 million to focus on the top priorities and address the most urgent problems, such as invasive species, coastal health, areas of concern, toxic pollutants, habitat and species, non-point source pollution, indicators and information, and sustainability. Mayors and Governors committed to meet matching levels for this initial federal investment, which would amount to approximately half of the $300 million.

In addition, Mayors and Governors requested several other federal steps to help advance the restoration and protection of the Great Lakes, including enactment of comprehensive aquatic invasive species legislation, with a special emphasis on ballast water, and a more streamlined approach to federal wetlands protection.

The Mayors appreciate that some members of Congress have shown interest in moving forward on some aspects of Great Lakes restoration and protection. The Senate Environment and Public Works Committee held a hearing earlier this year on the Regional Collaboration, and we sincerely appreciate that this Subcommittee is taking similar action by holding this hearing. In addition, various members of Congress have pushed hard for action on invasive species legislation, as well as on legislation to ban the Asian carp and legislation to expand the Great Lakes Fish and Wildlife Restoration Act.

However, none of this legislation has been enacted and, with the exception of the Legacy Program, no additional Great Lakes funding is on the horizon.

The Mayors are disappointed that there has not been more progress from the U.S. Environmental Protection Agency and the other federal agencies in terms of supporting forward movement on the Regional Collaboration Strategy.

Moreover, the federal Great Lakes Interagency Task Force, which was established by the President's Executive Order to coordinate federal Great Lakes policy among numerous federal agencies, still has not taken any substantive action. We are also very concerned about other federal actions that are wholly inconsistent with the Strategy, such as the proposal to continue cutting the Clean Water State Revolving Fund, which has been slashed in recent years by approximately 50%, or more than $700 million.

The lack of federal movement has not slowed the momentum of Great Lakes Mayors, or Great Lakes Governors and Tribes in working towards Great Lakes restoration and protection. Great Lakes cities are spending hundreds of millions of dollars annually in capital investments and operating expenses on sewers, treatment plants, stormwater management, water conservation, waterfront parks and many other efforts to restore the Great Lakes. As one example, in my city, we have been working to protect our beaches so that families from Racine can enjoy swimming in Lake Michigan. We have obtained over $830,000 in grant funds to improve monitoring, identify sources of contamination and improve beach management to reduce water quality advisories and educate the public. We also spent over $600,000 of our own local money and a $150,000 grant from Wisconsin to improve stormwater management.

These types of activities are being undertaken in cities all across the Great Lakes as Mayors do our part to increase the value of this natural resource and the enjoyment of our citizens. Mayors want to continue as full partners with federal, state, and tribal governments in the effort to restore and protect the Great Lakes. This effort is critical to our region and to the nation. We are fully engaged with Canadian cities as well, to make sure that the international dimensions of the Great Lakes resource are fully appreciated.

In summary, the Cities Initiative remains strongly committed to its initial request to the President and Congress for a $300 million investment to begin work towards implementation the highest priority items included in the Strategy. The Cities Initiative also remains committed to working towards passage of comprehensive invasive species legislation and other priority Great Lakes bills consistent with the Strategy.

We have a unique opportunity with the Regional Collaboration Strategy to make a significant departure from "business as usual" towards a consensus approach. The Cities Initiative wants to make sure we do that so future generations will look back with gratitude and say that all levels of government made a positive change for the Great Lakes by working together to restore and protect them.

Thank you for holding this important hearing and for the opportunity to provide testimony.

Contact Information:

Gary Becker, Mayor
City of Racine
730 Washington Avenue
Racine, Wisconsin 53403
262-636-9111

GREAT LAKES AND ST. LAWRENCE CITIES INITIATIVE
BOARD OF DIRECTORS 2006 / 2007

Mayor David Miller, Toronto
Chair and Director

Mayor Richard M. Daley, Chicago
Founding Chair and Director

Mayor Gary Becker, Racine
Vice Chair and Director

Mayor George K. Heartwell, Grand Rapids
Secretary and Director

Mayor Terry Geddes, Collingwood
Treasurer and Director

Mayor Herb Bergson, Duluth
Director

Mayor Andrée Boucher, Québec Metro Community
Director

Mayor Robert Duffy, Rochester
Director

Mayor Carleton S. Finkbeiner, Toledo
Director

Mayor Ted Knight, Parry Sound
Ex Officio Director

Mayor Denis Lapointe, Salaberry-de-Valleyfield
Director

Mayor Lynn Peterson, Thunder Bay
Director

Mayor Timothy Rigby, St. Catharines
Director

Mayor Joseph Sinnott, Erie
Director

Mayor Gerald Tremblay, Montréal
Director

177 North State Street, Suite 500, Chicago, Illinois 60601 ~ (312) 201-4516 phone ~ (312) 553-4355 fax
www.greatlakescities.org

David Miller, Mayor of Toronto, Chair

Richard M. Daley, Mayor of Chicago, Founding Chair

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

COMPLETE STATEMENT

OF

BRIGADIER GENERAL BRUCE A. BERWICK
COMMANDER
GREAT LAKES & OHIO RIVER DIVISION
U.S. ARMY CORPS OF ENGINEERS

BEFORE

UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON TRANSPORTATION & INFRASTRUCTURE

SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

ON

THE GREAT LAKES REGIONAL COLLABORATION STRATEGY

SEPTEMBER 13, 2006

COMPLETE STATEMENT

OF

BRIGADIER GENERAL BRUCE A. BERWICK
COMMANDER
GREAT LAKES & OHIO RIVER DIVISION
U.S. ARMY CORPS OF ENGINEERS

BEFORE THE

UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON TRANSPORTATION & INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

ON

THE GREAT LAKES REGIONAL COLLABORATION STRATEGY

Introduction

Mr. Chairman, Committee members, and distinguished guests, I am pleased to testify before you on the U.S. Army Corps of Engineers (Corps) activities that contribute to the protection and restoration of the ecosystem of the Great Lakes.

The Great Lakes ecosystem is a nationally significant natural resource. It is the world's largest freshwater ecosystem, and also provides millions of U.S. and Canadian residents with water for consumption, transportation, power, recreation, and a number of other uses. The Corps is working together with other Federal agencies, the Canadians, and the affected States, Tribes, local governments stakeholder groups, to help protect and restore this ecosystem.

The Assistant Secretary of the Army (Civil Works), Mr. John Paul Woodley, Jr., is the Department of Army's representative on the Great Lakes Interagency Task Force established under Executive Order 13340, which the President issued in May 2004. Corps staff participated in several of the Great Lakes Regional Collaboration teams and co-chaired the Sustainable Development Strategy Team. The Corps also provided some funding for contractor support.

My comments will focus on several specific projects that the Corps is implementing in cooperation with non-Federal partners that will benefit the ecosystem of the Great Lakes and provide some perspective on the challenges facing the effort to protect and restore the ecosystem of the Great Lakes.

Regional Collaboration

The Strategy to Restore the Great Lakes, which was produced by the Great Lakes Regional Collaboration, addresses eight of the nine priority issues identified by the governors of the Great Lakes States. These eight issue areas cover a wide range of environmental concerns, including invasive species, contaminated sediments, loss of fish and wildlife habitat, and aging wastewater infrastructure.

The Strategy suggests a variety of ways to improve the protection and restoration of the Great Lakes. Most of the recommendations in the Strategy are relatively broad and programmatic in nature. The Strategy also does not integrate its recommendations across the eight issue areas.

The Corps' approach to water resources involves the consideration of alternatives, evaluation of costs, impacts and benefits, and direct participation by all levels of government, industry, and stakeholders. This participation fosters an open dialogue to integrate sometimes competing or conflicting water resource needs.

Collaborative, system-wide planning can contribute to the protection and restoration of the ecosystem and a sustainable balance of water resource uses. In the Great Lakes, as elsewhere, the Corps is working to find ways to protect and restore the ecosystem while still meeting water supply, navigation, commerce, recreation, and other uses.

Corps Activities that Benefit the Great Lakes Ecosystem

The Corps of Engineers has a variety of programs and projects in the Great Lakes that provide for both economic development and aquatic ecosystem restoration. I will provide a brief summary of a few of these projects and programs.

The Corps of Engineers is operating the electrical barrier on the Chicago Sanitary and Ship Canal with the goal of preventing, if possible, the migration of the Asian carp and other invasive fish species between the watershed of the Mississippi River (via the Illinois Waterway) and the Great Lakes ecosystem. We are continuing to operate the demonstration barrier, which was constructed in 2002, and are constructing a permanent barrier. This project has been challenging for technical reasons, but we recognize its importance to the ecosystem of the Great Lakes and are doing our best to keep this line of defense in place.

In addition, the Corps is working in partnership with the Great Lakes Fishery Commission to design and build traps and barriers to control the spread of the sea lamprey, an invasive species that is already in the Great Lakes. The sea lamprey is an eel-like fish that parasitizes larger game fish. So far, we have completed two traps and one barrier and have several more such efforts being readied for construction through Section 1135, a program authorized for small projects under our aquatic ecosystem restoration mission.

One of the Corps' regional programs, specific to the Great Lakes, is called the Great Lakes Tributary Model. Through this program, we are developing computer models of

Great Lakes tributaries so that State and local land management agencies are better able to evaluate, prioritize and design options for soil conservation and nonpoint pollution prevention. This program has developed models for 20 tributaries so far. One example is the model developed for the Nemadji River, which flows through northern Minnesota and Wisconsin into Duluth-Superior Harbor. This model helped county and state agencies evaluate the effects of forestry practices in order to reduce soil and streambank erosion. The long-term benefits of this Great Lakes program will be less soil erosion, less nonpoint pollution washing into rivers, and less dredging and contamination in our navigation channels downstream.

The Administration's Budget for FY 2007 includes funding for several Corps efforts that will benefit the ecosystem of the Great Lakes. The McCook Reservoir project is part of a larger effort to virtually eliminate the backflows of raw sewage into Lake Michigan at Chicago. The Confined Disposal Facility in East Chicago, Indiana will allow dredging in support of navigation at Indiana Harbor, the fourth busiest port on the Great Lakes, and will also remove and confine several million cubic yards of contaminated sediments from this Great Lakes Area of Concern.

Over the past forty years, the Corps of Engineers has removed and safely confined more than 90 million cubic yards of contaminated sediments from Great Lakes harbors and channels as part of our commercial navigation mission. Our experience with dredging has been used to support the remediation of contaminated sediments in the Great Lakes through other programs, including the EPA's Legacy Act program.

This past June, I joined EPA Administrator Steve Johnson in a celebration of the ongoing Legacy Act sediment remediation project in Ashtabula, Ohio. The Corps' participation in this effort included planning and design of the sediment cleanup through the Corps' Great Lakes Remedial Action Plan (RAP) and Environmental Dredging authorities. The Corps is also preparing designs for the proposed one-time expanded dredging along the authorized Federal navigation channel to complement the Legacy Act cleanup.

Another activity that we are just starting focuses specifically on wetlands and aquatic habitat. Earlier this year, Assistant Secretary of the Army (Civil Works) John Paul Woodley, Jr., announced the selection of the Great Lakes Habitat Initiative project for $1 million of FY 2006 funding.

This two-year Great Lakes Habitat Initiative is an example of the type of integrated planning that can help bridge the gap between general recommendations for the protection and restoration of the Great Lakes and site-specific actions. This initiative will identify on-the-ground projects for habitat protection and restoration, develop performance metrics for prioritization, create comparable cost and benefit data, and link projects with existing Federal, State, Tribal, local, and non-governmental funding sources.

Conclusion

The Corps is pleased to have had the opportunity to appear before you to provide an overview of our activities of importance to the ecosystem of the Great Lakes. We value highly the water resources of the Great Lakes, the partnerships we have formed with our sister Federal agencies, the Canadians, the Great Lakes States, Tribes, local governments and stakeholder groups in managing and protecting this unique resource.

The Corps looks forward to continuing these partnerships. Mr. Chairman, this concludes my remarks. I would be happy to answer any questions.

STATEMENT OF
THE HONORABLE JERRY F. COSTELLO
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
HEARING ON "THE GREAT LAKES REGIONAL COLLABORATION STRATEGY – CAN IT BE IMPLEMENTED TO RESTORE AND PROTECT THE GREAT LAKES?"
WEDNESDAY, SEPTEMBER 13, 2006 AT 2:00PM

Thank you, Mr. Chairman, for holding this hearing on the Great Lakes regional collaboration strategy.

Mr. Chairman, this Subcommittee has a long history of oversight on the ecological and environmental health of the Great Lakes. Over the past three decades, the Subcommittee has held numerous hearings on this issue, and has investigated and proposed legislation to address Great Lakes water quality impairment, contaminated sediments, and a wide variety of sources of pollution to the Lakes.

As a life-long resident of a Great Lakes state, I am well aware of the importance of these vital natural resources to the economic health and well being of our state. Whether as a source of drinking water for our largest cities, a major transportation

corridor for the movement of goods and services, or as a center for recreation, the Great Lakes are integral to the regional economies and livelihood of those states that line their shores.

I am pleased that increased collaboration among Federal, State and local agencies and organizations to improve the overall health of the Great Lakes has been occurring. Illinois' own Chicago Mayor Richard Daley is the Founding Chair of the Cities Initiative to advance water quality, water conservation and waterfront vitality by being active in Great Lakes decision-making. While I agree that additional coordination is important for improving the health of the Lakes, without additional funding, these opportunities for improvement will be severely limited.

Clearly, Mr. Chairman, significant policy and funding challenges remain in this nation's efforts to restore and protect the Great Lakes. I am pleased that this Subcommittee continues to

explore these issues. I welcome the witnesses here today, and look forward to their testimony.

Water Resources and Environment Subcommittee
Hearing on Great Lakes Regional Collaboration
Wednesday, September 13, 2006

Opening Statement of Congressman Vernon J. Ehlers

Mr. Chairman,

Thank you so very much for holding this hearing. I am extremely pleased that today we are talking about Great Lakes protection and restoration. A lot has happened in the two years since we last held a hearing on this topic back in May 2004 -- it has been a busy and most productive time. I am eager to hear from our witnesses about what they have been doing and, more importantly, about the next steps they have planned for improving the water quality of the Great Lakes.

The federal, state, and local officials and policymakers, as well as advocates and experts involved in the Great Lakes Regional Collaboration have done a tremendous job of setting out a comprehensive strategic action plan for making all the waters of the Great Lakes swimmable, potable, and fishable all the time, everywhere. My staff and I were very closely involved in the work of the Regional Collaboration, and I am eager to see many of its recommendations implemented as soon as possible. That is why I introduced H.R. 5100, a bill to put into place many of the legislative changes that are necessary to improve and expand federal programs to clean up and protect the Lakes. This bill has more than 50 cosponsors, including several members of this subcommittee. I hope we can take up that bill soon, Mr. Chairman.

The longer we wait to implement the recommended changes, the more expensive and more complicated the solutions become. This is particularly true in two areas – preventing further introductions of aquatic invasive species and cleaning up contaminated sediments in Areas of Concern. I am very interested in hearing from the witnesses on these two critical issues. I also want to emphasize here at the outset of the hearing that the Regional Collaboration Strategy should be used as it was intended: not just as a wish-list of program changes and funding levels, but as a strategic action plan to guide resource allocation, policy decision-making and priority-setting.

Finally, Mr. Chairman, let me bring one other important matter to the committee's attention. During the August recess, I received a letter from Peter Wege, a philanthropist in West Michigan who has been very active in Great Lakes policy. The Wege Foundation was instrumental in forming and supporting the Healing Our Waters Coalition, an alliance of more than 80 environmental and conservation organizations in and around the Great Lakes Basin. Mr. Wege sent to me a letter from another old friend, former President Gerald Ford. As you know, he represented the same area in and around Grand Rapids, Michigan, that I now have the pleasure of representing. The Great Lakes are dear to him, and he recognizes their national and international importance. President Ford wrote in his letter that the Great Lakes enriched his life and that he shares my commitment to restoring and protecting the Lakes for our children and our grandchildren. I would like to submit a copy of the letter from President Ford for the record.

Thank you, Mr. Chairman.

TESTIMONY OF
BENJAMIN H. GRUMBLES
ASSISTANT ADMINISTRATOR FOR WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
OF THE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U. S. HOUSE OF REPRESENTATIVES

September 13, 2006

INTRODUCTION

Good afternoon, Mr. Chairman and members of the Subcommittee. I am pleased to have the opportunity to provide you an update on one of the Administration's environmental priorities, restoring and protecting the Great Lakes. With our partners, we have taken many promising actions since President Bush signed the Great Lakes Executive Order in May 2004. Specifically, I would like to discuss the Administration's ongoing commitment to restore and protect the Great Lakes, including progress regarding the Great Lakes Interagency Task Force and the Great Lakes Regional Collaboration.

BACKGROUND

On May 18, 2004, President Bush signed the Great Lakes Executive Order establishing the Great Lakes Interagency Task Force and promoting a Regional Collaboration of National Significance for the Great Lakes.

The Interagency Task Force was created to increase and improve collaboration and integration among the more than 140 federal programs that help fund and implement environmental restoration and management activities throughout the Great Lakes system. Through the Task Force we are working to help ensure that these programs are efficient, coordinated, and environmentally-sound.

The purpose of the Regional Collaboration was to create a partnership among the federal government, Great Lakes States, tribal and local governments, communities, and other interests to address nationally significant environmental and natural resource issues involving the Great Lakes.

PROGRESS TO DATE/ NEXT STEPS

The Interagency Task Force

In its October 2005 report to the President on Implementation of the Great Lakes Executive Order, the Federal Interagency Task Force estimated that the federal government spends approximately half a billion dollars annually in support of Great Lakes water quality improvement programs.

In addition, the Administration committed to begin implementing 48 near term actions in 2006 to help speed restoration and protection of the Great Lakes. These activities address issues in all eight of the priority areas identified in the Great Lakes Regional Collaboration's December 2005 Strategy to Restore and Protect the Great Lakes.

Examples of EPA activities include: developing for release this Fall a standardized sanitary survey form for use by the State and local governments to help identify sources of contamination affecting public beaches in the Great Lakes; providing improved policy guidance on managing peak flows at sanitary sewer plants to reduce overflows; conducting surveillance for emerging chemicals of concern; and working with the Corps of Engineers to streamline and improve the permitting process for restoration projects in wetlands and other aquatic habitat in the Great Lakes Basin.

The Task Force's work includes efforts underway in other federal agencies as well. These activities include: restoring productive fisheries through efforts of

the U.S. Fish and Wildlife Service and the Great Lakes Fishery Commission in partnership with States, Tribes, and Canada; conducting rapid watershed assessments on critical watershed areas to collect natural resource data and applying critical conservation on the ground through the Department of Agriculture; supporting authorization to make permanent the demonstration barrier on the Chicago Sanitary and Ship Canal through the Corps of Engineers; and, joining with the States in an equally shared effort to develop wetlands restoration plans that will enhance and protect a total of 200,000 acres.

Of equal importance to these specific activities is the Task Force's attention to its charge to improve collaboration and integration among relevant federal programs in the Great Lakes. To this end, the Task Force has developed a work plan to address all components of the Executive Order, including: fostering consistent federal policies toward the Great Lakes, developing outcome-based goals, improving the exchange of information, coordinating scientific research programs, and collaborating with Canada on binational issues.

In addition, the Task Force is moving forward to improve collaboration and coordination in two specific high-priority areas by establishing subcommittees to address wetlands and aquatic invasive species rapid response efforts. The main purpose of the Wetlands Subcommittee is to oversee the commitments for wetlands in the Federal Near Term Action Plan, including reviewing federal wetlands management programs in order to identify possible improved program coordination, and working with our non-federal partners on an equally-shared goal to protect 200,000 acres of wetlands in the Great Lakes basin. The main purpose of the Aquatic Invasive Species Rapid Response Subcommittee is to establish a communication network among federal agencies to make a coordinated response to newly identified aquatic invasive species, primarily in response to requests for assistance from State or local authorities.

Another example of improved coordination and leveraging of resources is the Great Lakes Watershed Restoration Grant Program. EPA, the U.S. Fish & Wildlife Service, NOAA, and USDA Forest Service and NRCS partnered with the National Fish and Wildlife Foundation to create and fund the Program to improve the water quality and ecological health of the Great Lakes Basin. Selected projects specifically address ecological restoration needs identified by the Great Lakes Regional Collaboration. Selections were announced in March 2006, and include 14 projects receiving approximately $827,000. These funds will be leveraged by an additional $1.355 million in non-federal contributions, for a total of over $2.2 million in funding.

In order to ensure that the Interagency Task Force makes substantial progress and delivers real results to the Great Lakes in all of these areas, EPA Administrator Johnson has designated Gary Gulezian, Director of EPA's Great Lakes National Program Office, as the senior manager in charge of monitoring progress on implementing the Interagency Task Force's 48 Near Term Actions. This designation ensures that Great Lakes issues will remain a high priority for EPA and the rest of the Task Force, and that progress is tracked at the highest levels.

The Regional Collaboration of National Significance

The collaborative effort envisioned in the Great Lakes Executive Order became a reality with the formation of the Great Lakes Regional Collaboration (GLRC) in December 2004. The Collaboration partners, through the outstanding efforts of the eight Strategy Teams, spent the subsequent year developing recommendations for restoring and protecting the Great Lakes. After receiving extensive public input on the draft recommendations, the GLRC released its final Strategy last December. As part of the resolution signed at the ceremony marking the release of the Strategy, all of the Collaboration partners affirmed that the Strategy will guide future efforts to protect and restore the Great Lakes.

This unprecedented document offers a unique opportunity to make real improvements to the Great Lakes. For the first time, all levels of government, as well as our non-governmental partners, are looking to the same goals, objectives, and recommendations to help guide their actions regarding the Great Lakes.

The Great Lakes Regional Collaboration will continue into the future to guide implementation of the Strategy. As part of that effort, the Collaboration has created an implementation framework to: (1) help ensure the Strategy is carried out and results are measured and reported; (2) facilitate coordination of Great Lakes restoration and protection activities among GLRC participants; and (3) communicate with stakeholders and provide for ongoing public participation. In addition, the Collaboration is identifying near term priorities that all partners will work on jointly in the near future.

ADDITIONAL ADMININSTRATION SUPPORT FOR THE GREAT LAKES

The President's Fiscal Year 2007 Budget Request

The Administration is using the Strategy as a guide as it plans its future activities in the Great Lakes basin. For example, the President's FY07 budget contains several requests for funding that will support priorities in the GLRC Strategy:

- The budget for EPA includes essentially full funding of the authorized levels in the Great Lakes Legacy Act for cleanup of the Areas of Concern, almost $50 million or approximately 70% more than appropriated in FY 2006. This funding will help leverage at least $25 million from our State and local partners as well. Already, over 250,000 cubic yards of contaminated sediments were remediated through the Legacy Act in 2004 and 2005.

- Several of USDA's conservation programs, including the Wildlife Habitat Improvement Program and the Conservation Security Program, would see increases. Of particular note is a proposed increase of 100,000 acres and

$153 million over FY06 enacted levels for the Wetlands Reserve Program. These are all national programs, of course, but the Great Lakes basin stands to benefit as well.

- In support of the Great Lakes Regional Collaboration, NOAA's budget requests $1.5 million to establish a Great Lakes Habitat Restoration Program that will mobilize NOAA's restoration assets to restore the Great Lakes' aquatic resources. This funding will be used to identify an optimal restoration plan and to provide outreach, facilitation and technical assistance to stakeholders and communities participating in the restoration activities. In addition, NOAA's budget contains an increase in funding of $1.5 million for its nation-wide Aquatic Invasive Species Program, a portion of which will benefit the Great Lakes.

- With an increase of $17.5 million, the Corps of Engineers will continue construction of the McCook Reservoir project which is part of a larger effort to virtually eliminate the backflows of raw sewage to Lake Michigan at Chicago, reducing beach closings, and enhancing coastal health.

- The Corps of Engineers also will continue construction of a facility to confine more than 4 million cubic yards of contaminated sediments from the Indiana Harbor navigation channel and adjacent areas. Removal of these highly contaminated sediments will be a significant step toward restoration of the Grand Calumet River, Indiana Area of Concern.

- A portion of the increase for the Department of the Interior's North American Wetlands Conservation Fund will help advance wetlands restoration in the Great Lakes.

- The Department of the Interior – Fish and Wildlife Service budget includes funding for its Aquatic Invasive Species Program and an increase of $2 million to restore fish habitat and fish passage under the National Fish Habitat Initiative, portions of which also benefit the Great Lakes.

The Great Lakes Legacy Act

EPA believes the Great Lakes Legacy Act, (Legacy Act) offers one of the best tools for accelerating environmental progress, and the Administration is committed to its success. Nearly $50 million of the $70 million requested in the President's EPA FY07 budget for the Great Lakes is to fund the Legacy Act. This represents essentially full funding of the authorized levels in the Great Lakes Legacy Act for cleanup of contaminated sediments in the Areas of Concern, and

is a clear demonstration of the Administration's commitment to the restoration and protection of the Great Lakes.

The Legacy Act was passed by Congress and signed into law by the President on November 27, 2002. The Act authorizes $270 million in funding over five years beginning in fiscal year 2004 to help with the remediation of contaminated sediment in "Areas of Concern located wholly or partially in the United States" (U.S. AOCs).

With its FY 2004 and 2005 appropriations, EPA completed three sediment remediation projects with our non-Federal partners (Michigan Department of Environmental Quality and Wisconsin Department of Natural Resources). These took place in Trenton, Michigan (Detroit River AOC), Muskegon, Michigan (Muskegon AOC) and Superior, Wisconsin (St. Louis River AOC). These three projects resulted in the remediation of over 250,000 cubic yards of contaminated sediment, at a total cost of $28.6 million ($18 million, or 63 percent, Federal share).

Two additional projects currently are underway. EPA, in cooperation with the Ashtabula City Port Authority (the non-federal sponsor), will clean up 500,000 cubic yards of PCB-contaminated sediment from a one-mile stretch of the Ashtabula River in Ohio, a tributary to Lake Erie. The work, expected to be completed in 2009, will be done in close cooperation with the U.S. Army Corps of Engineers. EPA and the Port Authority are sharing project costs equally, with each contributing $25 million. In addition, the Corps will conduct navigation dredging downstream of the project area, also removing contaminated material from the River.

The Tannery Bay project, on the St. Marys River near Sault Ste. Marie, Michigan, was launched in July. EPA, the Michigan Department of Environmental Quality and Phelps Dodge Corp. will dredge 40,000 cubic yards of

sediment contaminated with mercury and chromium from the bay and Tannery Point wetland. The Legacy Act will fund sixty percent of the cost of the project and Phelps Dodge, which owns a former tannery property next to the bay, will contribute 35.5 percent. The Michigan Department of Environmental Quality, through the State's Clean Michigan Initiative, will provide the other 7.5 percent. Work is expected to be completed in late Fall. This project constitutes the most significant and critical step on the United States side of the border to delist the St. Marys River as an Area of Concern. We will continue to work with our Canadian counterparts to assure that all necessary actions will be undertaken to fully delist this area, pursuant to the Great Lakes Water Quality Agreement.

In order to clarify how Legacy Act projects are identified, selected and evaluated to clean up the sediment and reverse the environmental harm to Great Lakes rivers and harbors, the Agency put a Rule into effect on April 25, 2006 (Published in the Federal Register on May 1, 2006).

The Great Lakes Legacy Rule provides a roadmap for selecting the highest priority projects and leveraging public and private dollars to accelerate environmental progress in cleaning up Areas of Concern. Cleanup of these areas is a priority of the Great Lakes Regional Collaboration, and the Administration is proud to be moving forward aggressively to tackle this issue through the Legacy Act. The result will be healthier aquatic habitat and cleaner water for fish, wildlife and the 35 million residents of the Great Lakes region.

Great Lakes Water Quality Agreement

The Administration is also working internationally to restore and protect the Great Lakes. The U.S. and Canadian governments are reviewing the Great Lakes Water Quality Agreement. The effort, which began in April of this year, will span 18 months and will result in recommendations to improve the operation and effectiveness of the current Agreement. This review, which occurs every six

years, provides an important opportunity to ensure that the Agreement continues to be a visionary statement guiding not only governments, but also members of the Great Lakes community, in the continued protection and restoration of the Great Lakes. The U.S.-Canada International Joint Commission is assisting with the binational review of the Great lakes Water Quality Agreement.

Water Use Efficiency

The Great Lakes Regional Collaboration's Strategy focuses on eight of nine priorities for restoring and protecting the Great Lakes originally identified through the Great Lakes Governors Priorities Initiative in 2003. The ninth priority, sustainable use of water resources, is being addressed by the States through on-going binational efforts to implement the Great Lakes Charter Annex of 2001. The Annex Implementing Agreement, signed by the Governors and Premiers on December 13, 2005, calls for, among other things, the development of a water conservation and efficiency program. The Administration also has launched some important initiatives to support greater water efficiency. These initiatives will benefit the Great Lakes basin and complement the efforts of the Great Lakes Governors.

WaterSense

On June 12th, EPA Administrator Johnson announced WaterSense, an EPA-sponsored voluntary partnership program to promote water efficiency and enhance the market for water-efficient products and services. EPA's goals for WaterSense are to raise awareness about the importance of water efficiency, ensure the performance of water-efficient products, and provide good consumer information. In general, WaterSense-labeled products will be about 20 percent more water-efficient than the average product in the same category.

Alliance for Water Efficiency

With support from EPA, the California Urban Water Conservation Council (CUWCC) is establishing the Alliance for Water Efficiency. The Alliance, which will be located in Chicago, Illinois, is a national organization focusing on water use efficiency. It will represent the needs of the water efficiency community, develop initiatives for improved products, research new technologies for saving water, and assemble programs for water utility involvement across the United States. We are particularly pleased about its location in the Great Lakes Region, which contains approximately 20% of the world's fresh surface water supply. It is important to complement U.S. State and Canadian provincial efforts through cooperative conservation and public education.

CONCLUSION

In closing, Mr. Chairman, I would like to thank the Subcommittee for its leadership on Great Lakes issues. The Administration looks forward to working with you and all of our partners to continue this important work, because it is only through concerted, coordinated action that we will realize our mutual goal of a cleaner, healthier Great Lakes. I would be happy to answer any questions that you may have.

* * *

**U.S. ENVIRONMENTAL PROTECTION AGENCY'S
SUPPLEMENTAL INFORMATION FOR THE RECORD
FOR THE SEPTEMBER 13, 2006 HEARING
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT**

Over the past 20 years, communities have spent more than $1 trillion (in 2001 dollars) on drinking water treatment and supply and wastewater treatment and disposal. However, America's infrastructure systems are aging. Much of it was constructed in the period following World War II and will be reaching the end of its useful life in the next 20-40 years. The Agency has approached this challenge of keeping pace with infrastructure needs of the future by focusing on "Four Pillars of Sustainable Infrastructure" – better management, water efficiency, full cost pricing, and the watershed approach. EPA is building on these pillars using the tools of technology, innovation, and collaboration. We are also investigating innovative, market-based financing to help communities ensure adequate funding for sustainable infrastructure.

Specific examples of activities EPA is undertaking to build on the Four Pillars include:

On May 2, 2006, EPA signed a groundbreaking utility management partnership agreement with six leading water and wastewater utility organizations to ensure the long-term viability of our nation's water systems through effective utility management. Under this agreement, we will work together to identify the key attributes of sustainable management; develop measures to use in gauging utility effectiveness; and develop a strategy to promote widespread adoption of sustainable management practices across the water sector.

As more and more utilities are recognizing the need to better align their pricing structures with the cost of providing water and wastewater services, EPA will convene an expert panel this November to define an approach to full cost pricing that makes sense and can be followed by practitioners across the country.

EPA also believes that greater efficiencies can be found if infrastructure planning is done in an integrated manner on a watershed scale. Communities that have done this have demonstrated that it is possible to reduce demand on their systems while furthering other, broader environmental goals. This December, EPA is convening a watershed forum to help define areas where EPA can foster these integrated watershed efforts, and work toward breaking down barriers in communities and within the agency.

In addition to the need for collaboration, it is important to find and pursue innovation on both the demand and supply sides of the equation.

On the demand side there are opportunities in both adopting innovative management approaches and taking advantage of new and evolving technologies.

The adoption of asset management programs and environmental management systems can have tangible impacts on the bottom line at a utility. With our partners, EPA is fostering these approaches through training sessions around the country – including Asset Management sessions in Chelmsford, Massachusetts; Vancouver, Washington; and Des Moines, Iowa.

Another innovative approach which is gaining momentum is the adoption of Water Quality Trading programs. This past May, EPA co-sponsored the second annual conference on Water Quality Trading, at which we saw twice the number of attendees than were at the first conference.

The adoption of new and innovative technologies will also help us on the demand side. Much of the country's infrastructure needs are found in aging piping systems that are associated with our water and wastewater. EPA recently released an Emerging Technologies report on conveyance systems to help spread the word on innovations in this important area. A similar report on emerging technologies in the field of biosolids will be released in the near future as well.

Lastly, aspects of both demand and supply will be included as part of a larger conference which EPA is holding in March of 2007. The conference, "Paying for Sustainable Water Infrastructure: Innovations for the 21st Century," will include parallel tracks on the demand side through the Sustainable Infrastructure Initiative, as well as innovations in supply side financing efforts on the State, local, federal, and international scales.

In addition to the innovative approaches contained in the Four Pillars, EPA continues to support more traditional approaches to addressing infrastructure needs.

The FY2007 President's Budget request for EPA supports the use of science and data by requesting $7 million for a Water Infrastructure Initiative. These funds will provide EPA with resources to conduct a major research effort focused on helping reduce the cost of operating, maintaining, and replacing old drinking and wastewater systems.

The President's budget request also continues the Administration's commitments to the Clean Water and Drinking Water State Revolving Funds (SRFs). The budget provides $688 million for the Clean Water SRF, keeping the program on track to meet the cumulative capitalization commitment of $6.8 billion for 2004-2011. This funding level will allow the Clean Water SRF to provide $3.4 billion in loans annually, even after federal capitalization ends, and will ensure communities have access to capital for their wastewater infrastructure needs.

The President's budget also proposes $841.5 million for the Drinking Water State Revolving Fund, a $4 million increase over the 2006 enacted level. This request keeps the Administration's commitment to provide sufficient capitalization grants to allow the

Drinking Water SRF to provide $1.2 billion annually, even after federal capitalization ends.

Taken together, all of these initiatives, innovative tools, and funding resources will help EPA and its partners continue to build on the gains in water quality that we have worked so hard for and enjoyed over the past 30 years.

* * *

Before the House Subcommittee on Water Resources and Environment

Great Lakes Regional Collaboration Strategy

Can it be implemented to restore and protect the Great Lakes?

Testimony of Dr. Donald Scavia

Professor and Associate Dean, School of Natural Resources & Environment

Director, Michigan Sea Grant

University of Michigan

September 13, 2006

Mr. Chairman, Members of the Subcommittee, I thank you for this opportunity to testify today on implementing the Great Lakes restoration and protection strategy. My name is Don Scavia. I am Professor of Natural Resources and Environment at the University of Michigan and Director of the Michigan Sea Grant program. I am also the science advisor to the Healing our Waters Great Lakes coalition steering committee. The coalition represents 85 national, regional, state, and local organizations, including Great Lakes conservation organizations such as the Alliance for the Great Lakes, Great Lakes United, and the Ohio Environmental Council; national conservation organizations like Ducks Unlimited, Trout Unlimited, the Sierra Club, and the Audubon Society; and educational institutions such as Shedd Aquarium and the Brookfield Zoo.

My testimony today focuses on four areas: 1) the need to act now to protect and restore these national treasures; 2) restoration and protection priorities identified by the scientific community in the white paper: "A Prescription for Great Lakes Ecosystem Protection and Restoration", 3) the need for a strong science base for restoration, and 4) the critical role for an independent voice that Great Lakes universities can provide.

A significant portion of my testimony draws directly from the white paper: *Prescription for Great Lakes Ecosystem Protection and Restoration: Avoiding the Tipping Point of Irreversible Changes*[1], which I include as part of my written testimony. The paper was written by 8 Great Lakes scientists in response to the HOW Coalition's request for a scientific perspective on restoration needs. The paper has been endorsed by over 209 scientists from every state in the Great Lakes basin, as well as from states like California, Florida, Maryland, Hawaii, Colorado, and Tennessee. In fact over one-third of the endorsements were from outside the basin! This is truly an issue of national significance.

It is critical to act now

The view from the majority of the science community is that we know enough now to take action to restore and protect the Great Lakes. This is a significant recommendation because it comes from a community that often calls first for more research. While there are, indeed, important science needs, they should not create a rationale for inaction. Making a substantial investment in the Great Lakes restoration and protection now will ensure that the economic and ecological

[1] http://www.restorethelakes.org/PrescriptionforGreatLakes.pdf

health of the Great Lakes region is strong and healthy. This is not only of great importance to the region, but also to the nation. Delaying that investment will make future actions far more costly and could result in irreversible damage to this national and global treasure.

The authors and endorsers of the Prescription Paper point out that Great Lakes ecosystems may be nearing a tipping point – beyond which the lake ecosystems would move to a new state, one that is less desirable from a recreational, commercial, and aesthetic perspective and, more importantly, one from which it will be very difficult, if not impossible, to recover. The problem with ecological tipping points, though, is that you cannot be sure you have reached it until it is too late. Thus, we urge a precautionary approach to avoid passing that critical point.

In another consensus report (*Scientific Consensus on Marine Ecosystem-Based Management*)[2] over 200 scientists cautioned against reaching thresholds beyond which altered marine ecosystems may not return to their previous states. In that report, they also state that because the tipping point for these irreversible changes may be impossible to predict, increased levels of precaution are prudent. While the same ecological principles cited for the world's oceans apply to the Great Lakes, the lakes may be even less able to cope with stress than typical coastal marine environments because the Lakes are relatively closed and evolutionarily younger systems ill-adapted to large fluctuations.

Symptoms of stress

There is widespread agreement among scientists that the Great Lakes are exhibiting symptoms of stress from toxic chemicals, invasive species, excess nutrients, shoreline modifications, change in land use, hydrologic alterations, and climate change. While most of these stresses are not new, more than ever we are seeing symptoms of ecosystem breakdown -- in other words an ecosystem nearing its "tipping point" - caused by the combinations of these stresses that overwhelm natural buffering capacities that enable ecosystems to be resilient. Large areas in the lakes are undergoing rapid changes where these combinations of persistent and new stresses are interacting to trigger synergistic ecosystem degradation. Rapid ecological responses to new stresses that may interact with each other and with remnant features of past responses to older stresses, have exhibited sudden and unpredicted changes in the past 5 to 10 years, to an extent that is unique in Great Lakes' recorded history. The new stresses have complicated past and current efforts to remediate earlier harmful phenomena, such as:

- Extirpation or major declines in important native species (such as lake trout and deepwater ciscoes) due to over fishing and invasive species (such as sea lamprey predation on lake trout, and competition with deepwater ciscoes by invasive alewives and rainbow smelt);
- Declines in other valued and important native aquatic species (including certain plankton, unionid clams, and certain native fish species) caused by altered food webs and introductions of aquatic invasive species (e.g., zebra and quagga mussels, round gobies and predatory zooplankton such as *Bythotrephes cederstroemi* and *Cercopagis pengoi* (two species of water fleas);

[2] http://compassonline.org/files/inline/EBM%20Consensus%20Statement_FINAL_July%2012_v12.pdf

- Widespread reproductive failures of keystone, heritage, and other (both native and introduced) fish species, including lake trout, sturgeon, lake herring, coaster brook trout, and Atlantic and Pacific salmon caused by toxic contamination and loss of habitat, including loss of over 90% of wetlands along the Huron/Erie corridor;
- Approximately 50% of the threatened and endangered birds are wetland dependent species, and no wonder given the estimated 60% loss of wetlands in the Great Lakes watershed.
- Toxic contamination of fish threatens not only the species themselves, but also other wildlife and people, resulting in fish consumption advisories throughout the Great Lakes and inland lakes and rivers;
- General reduction in water quality, increased toxic algal blooms, Type E botulism in fish and waterfowl, and contamination of drinking water.
- Fouling of coastlines and near-shore areas from sewage overflows and contaminated runoff, resulting in beach closings, and loss of habitat for fish and waterfowl;
- Elimination of the rooted plant community and disruption of food webs in Sandusky Bay and Cootes Paradise in Hamilton Harbour, due to sediment and other pollutant loads.

Critical food-web disruptions are a particular case in point with regard to the tipping point. These disruptions date back to at least the invasion of the sea lamprey and the cascade of loss of native fishes and invasions of alewife, rainbow smelt, and a host of others.

However, more recent dramatic disruptions include the now well-documented rapid disappearance of the once abundant benthic invertebrate, *Diporeia,* from large areas of all the lakes except Superior. For example, the abundance of the critical member of the Lake Michigan food web declined from 5,200 individuals per square meter in 1994/95 to 300 per square meter in 2005. These dramatic declines are likely linked quite closely with the zebra and quagga mussel invasion, and may be one of the clearest warning signs of a tipping point where the Lakes may be moving into a new regime where these mussels maintain high populations, and prevent any substantial recovery of *Diporeia,* the once primary diet of important fish. In fact, Dave Jude - my colleague at the University of Michigan - found enormous numbers of quagga mussels in Lake Michigan this summer at depths where only few or none were found before. At a 100-meter depth, he pulled up between 600 and 700 pounds of quagga mussels in just a 10 minute bottom trawl tow. So many members of the fish community have historically depended on *Diporeia* that lacking this critical food source is another clear indicator of the ecosystem reaching a tipping point.

Restoration and Protection Priorities

The Strategy developed through the Great Lakes Regional Collaboration (GLRC) does a good job of identifying major stresses, and their recommendations for addressing them come just in time. The Collaboration is an historic event in two important respects. First, it is the first time that all levels of government and virtually all private stakeholders have come together to draft and support a single Great Lakes restoration plan. Over 1,500 people participated in the drafting of the final plan, including representatives from cities, counties, state agencies, tribal

representatives, federal agencies, Congressional staff, businesses, conservation organizations, university scientists, and concerned citizens. All of the scientists who authored the Prescription Paper, and many of those that subsequently endorsed it, actively participated in the Collaboration.

The GLRC Strategy is also the most comprehensive Great Lakes restoration and protection plan in history. It documents virtually every major problem besetting the Great Lakes; it recommends concrete solutions; identifies programs to implement those solutions; and recommends the funding needed for those programs to succeed. This level of consensus is unprecedented. And unlike so many other plans that have come before it, this isn't a plan for any one stakeholder or any one lake, but rather one for the entire basin. It has received input and endorsement from the scientific community, agencies, public interest organizations, businesses, and recreationists. And, it comes as a result of the president's May 2004 Executive Order. Importantly, many of the GLRC recommendations build upon and strengthen successful existing efforts.

> ***An international caveat*** -- The GLRC was a critical first step in forming a permanent institutional mechanism to guide restoration efforts and to facilitate coordination among public agencies, research institutions, and stakeholder organizations to reach consensus on specific priority actions and integrated measures of progress. It is important, however, to also recognize that the Great Lakes are international waters and they require strong coordination and cooperation with Canada. So, the next step in planning should integrate GLRC efforts with those of the Great Lakes Fishery Commission, International Joint Commission, and environmental and resource programs of Great Lakes states and provinces.

While the GLRC Strategy outlines the issues and plans for addressing each of the Lakes' stresses, the Prescription paper provides science-based criteria for setting priorities within that plan. With an emphasis on addressing multiple stresses and repairing the Lakes' nearshore buffering capacity, the Paper sets the highest priorities for Prevention, Protection, Restoration, and Monitoring:

Prevent. This category of projects and programs includes efforts to prevent additional stress from new invasive species, new chemicals, and new physical modifications. The highest priorities are to prevent new stresses that have impacts at watershed, lake, or basin scales. For invasive species, for example, projects that contribute to prevention of introduction of a new species that can potentially impact the entire Basin may rank higher than a project to prevent the spread of an invasive species already established in one part of the Basin.

Protect. This category includes efforts to protect areas of the Great Lakes that currently posses the characteristics we are striving for in restoration. Thus, the highest priorities are for projects and programs that prevent decline in regions that currently maintain resilient, well-functioning ecological processes. Certain nearshore areas of Lake Superior and northern Lake Huron could be examples of locations at which such protection projects would be encouraged.

Restore. The GLRC recommendations aim to reduce the key stresses that prevent these ecosystems from delivering the services society desires of them. However, it will never be possible to eliminate the stresses completely, and even when possible, it will likely take decades to achieve. So we must, at the same time, and perhaps with more urgency work to restore the Lakes' natural buffering capacity by increasing its resiliency – or ability to cope with stress. Therefore, this category focuses priority on efforts to restore areas that have lost their ability to assimilate stress (i.e., have lost resiliency and one or more of their primary ecological functions).

Highest priority projects should address nearshore (terrestrial and aquatic) regions, tributaries and their watersheds, and connecting waters.

Why focus on the nearshore? -- Over time, the combined effects of the suite of stresses have overwhelmed the ecosystem's self-regulating mechanisms. In the past, healthy nearshore communities and tributaries helped reduce the impact of many stresses on or entering the lakes. We now recognize that these nearshore and tributary areas constitute a buffer zone and add to the lakes' ability to rebound from stress, and without healthy buffers, the lakes' health is much more vulnerable. For this reason, it is of critical importance to ensure that the nearshore and tributary areas receive the most significant and urgent restoration attention.

Specific geographic areas where stresses have contributed or are likely to contribute to the degradation of the nearshore/tributary areas should be targeted first. These areas may well include those locations already identified as Areas of Concern by the International Joint Commission (expanded geographically to ensure they include all the major sources of stress) as well as nearshore/tributary areas that are now showing symptoms or vulnerability to multiple sources of stress. And this may require increased institutional focus (including increased emphasis within LaMP efforts) on these nearshore areas. This also has the added advantage of restoring urban coastlines, which in many instances have the most potential for restoration and is consistent with the Great Lakes Cities-St. Lawrence Cities Initiative "urban revitalization" agenda. The goal should be to reestablish the natural states critical to nearshore and tributary communities so they can once again perform their stabilizing function, or, if that is not feasible, enhance critical elements that play a role in stabilizing the communities. Many of the GLRC recommendations, if implemented properly, will provide this needed emphasis on near-shore (e.g., recommendations related to the AOCs, wetlands, coastal health, nonpoint source pollution).

Measure. Monitoring of agreed-upon integrative indicators is extremely important. This effort should build on ongoing efforts such as the development and application of State of the Lakes Ecosystem Conference (SOLEC) indicators. However, major negative changes in the ecosystem are occurring while many of the indicators that governments have traditionally used to measure Great Lakes health (water clarity, ambient water pollution levels, and certain contaminant levels in wildlife) actually show improvement. Because nonlinear changes may confound expected relationships between sources of stress and the lakes' response, traditional indicators alone may not be adequate descriptors of ecosystem health and may not be useful in predicting future conditions. While some type of consensus on indicators is desirable, given the dynamic nature of the system and our understanding of it, flexibility must also be included in their development and use.

Monitoring is essential to not only identify emerging issues, but importantly in the context of restoration, to track progress. Most managers and scientists now embrace the notion of adaptive management where adjustments in strategies are made as restoration proceeds. But, without effective monitoring systems, geared toward tracking progress at the right scales, adaptive management is not possible. A key issue for an effective monitoring network in this context is the ability for rapid detection of change on scales relevant to local and state decision makers, as well as Federal policy makers. Therefore, a priority should be placed on the nearshore terrestrial and aquatic ecosystem in concert with the geographic focuses of restoration. This requires close coordination of state and tribal agencies and the academic community to add higher spatial resolution to the Lake- and region-scale efforts of the Federal agencies.

Setting Restoration and Protection Priorities:

The GLRC Strategy lists a wide range of efforts, with some estimates of the costs of implementation reaching $20 billion over the next decade. While we support these efforts and the appropriations needed for implementation, it is clear that priorities must be set because the Nation can neither afford to pay for this all at once nor wait for full funding in the future.

We have been working with the Healing Our Waters-Great Lakes Coalition[3] and others to help identify the highest priority protection and restoration needs of the Lakes and our region. We suggest setting project priorities based on the following criteria. The intent is to provide a means to evaluate specific projects that various Great Lakes programs can support.

- *Does the project improve and/or protect ecosystem resiliency, functioning, and sustainability?*

A primary goal outlined in the Prescription Paper is to increase the Lakes' ability to assimilate stresses so they can maintain essential ecosystem functions (e.g., productivity, stable and healthy food webs) for the long term. In many places, this natural buffering capacity (or resiliency) has been lost (in particular in nearshore areas), and one of the highest priorities is to re-establish this capacity. Restoring resiliency should lead to improved sustainability, both for the ecosystem itself and for human use of it (e.g., exploitation of fisheries).

- *Does the project recognize and attempt to address all relevant stresses?*

While progress has been made in addressing some of the key stresses on the Lakes, the interactions of these stresses have now complicated the Lakes' recovery. Cumulative impacts and interactions among toxic chemical and nutrient loads, invasive species, modifications of physical structure, and habitat loss, for example, are now recognized as increasingly important in determining the ability of all components of the lake ecosystems to recover. To be most effective, projects need to take into account these cumulative impacts and interactions. In addition, a better understanding of all stresses will ensure that management decisions affecting one stress do not lead to conditions that exacerbate another stress. One challenge in this regard is that additional potentially significant stresses may only be recognized once a project is underway. Ideally, strong project proposals will note the potential of many such stresses to affect the project outcome in the proposal stage, based on previous experience and the scientific literature on relevant topics.

- *Does the project clearly address significant and well-documented current or anticipated impacts?*

While many projects are designed to address presumed stresses, the highest priorities should be those projects that demonstrate clear connections between the proposed actions and impacts. While the inherent complexity of the system will not allow for perfect predictions of future states in response to management actions, these connections should be explored with scientifically rigorous assessments.

- *Is there a plan to measure, assess, and communicate results?*

Many if not most protection and restoration projects are likely to be long-term in nature, and therefore need to be designed in an adaptive framework. To be adaptive, there needs to be a clear plan to monitor activities and the target impacts, assess progress, and potentially make adjustments as necessary in order to maximize likelihood of project success. In addition, to maintain stakeholder support for the effort, these results and assessments need to be communicated to decision makers and the public. Is there a plan to do so?

[3] www.restorethelakes.org

Setting Science Priorities

While investments in long-range, basic research is important, and such investments in the Great Lakes lag significantly behind those of coastal and marine environments, these investments need to be complemented with science that directly supports restoration. I should note, however, that thoughtful research can be both basic and useful as Donald Stokes outlined clearly in his book, *Pasteur's Quadrant*[4]. I recommend a science plan with two additional components beyond the monitoring efforts described above. These two components are Integrated Assessment and Restoration Innovation.

Integrated Assessment – Decades of research and monitoring have produced vast quantities of data and information on Great Lakes conditions, processes, and functioning. However, much of this information is inaccessible or not organized and synthesized in ways most useful to local, state, and Federal decision makers. Providing this information, along with its level of certainty, in credible and timely ways on issues identified by decision makers is an essential element of science support for restoration and protection.

Integrated Assessment (IA) is a formal approach to synthesizing and delivering relevant, independent scientific input to decision making through a comprehensive analysis of *existing* natural and social scientific information in the context of a policy or management questions. These assessments not only draw on the talents of subject matter experts, but also engage the broader stakeholder community in defining boundaries, integrating traditional knowledge, and identifying socially-acceptable solution options. The IA results are peer reviewed and subject to public comment, and the process should be supported by funds independent of those with vested interests in any particular solution option. IA takes the following structured approach:

1. Define the policy relevant question around which the assessment is to be performed. This is done in conjunction with managers and policy makers such that the analysis is directed toward solving specific policy or management needs.
2. Document the status and trends of appropriate environmental, social, and economic conditions related to the issue. This is a value-independent description of current conditions and, to the extent possible, the historical trends in those properties.
3. Describe the environmental, social, and economic causes and consequences of those trends. This often includes simulation, statistical, and other explanatory models and analyses. Again, these descriptions are fact-based although subject to analysis and interpretation.
4. Provide forecasts of likely future conditions under a range of policy and/or management actions. This can be quantitative forecasts from models or other trend analysis tools. These are subject to considerable scientific evaluation and interpretation.
5. Provide technical guidance for the most cost effective means of implementing each of those management options. These efforts are designed to provide those who are

[4] Stokes, D.E. 1997. Pasteur's Quadrant. Basic Science and Technological Innovation. Brookings. Washington, DC. 180 Pg.

responsible for implementation the menu of approaches available to them, along with some evaluation of their potential for success and cost-effectiveness

6. Provide an assessment of the uncertainties associated with the information generated for the above steps and outline key monitoring, research, and modeling needs to improve future assessments in this area. This assessment of uncertainties is often a guide to future research needs.

Such approaches have been very useful, for example, in assessments of the impacts of climate variability[5] and the causes and consequences of hypoxia in the Gulf of Mexico[6] (called for in the Harmful Algal Bloom and Hypoxia Research and Control Act), as well as a key element of the new science program for Michigan Sea Grant[7]. The Gulf of Mexico Hypoxia IA, for example, led to a Federal-state-tribal Action Plan for reducing nutrient loads to the Gulf, the primary anthropogenic driver of hypoxia.

Restoration Innovation – While we have enough information to proceed now with restoration, the task is long term and we need investments in new ways to deal with existing and emerging threats, as well as to find the most cost-effective technologies for identifying threats and restoration approaches. Such innovations could include: new ways to detect and monitor threats to ecosystem structure and functioning; improved methods for synthesizing and integrating information to provide useful forecasts of the impacts of management action or inaction; technologies for restoring wetlands, coastal habitats, and contaminated sites; methods to value ecosystem goods and services; assessments of the social causes and impacts of ecosystem change; and means to reduce uncertainties in Integrated Assessments.

While the needs for such innovations can be identified, their solutions are hard to predict, and are best sought through investing in, and nurturing, the skills and talents of Great Lakes scientists, including through academic programs.

The Role of Universities

A strong and effective science program supporting restoration and protection of the Great Lakes needs the innovation, expertise, and independent voice of the academic community. During the 1960s, 70s, and 80s, the Great Lakes academic community was well-supported and provided an important complement to the science conducted in the Federal and state labs. I know this first hand because I worked in a Great Lakes Federal lab from 1975-1990. Working together, and with state agencies and environmental NGOs, these communities identified and analyzed the most important issues of the time – fisheries decline, eutrophication, and chemical contamination. Academic institutions contributed expertise in fisheries biology, food-web structure, ecosystem dynamics, biogeochemistry, ecosystem modeling, and engineering to these successes through cooperation and participation in activities and programs under the auspices of the bi-national Great Lakes Water Quality Agreement and Great Lakes Fisheries Convention, for example.

Through both applied research and research that improved our fundamental understanding of the Lakes' physical and ecological dynamics, academic research and modeling played historically important roles in critical resource management and policy decisions:

[5] http://www.usgcrp.gov/usgcrp/nacc/default.htm
[6] http://www.nos.noaa.gov/Products/pubs_hypox.html
[7] http://www.miseagrant.umich.edu/ia/index.html

- Reducing phosphorus inputs to reduce algal growth and improve water clarity;
- Sea lamprey control;
- Reductions in industrial pollution;
- Reduction in contaminants such as DDT and PCBs;
- Reduced occurrences and magnitude of chemical spills and discharge of objectionable and nuisance materials that form scums, sludge, and odors;
- Confinement and removal of contaminated sediment;
- Growing recoveries of some native species, such as the lake trout in Lake Superior and the bald eagle throughout the Great Lakes

And these efforts have had significant impacts. In many places, nutrient control reduced algal overgrowth and increased water clarity, sea lamprey control allowed a rebound in fish populations, reduced industrial pollution resulted in declines of DDT and PCBs in fish and wildlife by as much as 90%, confinement and removal of contaminated sediment are progressing, and populations of native species, such as the lake trout in Lake Superior and the bald eagle throughout the Great Lakes are making substantial recoveries.

In spite of this progress, and as outlined above and in the GLRC report and the "Prescription paper", the Great Lakes are exhibiting a multiplicity of nagging and emerging issues that are impeding further ecological and economic recovery. Just when we need more research and monitoring to assist sound, science-based management and policy decisions, the Great Lakes research community is in decline. An aging work force will soon retire taking with it historical knowledge and perspective because of limited ability to hire young scientific replacements. Old and outdated scientific tools, facilities, and vessels are not being upgraded to address the complex problems of today. Funding for both Federal and state science agencies are not keeping up with inflation and funding to the Great Lakes academic community is scarce, resulting in a significant loss of Great Lakes researchers from Great Lakes academic institutions.

Academics can and should play strong, even dominant, roles in Integrated Assessment, in assisting in and interpreting results from monitoring programs, in identifying and clarifying emerging issues, and in providing innovative solutions to both long-standing and new issues. Academics are knowledgeable and interested parties in this management, but not constrained by the mission and viewpoints of their home organization. To be most effective, their work needs to be independent, based on competition and peer review, and well-funded. There are existing models for Federal programs that can provide that support in ways that are connected to and integrated with Federal and state science, but not handmaiden to it. These include EPA's Science to Achieve Results (STAR) program, NOAA's Center for Sponsored Coastal Ocean Research (CSCOR), and the Great Lakes Sea Grant programs. Each of these programs has a distinct mission that complements the others, as well as those of the Federal labs. They have established processes for interacting with the academic community and administering effective extramural grant programs. They require increased funding and encouragement to continue to expand their programs in the Great Lakes, focused on supporting restoration and protection needs.

It is important to build upon proven models of academic-governmental partnerships like Sea Grant and NOAA's CSCOR with well-funded, objective, and independent academic research

that has strong linkages to resource management and policy needs. These programs can supply the people and new technologies for problem-solving, technology transfer, and the communication of science to policymakers and the public.

Summary and Conclusion

In closing, Mr. Chairman, I would like to thank you and the Subcommittee for your leadership in scheduling this hearing and maintain the momentum for Great Lakes restoration. We believe it is time to invest in the restoration and protection of the Great Lakes to avoid reaching a tipping point, beyond which it may not be possible to restore their great service to society. We also recommend a set of criteria to be used to set priorities for restoration and protection efforts to ensure the most important and effective measures are taken first.

It is also critical to ensure there are sufficient investments in science to both monitor and help guide restoration efforts. Without a strong science base, restoration will be less effective and more costly to the taxpayers.

Thank you for inviting me to participate in this hearing. The Great Lakes science academic community looks forward to working with you and all of our Collaboration partners to continue this important work, because it is only through concerted, coordinated action that we will realize our mutually-held goal of a cleaner, healthier Great Lakes.

I would be happy to answer any questions that you may have.

Prescription for Great Lakes Ecosystem Protection and Restoration

Avoiding the Tipping Point of Irreversible Changes

December 2005

(Endorsements as of May, 2006)

Jack Bails, Vice President, Public Sector Consultants

Alfred Beeton, Ph.D., retired Director of Great Lakes Environmental Laboratory, Adjunct Professor, University of Michigan

Jonathan Bulkley, Ph.D., Professor, University of Michigan

Michele DePhilip, Aquatic Ecologist, Great Lakes Program, The Nature Conservancy

John Gannon, Ph.D., Senior Scientist, International Joint Commission

Michael Murray, Ph.D., Staff Scientist, Great Lakes Natural Resource Center, National Wildlife Federation

Henry Regier, Ph.D., Professor Emeritus, University of Toronto

Donald Scavia, Ph.D., Professor and Sea Grant Director, University of Michigan

Note: Affiliations are listed for identification purposes only.

OVERVIEW

There is widespread agreement that the Great Lakes presently are exhibiting symptoms of extreme stress from a combination of sources that include toxic contaminants, invasive species, nutrient loading, shoreline and upland land use changes, and hydrologic modifications. Many of these sources of stress and others have been impacting the lakes for over a century. These adverse impacts have appeared gradually over time, often in nearshore areas, in the shallower portions of the system, and in specific fish populations. Factors such as the size of the lakes, the time delay between the introduction of stress and subsequent impacts, the temporary recovery of some portions of the ecosystem, and failure to understand the ecosystem-level disruptions caused by the combination of multiple stresses have led to the false assumption that the Great Lakes ecosystem is healthy and resilient.

Because it has taken the Great Lakes four centuries of exposure to these human-induced stresses to get to this point, some argue we have decades to control these and other sources of stress and promote the lakes' recovery.[1] From this perspective, protecting the Great Lakes is not particularly urgent and action can wait until we conduct more studies, while taking small corrective measures when the opportunity or need arises. However, if not addressed with great urgency, the Great Lakes system may experience further – and potentially irreversible – damage.

In large areas of the lakes, historical sources of stress have combined with new ones to reach a tipping point, the point at which ecosystem-level changes occur rapidly and unexpectedly, confounding the traditional relationships between sources of stress and the expected ecosystem response. There is compelling evidence that in many parts of the Great Lakes we are at or beyond this tipping point. Certain areas of the Great Lakes are increasingly experiencing ecosystem breakdown, where intensifying levels of stress from a combination of sources have overwhelmed the natural processes that normally stabilize and buffer the system from permanent change.[2]

Although the specific episodes of ecosystem breakdown have been unpredictable and alarming, few Great Lakes researchers are surprised by these occurrences. A number of papers were published in the 1980s describing stresses in various areas of the Great Lakes, including Lake Erie and shallow embayments in lakes Michigan, Huron, and Ontario. These papers described the symptoms of the Great Lakes ecosystem under distress, and laid the foundation for a conceptual ecological framework for understanding the changes that were occurring at that time. Rapport et al. (1985) discussed ecosystem self-regulating mechanisms (such as responses to invasive species) and the process by which stresses can give rise to early warnings, coping mechanisms, and ultimately lead to ecosystem breakdown if the overall stress is sufficiently prolonged and/or intense. The ecosystem adaptation syndrome discussed in the paper can be used to help formulate a systematic ecosystem approach to environmental management of the Great Lakes. This ecosystem breakdown concept helps explain the scope,

[1] Great Lakes Interagency Task Force, Report to the President on the Implementation of the Great Lakes Executive Order, undated, available at: http://www.epa.gov/glnpo/collaboration/final_rttp_10282005.pdf

[2] This is analogous to discussions of resilience and catastrophic change in ecosystems as presented in Scheffer et al. (2001), whereby assuming alternative stable states are available, sufficient perturbation in any ecosystem can shift it to an alternative (and potentially "unwanted") stable state.

intensity, and speed of the ecosystem changes that have occurred in the Great Lakes since the 1980s.

Examples of ecosystem breakdown or major changes in the lakes include: (1) persistence of the anoxic/hypoxic zone in the central basin of Lake Erie and other stresses in the eastern and western basins; (2) continued symptoms of impairment (including eutrophication) in Saginaw Bay and Green Bay; (3) well-documented rapid disappearance of the once abundant amphipods in the genus *Diporeia* in sediments of large areas of all the lakes (except for Lake Superior), and concomitant food web disruptions; (4) recent declines in growth, condition and numbers of lake whitefish in Lake Michigan and portions of Lake Huron; and (5) elimination of the macrophyte (i.e. rooted plant) community and simplification of the benthic food web, in Sandusky Bay on Lake Erie and Cootes Paradise in Hamilton Harbour on Lake Ontario, due to sediment and other pollutant loads.

The major cause of ecosystem breakdown is the severe damage that has been done to the Great Lakes' self-regulating mechanisms. In the past, healthy nearshore communities and tributaries helped reduce the impact of many stresses on or entering the lakes. Over time, the combined effects of a whole suite of stresses from a variety of human-induced sources have overwhelmed the ecosystem's self-regulating mechanisms. This diagnosis suggests that it is appropriate and necessary to address multiple sources of stress in order to reverse the trend toward widespread ecosystem breakdown. The following is a list of Great Lakes management objectives based on this diagnosis.

- *Restore*

Restore critical elements of the *ecosystem's self-regulating mechanisms*. To the extent possible, reestablish natural attributes of critical nearshore and tributary communities so they can once again perform their stabilizing function. Where full restoration of natural attributes is not possible, improve desirable aspects through *enhancement* of important functions.[3]

- *Remediate*

Remediate abusive practices that create *sources of stress*. Reduce or eliminate physical habitat alterations, pollution loadings, pathways for invasive species, and other stressors or their vectors into the lakes.

- *Protect*

Protect the functioning portions of the ecosystem from *impairment*. Preserve those portions of the ecosystems that now are healthy, and those that can be restored or enhanced, through sustainable development practices within the Great Lakes basin.

- *Measure*

Building on existing efforts, measure ecosystem health through a set of agreed-upon integrative indicators that can serve to assess current conditions and monitor the progress of restoring the lakes.

[3] Establishment of restoration goals obviously needs to acknowledge ecological constraints (e.g., the presence of numerous invasive species – including introduced fish – that are currently important components of food webs) as well as consider other human use objectives (e.g., maintenance of sport fisheries that include introduced species) (see, for example, discussions in Kitchell et al., 2000; Mills et al., 2003; Sproule-Jones, 2003).

The conceptual model here indicates the importance of immediate and sustained action. It advocates using the principles of ecosystem-based management to restore and protect the Great Lakes. Without such action, the lakes could potentially suffer irreversible and catastrophic damage.

SYMPTOMS

Many of the changes the Great Lakes have experienced in response to sources of stress have been documented for decades. Examples of symptoms and sources of stresses to the lakes include:

- Extirpation or major declines in important native species (such as lake trout and deepwater ciscoes) due to overfishing and effects from aquatic invasive species (such as sea lamprey predation on lake trout, and competition with deepwater ciscoes by introduced alewives and rainbow smelt);
- Widespread reproductive failures of keystone, heritage, and other (both native and introduced) fish species, including lake trout, sturgeon, lake herring, coaster brook trout, and Atlantic and Pacific salmon;
- Fouling of coastlines, resulting in beach closings and loss of habitat for fish and waterfowl;
- Toxic contamination of fish, which threatens the health of people, wildlife, and some fish species themselves, and results in fish consumption advisories throughout the Great Lakes and inland lakes and rivers;
- Loss of coastal wetlands, including over 90% of the presettlement wetlands along the Lake Huron/Lake Erie corridor;
- More recent introductions of aquatic invasive species (e.g., zebra and quagga mussels, round gobies and predatory zooplankton such as *Bythotrephes cederstroemi* and *Cercopagis pengoi* (two species of water fleas)) leading to declines in valued/important native aquatic species (including certain plankton, unionid clams and certain native fish species);
- Decreased populations of benthic organisms in many locations, causing decreased health in lake whitefish and with the potential to impact other species; and
- General water quality degradation, associated algal blooms, Type E botulism in fish and waterfowl, and contamination of drinking water (e.g., Johnson et al., 1998; Beeton et al., 1999; IJC, 2000; IJC, 2002; IJC, 2004; Whelan and Johnson, 2004).[4]

[4] In some cases, policies designed to address these stresses have been effective. Most notably, the passage in the United States of the Clean Water Act in 1972 and subsequent amendments initiated the National Pollutant Discharge Elimination System for point sources and resulted in billions of dollars in investments by federal, state, and local governments to upgrade, improve, and extend wastewater collection and treatment systems directly tributary to the Great Lakes; similar scale investments were made in Canada. The ban on the use and manufacturing of certain toxic chemicals, and strict protections put on others, has helped allow key indicator species (eagles, herring gulls) to return to health. However, even with substantial investments over the past three decades, wastewater treatment plants and sewer systems are in need of substantial new capital expenditures for major repairs, upgrades and, in some cases, replacement, and it is clear that local funding alone will not be adequate to the task. In addition, though a subject of research and policy focus for a number of years, nonpoint source pollution – including urban runoff, agricultural runoff, air deposition, and contaminated sediments – continues to be a significant contributor of pollutants to Great Lakes waters.

Historically, these and other symptoms were attributed to six major anthropogenic or human-induced sources of stress to the ecosystems in each lake.[5] The symptoms may appear stepwise like a chain reaction or self-organize in a complex, ecologically degraded manner. Listed in no particular order are those anthropogenic sources of stress: (1) **overfishing** (i.e., extracting larger quantities of fish than the system can sustain naturally); (2) **nutrient loading** (i.e., addition of phosphorus and nitrogen in excess of natural levels, usually via human waste and urban and agricultural runoff); (3) the release of **toxic chemicals** (e.g., mercury, polychlorinated biphenyls (PCBs) and other chlorinated hydrocarbons), including many that are both persistent and bioaccumulative;[6] (4) increased sediment loading as well as other sources of stress associated with **land use practices** (e.g., physical changes including alteration of vegetative land cover, wetland filling, modification of shorelines); (5) introduction of invasive (nonnative) **exotic plant and animal species** (e.g., purple loosestrife, sea lamprey, and zebra mussel); and (6) **hydrologic alterations** in tributary and connecting waterways, diversion and/or alteration of flows through the construction of dams, channels, and canals, alteration of natural drainage patterns (e.g., leading to increased surface water runoff and stream flows in urban areas with increased imperviousness).

Many of the symptoms of stress on the Great Lakes are attributable to a combination of these six sources of stress. Fouling of coastlines and near-shore areas arises from sewage overflows and contaminated runoff. Historically, valued species of fish declined in number or disappeared as a result of overfishing and, to varying degrees, invasive species, lost habitat connectivity, and toxic chemicals. Presently, invasive species and concomitant food web changes as well as lost connectivity of tributary spawning habitat play a larger role in affecting fish populations. Toxic chemical contamination in fish, which also threatens the health of humans and fish-consuming wildlife, is a direct result of historical and current toxic chemical releases. The loss of coastal wetlands stems from changes in land use practices and hydrologic alterations. Changes in water quality are caused directly by toxic chemical, nutrient, microbial and sediment pollution, as well as through actions of some invasive species (e.g., zebra mussels). Invasive species are the most likely principal source of food web disruptions now occurring in the Great Lakes, and are implicated in reproductive failures of some fish species (e.g., walleyes, lake trout, yellow perch, and lake herring) (McDonald et al., 1998; Fielder and Thomas, 2005).[7]

---

[5] Although we often speak of a "Great Lakes ecosystem," in most cases each lake basin has its own ecosystem, further divided into sub-basin ecosystems.

[6] In addition to chemicals that have been of longstanding concern in the Great Lakes, increasing attention is being directed at chemicals of emerging concern, including those found in products such as pharmaceuticals, personal care products, and flame retardants. Some of these and other chemicals may act as endocrine disruptors or otherwise alter regulatory systems in biota, and potentially add to the stress caused by toxic chemicals of principal focus in the region.

[7] One example of reproductive effects on salmonids involves the action of the enzyme thiaminase, which transforms the essential vitamin thiamine. In a recent study, lake trout fed diets with substantial amounts of thiaminase (either in bacterial form or with alewives (an introduced species with naturally elevated levels of the enzyme)) produce eggs more susceptible to embryonic early mortality syndrome (Honeyfield et al., 2005).

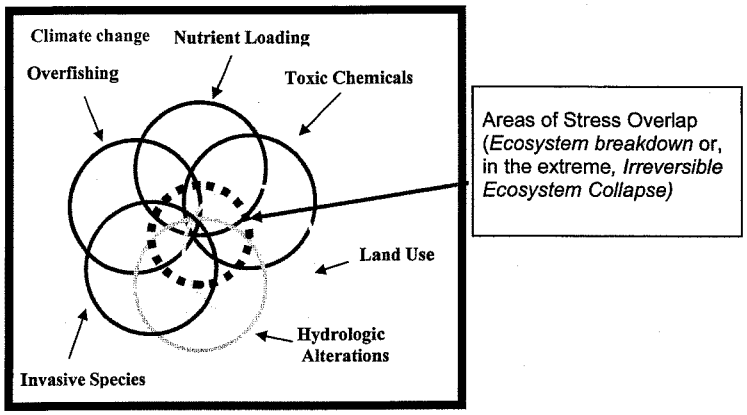
It should be noted that superimposed on these primary stresses are the broader, large-scale changes in global and regional climate. A recent analysis of the potential global warming and regional climate change impacts to the Great Lakes region included declining lake levels and the duration of winter ice, jeopardizing reproduction of some fisheries, and general lake warming that could negatively impact coldwater fish species, favor invasions of warm water nonnative species, and expand the duration of summer stratification and increase the potential for hypoxia ("dead zones") (Kling et al., 2003). These findings were generally consistent with earlier predictions for the Great Lakes in a scenario with a doubling of atmospheric carbon dioxide levels, although the researchers emphasized that the many complex interactions could lead to varied responses in individual ecosystems (e.g., thermal habitat changes in deep stratified lakes vs. shallow lakes and streams) (Magnuson et al., 1997). In addition to these potential compounding factors in the lakes proper, earlier ice breakup and earlier peaks in spring runoff will change the timing of stream flows, while increases in heavy rainstorms may cause more frequent flooding with potential increases in erosion, and additional water pollution from nutrients, pesticides, and other contaminants. While it is difficult to know how these changes will interact with the other six classes of stress identified above, there is little doubt that global warming will add yet another source of stress to the already perturbed Great Lakes ecosystem.

DIAGNOSING THE DISEASE

The Great Lakes ecosystem and the major human-induced sources of stress on it can be portrayed as a series of overlapping circles in a Venn Diagram, as shown in Figure 1 on the following page.[8] For areas where stresses act singly or jointly but not at intense levels, an ecosystem may change adaptively to an unhealthy state of diminished vigor and unpleasant aesthetics but not suffer major transformation to a disorganized critical state. Such a contrast could be analogous to a person feeling sick and redirecting vital efforts to recover at home rather than being taken to a crisis center for surgery or other intensive care. In an ecosystem in which only one stress acts intensely, positive (or reinforcing) or synergistic feedback loops can emerge, leading to a runaway or catastrophic breakdown process. However, such feedback loops are more likely to occur as the adverse effects of a number of stresses interact. The probability of disastrous ecosystemic breakdown appears to increase with the number of stresses acting on and interacting in the ecosystem. Thus, in this conceptual model, the probability of breakdown is likely to be highest at the center of the Venn Diagram where all types of stress act and interact to varying degrees. The prevention of this type of ecosystem breakdown should be the focus of attention in any restoration and protection efforts.

[8] The locations of stresses on the diagram is somewhat arbitrary, as the model is limited to working with stresses that are represented in two dimensions. It is possible that two or more stresses might interact in stronger ways (and others less coherently) that can be represented in the diagram.

Figure 1.



The magnitude (intensity), shape, and degree of overlap of the stresses have varied over time and space. For example, **overfishing** began in the late 1800s and continued into the 20th Century, while **invasive species** had significantly effected the ecosystem by the middle of the 20th Century. Other stresses have had significant effects more locally, such as **nutrient loading** in Green Bay, Saginaw Bay, and the western and central basins of Lake Erie, and **toxic chemicals** in the basin's industrial complexes such as along the Niagara, Detroit and Fox rivers (although due in part to diffuse loadings, many contaminants long ago become more widespread throughout the lakes themselves). In order to address these areas of overlap, there remains the need to better understand the salient features of these areas.

Conceptual Understanding of Ecosystem Stress Adaptation

The nearshore areas are important in the ecosystemic self-organization of the Great Lakes. Before the significant impact of humans (i.e., following European settlement), the nearshore areas were in equilibrium with surrounding areas. There was a healthy abundance and diversity of organisms interacting to various degrees with surrounding areas (from wetlands to offshore), and loads of nutrients and other constituents from land could be assimilated and/or transferred between communities without major disruptions to the functioning ecosystem. With development and industrialization in the Great Lakes, land use changes, increased pollution, and other factors have increased stress on these nearshore areas.

As the types and intensity of stress increased, two things happened. First, inflowing nutrients were shunted to the open waters of nearshore areas where photosynthetic energy fixation then erupted as plankton blooms. The blooms resulted in the loss of many valued, native species of nearshore communities and an increase in other species, native and nonnative, that favor open waters. Second, the entire ecosystem, including community abundance and composition, became unstable and began to undergo wider and more frequent fluctuations. Increased loadings of sediments from watershed runoff, toxic chemical inputs, oxygen depletion (following increased nutrient loads), hydrological alterations and other sources of stress

created a hostile environment to bottom dwelling, pollution-sensitive species and to the eggs of most Great Lakes fishes (Rapport et al., 1985; Steedman and Regier, 1987). Some of these changes were concomitant with or followed upon earlier changes to the upper portions of the food web due to a combination of introduction of aquatic invasive species (such as the sea lamprey, rainbow smelt and alewives) and overfishing, leading to extirpation or significant depletions of open water species such as lake trout and deepwater ciscoes (Eshenroder and Burnham-Curtis, 1999).

More recently, the invasion of zebra mussels in Lake St. Clair in 1988 and later arrival of quagga mussels have altered this nutrient flow dynamic in the Great Lakes yet again. Extensive colonization by zebra mussels in nearshore areas of the lower lakes has resulted in the reduction of nutrient and energy supplies to the open waters (Hecky et al. 2004). The extreme filtering capacities of zebra mussels for plankton has transferred energy from the water column to the nearshore benthic areas, and diminished the transport of nutrients via currents to the deeper waters. Also, quagga mussels colonize deeper waters and out-compete other organisms for food resources directly. The increased nearshore retention of nutrients along with clearer water has led to an increase in undesirable species of algae. Organic material filtered by mussels is transformed into biodeposits (pseudofeces and feces) that while serving in part as a food source for some organisms, are not utilized as a food source by many other benthic organisms (see below). In addition, the zebra mussels themselves are undesirable prey for most native Great Lakes fish species, but are readily consumed by invasive round gobies. The introduction and spread of zebra and quagga mussels has not only led to declines in native mussels (Nalepa et al., 1996) and other benthic species (see, for example, Nalepa et al., 1998; Dermott, 2001; Lozano et al., 2001), but has also facilitated the spread of other invasive species (Ricciardi, 2001).

With sufficient cumulative stress (including habitat loss, nutrient loadings, oxygen depletion, and invasive species), the capability of once healthy, resilient, and diverse coastal communities to buffer against natural and human perturbations can be overwhelmed. In essence, the health-sustaining system of the Great Lakes is seriously weakened. Once the resilient capabilities are exceeded the ecosystem organization abruptly and catastrophically changes, resulting in ecosystem breakdown. Under extreme circumstances where the suite of stresses become severely intense, the ecosystem adaptive responses in some cases move into another phase dominated by species that can tolerate and benefit from those sources of stress. The presence of surface scum, mats of fungi, strands of filamentous algae, and surface blooms of toxin-producing algae create this new phase in the water column. This surface association has appeared seasonally in certain bays and in the shallow waters of the Great Lakes, but has had adverse affects on both the nearshore and open water communities.

Scientists throughout the world are documenting the actual and expected damage that the loss of such ecosystem resiliency can cause. In March, 2005, the United Nations issued a final draft of a report endorsed by 1,200 of the world's leading scientists called the Millennium Ecosystem Assessment Synthesis Report (United Nations, 2005). One of the report's conclusions follows:

> **There is *established but incomplete* evidence that changes being made in ecosystems are increasing the likelihood of nonlinear changes in ecosystems (including accelerating, abrupt, and potentially irreversible changes), with**

> **important consequences for human well-being.** Changes in ecosystems generally take place gradually. Some changes are nonlinear, however: once a threshold is crossed, the system changes to a very different state. And these nonlinear changes are sometimes abrupt; they can also be large in magnitude and difficult, expensive, or impossible to reverse. (Emphasis in original, endnote omitted) (United Nations 2005)

The Millennium Ecosystem Assessment Synthesis Report conclusions are repeated in a "Scientific Consensus Statement for Marine Ecosystem-Based Management" recently adopted by over 200 scientists (Scientific Consensus 2005). The scientists signing the Consensus Statement on marine environments (as do the scientists endorsing this prescription paper) emphasize the need for a holistic, ecosystem-based management approach, including the dangers of managing only individual sources of stress or specific species:

> **Ecosystems can recover from many kinds of disturbance, but are not infinitely resilient.** There is often a threshold beyond which an altered ecosystem may not return to its previous state. The tipping point for these irreversible changes may be impossible to predict. Thus, increased levels of precaution are prudent as ecosystems are pushed further from pre-existing states. Features that enhance the ability of an ecosystem to resist or recover from disturbance include the full natural complement of species, genetic diversity within species, multiple representative stands (copies) of each habitat type, and lack of degrading stress from other sources. (Emphasis in original.) (Scientific Consensus, 2005)

While the same ecological principles cited for the world's oceans apply to the Great Lakes, the lakes may be less able to cope with stress than typical coastal marine environments. Ecosystems that have evolved in relatively unstable environments, such as those in the intertidal ocean communities that are exposed to frequent tidal movements and that have great diversity of species, are more likely to resist and/or recover from moderate human-induced stress. In contrast, the Great Lakes ecosystem is a relatively young (< 12,000 years), mostly oligotrophic system that has evolved in a relatively stable environment with a more limited number of species. The lakes represent a more closed system than coastal ocean waters, and respond more slowly to contaminant loadings (with longer hydraulic flushing times than coastal areas). Because of these differences, the lakes may be rapidly altered by even moderate stresses such as changes in water quality, system hydrology, or the introduction of invasive species (Rapport and Regier 1995). Thus, action to avoid the tipping point for irreversible ecosystem changes in the Great Lakes may be even more urgent than for coastal marine environments.

Great Lakes Ecosystem Response to Loss of Resiliency

In the Great Lakes, nonlinear changes are no longer a future threat – these types of changes are taking place now. While in some areas some indicators of ecosystem health have continued to improve over the past decade, other large areas in the lakes are undergoing rapid changes where combinations of effects of old and new stresses are interacting synergistically to trigger a chain reaction process of ecosystem degradation. The rapidness of this chain-reaction process, seen over the past five to fifteen years and involving sudden and unpredictable changes, is unique in the Great Lakes' recorded history. Some of the most significant changes observed include the radical food web disruptions occurring in Lakes Michigan, Huron, Erie, and Ontario; the reoccurrence of the anoxic/hypoxic zone in the central basin and other impairments (such as blooms of *Microcystis* cyanobacteria in the

western basin) in Lake Erie; and ongoing problems related to invasive species and other impairments in Lake Ontario. A profile of components of these potentially devastating ecosystem responses follows.

Profiles of Ecosystem Breakdown

Food Web Disruptions

Invasions of aquatic nonnative species in the Great Lakes have been a concern since the mid-twentieth century when sea lamprey, combined with other sources of stress, decimated populations of lake trout in the Upper Great Lakes. Facilitations between a series of invasive introductions have resulted in a synergistic effect leading to significant alterations of critical ecosystem processes in the Great Lakes. For example, reductions in lake trout and other predator species due to sea lamprey predation in Lakes Michigan and Huron paved the way for explosive increases in the populations of other invaders (e.g., alewife and rainbow smelt) which, in turn, competed with and preyed upon native forage species (Holeck et al., 2004).

More recently, researchers have documented a dramatic decline in abundances of the amphipod *Diporeia* in sediments of Lake Michigan. *Diporeia* is a critical component of the food web, important in the diets of many fish species. Historically, it has been the dominant food source for species such as slimy and deepwater sculpin, bloater, and lake whitefish. In the early 1980s average abundances of *Diporeia* in bottom sediments from Lake Michigan were as high as 12,200 individuals/m^2. However, *Diporeia* numbers began declining by the early 1990s, and by 2000 became severely depleted from sediment samples from Lake Michigan in much of the southern and northern portions of the lake, in some cases disappearing altogether (Nalepa et al., 1998; GLERL, 2003).

Populations of other macroinvertebrates have declined significantly in Lake Michigan as well. Oligochaete worms and fingernail clams showed declines in parallel with those of *Diporeia* in nearshore areas from 1980 – 1993 (Madenjian et al., 2002). While researchers have not been able to establish a direct link, they have associated the decline of *Diporeia* with increases in the abundance of the nonnative zebra mussel in Lake Michigan beginning in 1989. *Diporeia* and other benthic organisms depend on diatoms and detritus from other phytoplankton as a primary source of food, the same source of energy that zebra mussels utilize (Nalepa et al., 1998). Recent research indicates that the loss of amphipods is having serious consequences for the fish of Lake Michigan, including whitefish (Pothoven et. al., 2001), sculpin and bloater (Hondorp at al. 2005), and alewife (Madenjian et al., 2002). Evidence also indicates that similar food web disruptions are occurring or have already occurred in Lakes Huron, Erie and Ontario (e.g., Nalepa et al., 2003; Dermott and Kerec, 1997; Lozano et al., 2001).

Lake Erie: Re-emerging Problems and New Threats

For the Lake Erie ecosystem, cautious optimism about restoration was expressed in the early 1990s as the result of reductions in phosphorus loadings, improved dissolved oxygen levels in the bottom waters of the central basin, and increased fish populations (Markarewicz, 1991). However, while improvements have continued by some measures (e.g., increased water clarity, establishment of rooted aquatic plants), other impairments have persisted and/or increased in intensity in recent years. For example, recent data indicate that since the early 1990s springtime phosphorus concentrations have increased, summertime dissolved oxygen

levels in Lake Erie's central basin have decreased, and walleye numbers have begun to decline (IJC, 2004). Lake Erie nutrient loads and cycling, oxygen demand, dissolved oxygen levels and related issues have been the subject of a number of studies in recent decades, and it has been recognized that a combination of factors (including physical factors such as thickness of the bottom water layer, or hypolimnion) can affect deeper water dissolved oxygen levels.[9] Because of the number of factors involved, it is likely that no single factor explains the more recent periods of hypoxia (low oxygen conditions) in the central basin. Factors that could be influencing the persistent development of central basin summertime hypoxia include climate change and altered weather patterns (e.g., changes in temperatures and timing and intensity of storm events), changes in nutrient loadings (in particular from nonpoint sources – some data show increased phosphorus loadings from Ohio tributaries in the past decade), and altered internal cycling of phosphorus in response to the presence of zebra and quagga mussels (e.g., IJC, 2004; U.S. EPA and Environment Canada, 2004).

Avian botulism is another feature of the stress complex in Lake Erie (with cases also observed in Lakes Ontario and Huron), leading to episodic summertime die-offs of fish and fish-eating birds. The die-offs (which have included freshwater drum and birds such as common loons (*Gavia immer*) and red-breasted mergansers (*Mergus serrator*)) are linked to the generation of a neurotoxin produced by the anaerobic bacterium *Clostridium botulinum*. While the mechanisms leading to the outbreaks remain to be confirmed, the botulism toxin has been found in dreissenid mussels and invasive round gobies (a principal predator of zebra mussels), leading to the hypothesis that round gobies are transferring the toxin from zebra mussels to organisms higher in the food web (Domske, 2003; Ricciardi, 2005).

Another stress in Lake Erie is the return of blooms of the blue-green algae (or cyanobacteria) *Microcystis*. In addition to being a low quality food for other aquatic species, these algae can produce the microcystin toxin, which at sufficient levels can be harmful to fish, wildlife and humans. *Microcystis* are selectively expelled during feeding by zebra mussels, and thus zebra mussel colonization appears to be facilitating the re-emergence of these problem blooms (Vanderploeg, 2002). Another problem is the increasing frequency of algal mat development in nearshore areas (in particular in the eastern basin) by the filamentous green alga *Cladophora*. Blooms of this alga, which impair recreation and otherwise detract from beach aesthetic value, are linked to nearshore hypoxia/anoxia (U.S. EPA and Environment Canada, 2004).

Yet another significant potential threat to the ecosystem of Lake Erie and the other lakes is the presence of Asian carp in waters near the lakes. Several of these species have been imported to the southern U.S. to control unwanted organisms found in aquaculture facilities, and in some cases have escaped into the wild. While several individual Asian carp have been caught in Lake Erie, there are no established populations in Lake Erie or any of the other Great Lakes. However, at least two of the species have migrated up the Mississippi and Illinois Rivers and are within several miles of Lake Michigan. If the fish (which are planktivores and can range up to 40 kg) manage to breach barriers (such as the electric barrier on the Des Plaines River in Illinois), enter the Great Lakes, and become established, they could cause

[9] See for example Kay and Regier (1999) (and related papers in the State of Lake Erie volume) and Charlton (1987), Rosa and Burns (1987) and other papers in the same issue of the Journal of Great Lakes Research.

significant impacts on the ecosystem through competition with other fish that feed on plankton (U.S. EPA and Environment Canada, 2004).

Other emerging or ongoing symptoms of stress in Lake Erie include the continued presence of invasive species (including round gobies and quagga mussels), rising water temperatures, limited shallow water habitat due to hydromodified shorelines on the southern shore (in particular in the western basin), continuing presence of toxic chemicals (e.g., PCBs and persistent pesticides) leading to fish consumption advisories, and findings of pharmaceuticals, hormones and other chemicals of emerging concern in the Detroit River (IJC, 2004; U.S. EPA and Environment Canada, 2004).

Ongoing Impairments in Lake Ontario

Lake Ontario is also continuing to struggle with multiple sources of stress. While *Diporeia* declines have been reported since the 1990s following invasion by zebra mussels, as previously noted, the invasive quagga mussels have contributed to further alterations of the benthic community over broader areas in the lake. Other species that have invaded Lake Ontario in the past 10-15 years, with the potential to out-compete other native species, include the amphipod *Echinogammarus ischnus*, the New Zealand mud snail (*Potamopyrgus antipodarum*), and the predatory zooplankton *Cercopagis pengoi* (or fishhook water flea). The combination of a number of stresses over the past two decades (including oligotrophication, invasion by zebra and quagga mussels, fishery management practices, and climate change) has significantly altered the Lake Ontario fish community, with declines in alewife, native sculpin and whitefish, and increases in some native species associated with lamprey control (Mills et al., 2003). In addition, as with the other Great Lakes, numerous fish consumption advisories remain in place for Lake Ontario, including for PCBs, dioxins, mirex/photomirex and mercury (U.S. EPA, 2005; Ontario MOE, 2005).

PRESCRIPTION FOR RECOVERY

A number of management efforts (at local, state, national, and binational levels) directed at protecting and restoring the Great Lakes over the past three-plus decades have been developed and implemented, and there have been a number of successes. Sea lamprey control efforts starting in the 1950s have been relatively successful at controlling populations of this species, which has taken a significant toll on populations of lake trout and other native fish. Binational efforts following the signing of the Great Lakes Water Quality Agreement (GLWQA) in 1972 resulted in lowering of phosphorus loads to the lakes and improvements in a number of water quality indicators (in particular in the more heavily (nutrient) impacted lower lakes). Subsequent efforts under the GLWQA directed at toxic chemical contamination in Areas of Concern (AOC) (through Remedial Action Plans (RAPs)) have made some progress in addressing contaminated sediments, with two of 43 AOCs delisted. Implementation of Lakewide Management Plans (LaMPs) has also proceeded in recent years, with a number of efforts underway through the LaMP process in each lake to address numerous beneficial use

impairments.[10] Other efforts have been ongoing over the past decade to address specific problems in the lakes or basin, such as the Canada–U.S. Binational Toxics Strategy (addressing mostly persistent, bioaccumulative, toxic (PBT) chemicals) and the Great Lakes Panel on Aquatic Nuisance Species. In addition, the development of indicators of ecosystem health has been conducted through the State of the Lakes Ecosystem Conference (SOLEC) process.

The complexity of the jurisdictional management for the Great Lakes has long been recognized, involving management by two federal governments, eight states and two provinces, Native American and First Nation tribes, municipalities, as well as institutions such as the International Joint Commission, the Great Lakes Fishery Commission, and the Great Lakes Commission offering policy and management guidance. Challenges in implementing programs to protect the Great Lakes have been highlighted in recent reports, including a 2003 U.S. General Accounting Office (GAO) report. The report noted there were 148 federal (U.S.) and 51 state programs funding work on environmental restoration within the Great Lakes basin; a smaller number of federal programs (33) were focused specifically on the basin. The report also noted the lack of any overarching approach to coordinate program activities in support of Great Lakes restoration, as well as the lack of a coordinated monitoring program to determine basinwide progress toward meeting restoration goals (U.S. GAO 2003).

Indeed when faced with a particularly damaging human perturbation in the Great Lakes, our corrective response has generally been to focus on a particular cause of stress and not on the integrated sources of stress that allowed it to occur. For example, when excessive nutrients and associated algal blooms impaired Lake Erie, we focused on the major point sources of phosphorus that fed the algae and lead to oxygen depletion. For a short period, we dampened down that perturbation. However, now that similar degraded conditions have reappeared, we are uncertain if such conditions are due to insufficient control of excessive nutrients, are caused by invasive species, or the result of a combination of stress sources not effectively addressed when the problems were first identified. Compounding the issue, the Great Lakes ecosystem's adaptive responses, transforming into undesired, unhealthy states, seem to be increasing in a dramatic way, in particular due to the uncontrolled introduction of new invasive organisms that out-compete native species whose natural habitat has been severely degraded in a number of areas. In spite of some efforts at addressing invasive species introductions (such as ballast water exchange requirements in the Non-Indigenous Aquatic Nuisance Species Prevention and Control Act of 1990, which do not affect the large majority of ships entering the Great Lakes declaring "no ballast on board" but which in fact may contain residual ballast water), the rate of introduction of new aquatic invaders has remained high over the past 15 years, averaging over one new species every eight months since 1970 (Ricciardi 2001).

Two broad approaches for addressing Great Lakes problems by the policymaking and management communities are treating each symptom, or treating the disease. In addressing each perturbation individually, for example, one would look for approaches to control the spread of zebra or quagga mussels, approaches for reducing polluted runoff, and strategies for addressing existing contaminants and chemicals of emerging concern. Conversely, the Great

[10] For Lake Huron, the lakewide effort is the Lake Huron Binational Partnership, which is not nominally a LaMP.

Lakes community can address the unacceptable adaptive changes in the lakes by focusing attention on the multiple sources of stress that have led to wide-scale disruption of essential nearshore/tributary processes. While recognizing the difficulty in addressing a number of individual stresses (e.g., many years of efforts at suppressing sea lamprey populations), we believe focusing on the multiple sources of stress will lead to the best possible policymaking for and management of the Great Lakes ecosystem.

As we focus on multiple sources of stress, several critical ecosystem objectives should be maintained: (1) restore and enhance the self-regulating mechanisms of the Great Lakes by focusing on the health of key geographic areas. This includes major tributaries and key nearshore areas; (2) to the extent possible, remediate existing and prevent major new perturbations (e.g., stop the introduction of new invasive species and pollutants); (3) protect existing healthy elements by adopting sustainable land and water use practices in the basin that maintain the long-term health of the Great Lakes ecosystem and associated benefits; (4) better monitor ecosystem health and the progress of restoration and protection efforts.

Steedman and Regier (1987) outlined and defined a set of components for Great Lakes ecosystem rehabilitation and those definitions have been modified to formulate the following suggested four primary management objectives for the Great Lakes.

1. **Restore and Enhance Critical Nearshore Areas, Tributaries, and Connecting Channels**

   The ecosystem-based conceptual model should be applied to identify specific geographic areas where the combination of individual sources of stress have contributed or are likely to contribute to the degradation of the nearshore/tributary areas. These are areas where ecosystem breakdown is occurring or is likely to occur, and where action is most likely to restore resiliency to the Great Lakes. These consensus–targeted areas for coordinated restoration and protection efforts may well include those locations already identified as Areas of Concern by the International Joint Commission (expanded geographically to ensure they include the major sources of stress) as well as nearshore/tributary areas that are now showing symptoms or vulnerability to multiple sources of stress. This may require increased institutional focus (including increased emphasis within LaMP efforts) on these nearshore areas. The goal should be to reestablish the natural states critical to nearshore and tributary communities so they can once again perform their stabilizing function, or, if that is not feasible, enhance critical elements that play a role in stabilizing the communities.

2. **Remediate Basinwide Sources of Stress**

   Some of the major stress sources need to be managed through systematic, basinwide approaches. Impacts of stress are often lakewide, if not basinwide, and the remedies are not linked to a limited geographical area. Basinwide stress reduction recommendations include:

   - Support research on control of existing invasive species (e.g., round gobies, zebra and quagga mussels), and to the extent they are identified, implement any control measures
   - Prevent the introduction of new invasive species.

- Mitigate existing negative impacts and prevent significant future human alterations of tributary hydrology and Great Lakes shoreline structure. This can include promoting connectivity of habitat (such as wetlands or free-flowing rivers) important for many species.
- Reduce loadings of nutrients, sediments/dredged material, toxic chemicals, and microbial pollution to the Great Lakes and tributaries from all sources, including addressing continued development pressures and potential for increases in polluted runoff.

Actions such as these will be critical in preventing new perturbations as well as enabling the recovery process. Addressing nonnative species introductions is a key issue. Unlike chemical pollution (except in extreme cases of local pollution), nonnative species, if established, can be extremely difficult to control and have the potential to engineer the ecosystem to a significantly altered state.

3. Protect Healthy Functioning Elements

Sustainable development practices within the Great Lakes basin are required to preserve those portions of the ecosystem that now are healthy, and those that can be restored or enhanced. Recovery of healthy nearshore communities and tributaries, once begun, must be maintained; the conditions that caused the impairments in the first place must be addressed. Watershed-based approaches to land use management provide the best opportunity to minimize negative impacts on the surface water and groundwater essential to the sustainability of the Great Lakes ecosystem. Actions should support and expand activities that employ holistic, watershed-based approaches to land and water use decisions.

4. Monitor Ecosystem Health

Monitoring the ecosystem response through an agreed-upon set of integrative indicators will be an extremely important part of any Great Lakes restoration effort. This effort should build on ongoing efforts such as the development and application of SOLEC indicators. Major changes in the ecosystem are occurring while many of the indicators that governments have traditionally used to measure Great Lakes health (water clarity, ambient water pollution levels, and certain contaminant levels in wildlife) are actually improving. Because nonlinear changes, such as those the Great Lakes are currently experiencing, may confound expected relationships between sources of stress and the lakes' response, traditional indicators may not be adequate descriptors of the health of the ecosystem and may not be useful in predicting future conditions. While some type of consensus on indicators is desirable, given the dynamic nature of the system and our understanding of it, flexibility must also be included in the development and use of indicators.

Certain features of the ecosystem appear to be particularly responsive to the seven sources of stress (including climate change) identified above. Emblematic species such as certain fish-eating birds and populations and reproductive health of key fish species (such as lake trout, lake herring, walleye, yellow perch, and lake sturgeon) as well as wetland sub-ecosystem complexes should clearly be part of any monitoring program. In addition,

monitoring should include a strong human health component, in particular involving tribal/First Nation communities and other populations heavily dependent on Great Lakes fisheries and other resources. There have been varying degrees of research on integrative indicators of ecosystem integrity with most effort focused on emblematic species and wetland complexes. Some evidence suggests smaller organisms at the bottom of the food chain respond more quickly to change, and thus monitoring micro- and macro-invertebrates might well reveal the earliest signs of ecosystem disruption and/or recovery (Odum, 1985).

A key issue for any monitoring network is the ability for rapid detection and identification of new threats, in particular aquatic invasive species. This is particularly important given the difficulty in controlling invaders once established, and the significant economic costs and ecological disruption nonnative species can cause (Pimentel et al., 2000). Use of predictive tools based in part on an understanding of existing invasions can assist in monitoring for potential invasive species (Ricciardi, 2003).

SUMMARY

The health of the Great Lakes ecosystem is in jeopardy. While a number of remediation and other activities have been pursued through the years to address Great Lakes problems, additional actions are urgently needed to restore system elements, particularly in critical nearshore/tributary zones where a chain reaction of adaptive responses to a suite of stresses may be leading to catastrophic changes: ecosystem breakdown and potentially irreversible ecosystem collapse. Without at least partial restoration of these areas, the negative symptoms being observed in the Great Lakes will likely intensify and could degrade irreversibly. Concurrently, actions are needed to control or eliminate sources of basinwide threats to the essential biological, physical, and chemical components of the Great Lakes' ecosystem stability and health. Finally, large areas of the Great Lakes basin waters remain relatively healthy and productive and they provide a wide range of benefits to the people of the region. Protecting the remaining areas from further stress is significantly more cost-effective than attempting restoration after damage has occurred. In summary,

- Historically, when faced with a particularly damaging ecosystem impact, policy responses have focused on particular symptoms and not on the integrated sources of stress that cause these symptoms.
- To increase the effectiveness of policy and on-the-ground restoration, sources of stress and, especially, interactions between those sources need to be explicitly considered.
- One way to prioritize efforts is to focus on specific geographic areas that have experienced ecosystem breakdown and develop efforts to address the multiple sources of stress that have contributed to these impacts.
- Some major sources of stress to the Great Lakes have broad implications and need to be addressed basin-wide since the sources (and their impacts) are not always limited to single locations.
- Watershed-based approaches offer the best opportunity to protect existing basin waters by establishing sustainable land and water use development practices.

LITERATURE CITED

Beeton, A. M., C. E. Sellinger, and D. E. Reid, 1999. An Introduction to the Laurentian Great Lakes Ecosystem. In W. W. Taylor and C. P. Ferreri, Eds., Great Lakes Fishery Policy and Management: A Binational Perspective. Michigan State University Press, pp. 3-54.

Charlton, M. N. 1987. Lake Erie oxygen revisited. *Journal of Great Lakes Research* 13:697-708.

Dermott, R., 2001. Sudden disappearance of the amphipod Diporeia from eastern Lake Ontario, 1993-1995. *Journal of Great Lakes Research* 27:423-433.

Dermott, R., and D. Kerec. 1997. Changes to the deepwater benthos of eastern Lake Erie since the invasion of *Dreissena*: 1979-1993. *Canadian Journal of Fisheries and Aquatic Sciences* 54:922-930.

Domske, H. M., 2003. Botulism in Lake Erie Workshop Proceedings, Co-sponsored by New York Sea Grant, Ohio Sea Grant, and Pennsylvania Sea Grant, April 3, 2003, Buffalo, NY.

Eshenroder, R. L. and M. K. Burnham-Curtis. 1999. Species succession and sustainability of the Great Lakes fish community. In W. W. Taylor and C. P. Ferreri, Eds, *Great Lakes Fishery Policy and Management: A Binational Perspective.* Michigan State University Press. 145-184.

Fielder, D. G. and M. V. Thomas, 2005 (in press), Fish Population Dynamics of Saginaw Bay, Lake Huron, 1998-2004. Michigan Department of Natural Resources Fisheries Research Report.

Great Lakes Environmental Research Laboratory (GLERL), 2003. Decline in Lake Michigan Bottom Life, brochure, available at: http://www.glerl.noaa.gov/pubs/brochures/dipoflyer/dipo.html

Hecky, R. E.,R. E. H. Smith, D. D. Barton, S. J. Guilford, W. D. Taylor, M. N. Charlton, and T. E. Howell. 2004. The nearshore phosphorus shunt: a consequence of ecosysyem engineering by dreissenids in the Laurentian Great Lakes. *Canadian Journal of Fisheries and Aquatic Sciences* 61:1285-1293.

Holeck, K. T., E. L. Mills, H. J. McIsaac, M. R. Dochoda, R. I. Colautti, and A. Ricciardi, 2004. Bridging troubled waters: biological invasions, transoceanic shipping, and the Laurentian Great Lakes. *Bioscience* 54:919–929.

Hondorp, D. W., S, A. Pothoven, S. A., and S. B. Brandt, 2005. Influence of diporeia density on diet composition, relative abundance, and energy density of planktivorous fishes in Southeast Lake Michigan. *Transactions of the American Fisheries Society* 134:588-601.

Honeyfield, D. C., Hinterkopf, J. P., Fitzsimons, J. D., Tillitt, D. E., Zajicek, J. L., and Brown, S. B. (2005). Development of thiamine deficiencies and early mortality syndrome in lake trout by feeding experimental and feral fish diets containing thiaminase. *Journal*

of Aquatic Animal Health 17:4-12.

International Joint Commission (IJC), 2000. 10th Biennial Report on Great Lakes Water Quality, International Joint Commission, July 2000. Available at: http://www.ijc.org/php/publications/html/10br/en/indexen.html

IJC, 2002. 11th Biennial Report on Great Lakes Water Quality, International Joint Commission, September 2002, Available at: http://www.ijc.org/php/publications/html/11br/english/report/index.html

IJC, 2004.12th Biennial Report on Great Lakes Water Quality, International Joint Commission, September 2004, Available at: http://www.ijc.org/php/publications/html/12br/english/report/index.html

Johnson, B. L., H. E. Hicks, D. E. Jones, W. Cibulas, A. Wargo, and C. T. De Rosa, 1998. Public health implications of persistent toxic substances in the Great Lakes and St. Lawrence Basins. *Journal of Great Lakes Research* 24: 698-722.

Kay, J. J., and H. A. Regier, 1999. An ecosystemic two-phase attractor approach to Lake Erie's ecology. In: M. Munawar, T. Edsall & I.F. Munawar, editors. State of Lake Erie (SOLE) - Past, Present and Future. Ecovision World Monograph Series, Backhuys Publishers, Leiden, The Netherlands, pp. 510-533.

Kitchell, J. F., S. P. Cox, C. J. Harvey, T. B. Johnson, D. M. Mason, K. K. Schoen, K. Aydin, C. Bronte, M. Ebener, M. Hansen, M. Hoff, S. Schram, D. Schreiner, and C. J. Walters, 2000. Sustainability of the Lake Superior fish community: Interactions in a food web context. *Ecosystems* 3:545-560.

Kling, G., W., K. Hayhoe, L. B. Johnson, J. J. Magnuson, S. Polasky, S. K. Robinson, B. J. Shuter, M. W. Wander, D. J. Wuebbles, D. R. Zak, R.L. Lindroth, S. C. Moser, and M. L. Wilson, 2003. *Confronting Climate Change in the Great Lakes: Impacts on Our Communities and Ecosystems*, Union of Concerned Scientists, Cambridge, Massachusetts and Ecological Society of America, Washington, D.C.

Lozano, S. J., J. V. Scharold, and T. F. Nalepa. 2001. Recent declines in benthic macroinvertebrate densities in Lake Ontario. *Canadian Journal of Fisheries and Aquatic Sciences* 58:518-529.

Madenjian, C.P., Fahnenstiel, G.L., Johengen, T.H., Nalepa, T.F., Vanderploeg, H.A., Fleischer, G.W., Schneeberger, P.J., Benjamin, D.M., Smith, E.B., Bence, J.R., Rutherford, E.S., Lavis, D.S., Robertson, D.M., Jude, D.J., Ebener, M.P., 2002. Dynamics of the Lake Michigan food web, 1970-2000. *Canadian Journal of Fisheries and Aquatic Sciences*. 59(4):736-753.;

Magnuson, J. J., Webster, K. E., Assel, R. A., Bowser, C. J., Dillon, P. J., Eaton, J. G.., Evans, H. E., Fee, E. J., Hall, R. I., Mortsch, L. R., Schindler, D. W., Quinn, F. H., 1997. Potential effects of climate changes on aquatic systems: Laurentian Great Lakes and Precambrian shield region. *Hydrological Processes*, 11 (8) 825-871.

Makarewitz, J. C. and P. Bertram. 1991. Evidence for the recovery of the Lake Erie ecosystem. *Bioscience* 41: 216–223.

McDonald, G, J. D. Fitzsimond, and D. C. Honeyfield, Eds. 1998. Early Life Stage Mortality Syndrome in Fishes of the Great Lakes and Baltic Sea. Proceedings of American Fisheries Society Symposium 21, American Fisheries Society, Bethesda, Maryland.

Mills, E. L., J. M. Casselman, R. Dermott, J. D. Fitzsimons, G. Gal, K. T. Holeck, J. A. Hoyle, O. E. Johannsson, B. F. Lantry, J. C. Makarewicz, E. S. Millard, I. F. Munawar, M. Munawar, R. O'Gorman, R. W. Owens, L. G. Rudstam, T. Schaner, and T. J. Stewart. 2003. Lake Ontario: Food Web Dynamics in a Changing Ecosystem (1970-2000). *Canadian Journal of Fisheries and Aquatic Sciences* 60:471-490.

Nalepa, T. F. 1998. Dramatic changes in benthic macroinvertebrate populations in southern Lake Michigan. Aquatic Nuisance Species Update 4 (3):1.

Nalepa, T. F., D. J. Hartson, G. W. Gostenik, D. L. Fanslow, and G. A. Lang, 1996. Changes in the Freshwater Mussel Community of Lake St Clair: From Unionidae to Dreissena Polymorpha in Eight Years. *Journal of Great Lakes Research* **22**, 354-369.

Nalepa, T. F., D. J. Hartson, D. L. Fanslow, G. A. Lang, and S. J. Lozano. 1998. Declines in benthic macroinvertebrate populations in southern Lake Michigan, 1980–1993. *Canadian Journal of Fisheries and Aquatic Sciences* 55(11):2402–2413.

Nalepa, T. F., D. L. Fanslow, M. B. Lansing, and G. A. Lang, 2003. Trends in the Benthic Macroinvertebrate Community of Saginaw Bay, Lake Huron, 1987 to 1996: Responses to Phosphorus Abatement and the Zebra Mussel, Dreissena Polymorpha. *Journal of Great Lakes Research* 29:14-33.

Odum, E. P. 1985. Trends to be expected in stressed ecosystems. *Bioscience* 35:419–422.

Ontario Ministry of the Environment (MOE), 2005. Guide to Eating Ontario Sport fish, 2005-2006.

Pimentel, D., Lach, L., Zuniga, R., and Morrison, D. 2000. Environmental and economic costs of nonindigenous species in the United States. *Bioscience* 50, 53-65.

Pothoven, S.A., T.F. Nalepa, P.J. Schneeberger, and S.B. Brandt, 2001. Changes in diet and body condition of lake whitefish in southern Lake Michigan associated with changes in benthos. *North American Journal of Fisheries Management.* 21:876-883.

Rapport, D. J., H. A. Regier and T.C. Hutchinson. 1985. Ecosystem behavior under stress. *The American Naturalist* 125:617–640.

Rapport, D. J. and H. A. Regier. 1995. Disturbance and stress effects on ecological systems. I*n* B. Patten and S.E. Jörgensen, Eds. Complex Ecology: The Part-whole Relation in Ecosystems. Prentice Hall, Englewood Cliffs, New Jersey, pp. 397-414.

Ricciardi, A. 2001. Facilitative interactions among aquatic invaders: Is an 'invasional meltdown' occurring in the Great Lakes? *Canadian Journal of Fisheries and Aquatic Sciences* 58:2513-2525.

Ricciardi, A., 2003. Predicting the impacts of an introduced species from its invasion history: an empirical approach applied to zebra mussel invasions, *Freshwater Biology* 48:972-981.

Ricciardi, A. 2005. Facilitation and synergistic interactions among introduced aquatic species. In: H.A. Mooney, R.N. Mack, J. McNeely, L.E. Neville, P.J. Schei, J.K. Waage, Eds. Invasive Alien Species: A New Synthesis. Island Press, Washington, D.C., pp. 162-178.

Rosa, F. and N. M. Burns. 1987. Lake Erie central basin oxygen depletion changes from 1929-1980. *Journal of Great Lakes Research* 13:684-696.

Scheffer, M., S. Carpenter, J. A. Foley, C. Folke, and B. Walker. 2001. Catastrophic shifts in ecosystems. *Nature* 413:591-596.

Scientific Consensus. 2005. Scientific Consensus Statement on Marine Ecosystem-Based Management. Released March 21, 2005, at House Ocean Caucus Luncheon, Washington D.C. Communication Partnership for Science and the Sea. Available: http://compassonline.org/files/inline/EBM%20Consensus%20Statement_FINAL_Mar%2021%2005_vp.pdf. (May 2005).

Sproule-Jones, M. 2003. *Restoration of the Great Lakes: Promises, Practices, Performances.* Vancouver: UBC Press, 160 pp.

Steedman, R. J., and H. A. Regier. 1987. Ecosystem science for the Great Lakes: perspectives on degradative transformations. *Canadian Journal of Fisheries and Aquatic Sciences* 44, Supplement 2:95–130.

United Nations. 2005. Millennium ecosystem assessment synthesis report. United Nations Environment Programme (UNEP), Millennium Ecosystem Assessment Secretariat. Available: http://www.millenniumassessment.org/en/Products.Synthesis.aspx. (May 2005).

U.S. Environmental Protection Agency and Environment Canada, 2004. Lake Erie LaMP 2004 Report, prepared by Lake Erie LaMP Workgroup.

U.S. Environmental Protection Agency, 2005. National List of Fish Advisories database, available at: http://epa.gov/waterscience/fish/advisories/

U.S. General Accounting Office (GAO – now Government Accountability Office), 2003, Great Lakes: An Overall Strategy and Indicators for Measuring Progress Are Needed to Better Achieve Restoration Goals, GAO-03-515, April 2003.

Vanderploeg, H., 2002. The zebra mussel connection: Nuisance algal blooms, Lake Erie anoxia, and other water quality problems in the Great Lakes, Great Lakes Environmental Research Laboratory flyer, revised September 2002.

Whelan, G. E. and J. E. Johnson. 2004. Successes and failures of large scale ecosystem manipulation using hatchery production: the Upper Great Lakes experience. In M.J. Nickum, P.M. Mazik, J.G. Nickum and D.D. MacKinlay, Eds. Propagated Fish in Resource Management. American Fisheries Society, Symposium 44, Bethesda, Maryland, pp. 3-32.

ADDITIONAL GENERAL REFERENCES

Beeton, A. M. 1966. Indices of Great Lakes eutrophication. Great Lakes Research Division, University of Michigan, Publication 15, Ann Arbor, Michigan.

Beeton, A. M, and W. T. Edmondson. 1972. The eutrophication problem. *Journal of the Fisheries Research Board of Canada* 29:673–682.

Cook, P., J. A. Robbins, D. D. Endicott, K. B. Lodge, P. D. Guiney, M. K. Walker, E. W. Zabelo, and R. E. Peterson. 2003. Effects of aryl hydrocarbon receptor-mediated early life stage toxicity on lake trout populations in Lake Ontario during the 20th century. *Environmental Science and Technology* 37:3864–3877.

Dobson, T., H. A. Regier, and W. W. Taylor. 2002. Governing human interactions with migratory animals, with a focus on humans interacting with fish in Lake Erie: then, now, and in the future. *Canada-United States Law Journal* 28:389–446.

Edwards, C. J., and H. A. Regier, editors. 1990. An ecosystem approach to the integrity of the Great Lakes in turbulent times. Great Lakes Fishery Commission, Special Publication 90-4, Ann Arbor, Michigan.

Gladwell, M. 2000. *The Tipping Point: How Little Things Can Make a Big Difference.* Little, Brown and Company, Boston, MA.

Hecky, R. E., R. E. H. Smith, D. R. Barton, S. J. Guildford, W. D. Taylor, M. N. Charlton, and T. H. Howell. 2004. The nearshore phosphorus shunt: consequences of ecosystem engineering by dreissenids in the Laurentian Great Lakes. *Canadian Journal of Fish and Aquatic Sciences* 61:1285–1293.

Holsen, T.M., M.Cohen, T. J. Holsen, Corso, A. 2004. The Ann Arbor Statement: Actions to Improve Atmospheric Transport and Deposition Science, resulting from Great Lakes Binational Toxics Strategy Long Range Transport Workshop: The Atmospheric Pathway of Toxic Substances in the Great Lakes, Sept. 16-17, 2003, Ann Arbor, MI.

Hubbs, C. L., and K. F. Lagler, 2004, Fishes of the Great Lakes Region, Revised Edition, revised by G. R. Smith, University of Michigan Press, Ann Arbor, MI, 276 pp.

Kay, J. J., and H. A. Regier. 1999. An ecosystem two-phase attractor approach to Lake Erie's ecology. I*n* M. Munawar, T. Edsal, and I. F. Munawar, Eds. State of Lake Erie (SOLE)— Past, Present and Future. Ecovision World Monograph Series, Backhuys Publishers, Leiden, The Netherlands, pp. 511-533.

Koestler, A., and J. R. Smythies, Eds. 1976. *Beyond Reductionism.* Hutchinson, London.

Loftus, K. H., and H. A. Regier, Eds. 1972. Proceedings of the Salmonid Communities in Oligotrophic Lakes (SCOL) Symposium. *Journal of the Fisheries Research Board of Canada* 29:613–986.

Margalef, R. 1968. *Perspectives in Ecological Theory.* University of Chicago Press, Chicago.

Odum, E. P. 1969. The strategy of ecosystem development. *Science* 64:262–270.

Regier, H. A. and W. L. Hartman. 1973. Lake Erie's fish community: 150 years of cultural stress. *Science* 180:1248–1255.

Regier, H. A. and J. J. Kay. 1996. An heuristic model of the transformations of the aquatic ecosystems of the Great Lakes—St. Lawrence River basin. *Journal of Aquatic Ecosystem Health* 5:3–21.

Regier, H. A., T. H. Whillans, W. J. Christie, and S. A. Bocking. 1999. Over-fishing in the Great Lakes: the context and history of the controversy. *Aquatic Ecosystem Health and Management* 2:239–248.

Reynoldson, T. B., and A. L. Hamilton. 1993. Historic changes in populations of burrowing mayflies (*Hexagenia limbata*) from Lake Erie based on sediment tusk profiles. *Journal of Great Lakes Research* 19:250–257.

Schneider, J. C., and J. H. Leach. 1979. Walleye stocks in the Great Lakes, 1800–1975: fluctuations and possible causes. Great Lakes Fisheries Commission Technical Report 31:1–51.

Selye, H. 1974. *Stress Without Distress*. J. P. Lippincott, Philadelphia, Pennsylvania.

Van Oosten, J. 1930. The disappearance of the Lake Erie cisco—a preliminary report. *Transactions of the American Fisheries Society* 60:204–214.

Vallentyne, J. R. 1974. The algal bowl. Canada Department of Environment, Miscellaneous Publication 22, Ottawa, Ontario.

Vanderploeg, H. A., Nalepa, T. F., Jude, D. J., Mills, E. L., Holeck, K. T., Liebig, J. R., Grigorovich, I. A., and Ojaveer, H. 2002. Dispersal and Emerging Ecological Impacts of Ponto-Caspian Species in the Laurentian Great Lakes. *Canadian Journal of Fisheries and Aquatic Sciences* 59:1209-1228.

Verduin, J. 1964. Changes in Western Lake Erie during the period 1948–1962. *Verh. Internat. Verein. Limnol.* 15:639–644.

Vollenweider, R. A. 1968. Scientific fundamentals of the eutrophication of lakes and flowing waters with particular reference to phosphorus and nitrogen as factors in eutrophication. OECD, Technical Report DAS/CSI/68, Paris.

Vollenweider, R. A. 1990. Eutrophication: conventional and non-conventional considerations and comments on selected topics. Pages 77–134 *in* R. De Benardi, G. Giussani, and L. Barbanti, editors. Scientific perspectives in theoretical and applied limnology, Memorie dell'Istituto Italiano di Idrobiologia Dott. Marco de Marchi. Verbania Pallanza, Italy.

Vollenweider, R. A., M. Munawar, and P. Stadelman. 1974. A comparative review of phytoplankton and primary production in the Laurentian Great Lakes. *Journal of the Fisheries Research Board of Canada* 31:739–762.

Acknowledgments

The development of this white paper (including meetings and discussions among the authors and other scientists) was made possible through the generous support of the Wege Foundation and the Joyce Foundation. The views expressed in the paper are those of the authors, and do not necessarily represent the views of the financial supporters.

Original Authors:
Jack Bails, Vice President, Public Sector Consultants
Alfred Beeton, Ph.D., retired Director of Great Lakes Environmental Laboratory and currently Adjunct Professor, University of Michigan
Jonathan Bulkley, Ph.D., Professor, University of Michigan
Michele DePhilip, Aquatic Ecologist, Great Lakes Program, The Nature Conservancy
John Gannon, Ph.D., Senior Scientist, International Joint Commission
Michael Murray, Ph.D., Staff Scientist, Great Lakes Natural Resource Center, National Wildlife Federation
Henry Regier, Ph.D., Professor Emeritus, University of Toronto
Donald Scavia, Ph.D., Professor and Sea Grant Director, University of Michigan

This paper has also been endorsed (as of May, 2006) by:

Brett A. Adams

Brett Alan Adams, Ph.D.
Associate Professor
Dept. of Biology
Utah State University

Signature Not Available
Richard J. Abitz
Site Geochemist
Fluor Fernald, Inc

Signature Not Available
Professor Peter Abrams, F.R.S.C.
Department of Zoology
University of Toronto

Dave Allan, PhD.
Professor
University of Michigan

Dr. Charles Amlaner
Professor of Physiology and Behavior
Chairperson,
Department of Ecology and Organismal Biology
Indiana State University

Anders Andren, PhD.
Director Wisconsin Sea Grant
University of Wisconsin

Joseph Atkinson
Professor
University of Buffalo

Signature Not Available
Richard G. Baker
Professor Emeritus
Department of Geoscience
University of Iowa

Signature Not Available
Brian Barkdoll, Ph.D., P.E.
Associate Professor
Michigan Technological University

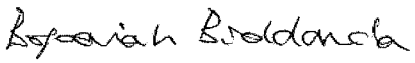
Dean Bavington
Assistant Professor
University of Michigan

Signature Not Available
David R. Bayne, PhD
Professor
Department of Fisheries
Auburn University, AL

Signature Not Available
David H. Benzing
Professor of Biology
Oberlin College

David J. Berg
Professor
Department of Zoology, Miami University

Signature Not Available
James D. Bever
Associate Professor and Director of Plant Sciences
Department of Biology, Indiana University

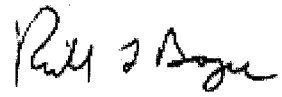


Bopiah Biddanda, PhD.
Professor, Grand Valley State University

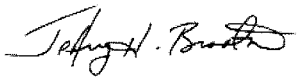
Vic Bierman, Jr., Ph.D.,
Senior Scientist, Limno-Tech Inc.

Signature Not Available
William R Boggess
Professor and Head Emeritus
Department of Forestry
University of Illinois at UIUC

Jonathan Bossenbroek, Ph.D.
Assistant Professor, Earth, Ecological and Environmental Sciences
Lake Erie Center, University of Toledo

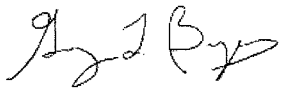


Richard L. Boyce
Assistant Professor
Northern Kentucky University

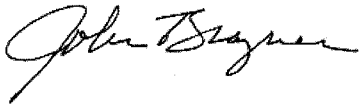


Jeffrey H. Braatne, PhD
Asst. Professor of Floodplain Ecology
Departments of Fish and Wildlife Resources
University of Idaho

R.A. Bourbonniere,
Environment Canada



G.L. Boyer
SUNY College of Environmental Science & Forestry

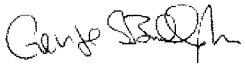


John Brazner
Former US EPA Research Fishery Biologist

Dr. Robert J. Brecha
Associate Professor
Associate Director, University Honors a nd John W. Berry, Sr. Scholars Program
Department of Physics and Electro-optics Program
University of Dayton

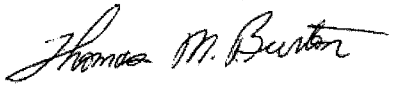
Signature Not Available
Stephen Brown, PhD.
Director, Shorebird Conservation Research Program
Manomet Center for Conservation Sciences

Signature Not Available
Kurt Brownell
Natural Resources Specialist
St. Paul District, U.S. Army Corps of Engineers
Mississippi River Natural Resource Project



G.S. Bullerjahn
Bowling Green State University

Signature Not Available
Gordon M. Burghardt
Alumni Distinguished Service Professor
James R. Cox Professor
Ecology & Evolutionary Biology
University of Tennessee



Tom Burton
Michigan State University

Signature Not Available
Jeb Byers, PhD
Assistant Professor of Ecology
Department of Zoology
University of New Hampshire

Signature Not Available
John Cairns Jr
University Distinguished Professor of Environmental biology Emeritus
Virginia Tech Blacksburg

Signature Not Available
Dr Parker E. Calkin
Professor Emeritus, Department of Geology, University at Buffalo, Buffalo, New York
Affiliate, Institute of Arctic and Alpine Research, U. of Colorado, Boulder

Signature Not Available
John R. Cannon, Ph.D.
Conservation Biologist
University of Maryland

H.J. Carrick
Pennsylvania State University

Signature Not Available
Michael Case
Research Scientist
World Wildlife Fund

Kai M. A. Chan, Asst Prof
Institute for Resources, Environment & Sustainability
University of British Columbia

Ted Cheeseman
CEO & expedition leader
Cheesemans' Ecology Safaris

Signature Not Available
Paul C. Chestnut
Consulting Engineer

Robert Cifelli
Research Scientist
Department of Atmospheric Science
Colorado State University

David Clapp
Michigan Department of Natural Resources
Charlevoix Fisheries Research Station

Signature Not Available
Amy L. Concilio
Science Associate
National Ecological Observatory Network

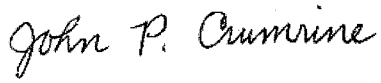
Signature Not Available
Dr. G. Dennis Cooke
Professor Emeritus
Biological Sciences
Kent State University

Signature Not Available
Jim Cotner
Moos Professor of Limnology
Department of Ecology, Evolution and Behavior
University of Minnesota

Bruce C. Cowell
Professor of Biology
University of South Florida

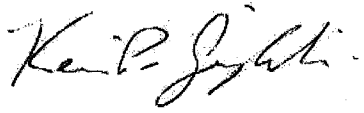
Signature Not Available
Dr. Dagmar Cronn
Professor of Chemistry and Director
Program in Environmental Health
Oakland University

Signature Not Available
Dr. James E. Crowfoot
Professor Emeritus of Natural Resources
and Urban and Regional Planning
Dean Emeritus of the School of Natural
Resources and Environment
University of Michigan



John Crumrine
Agriculture Project Manager
Heidelberg College

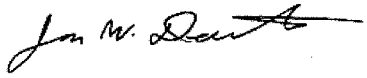
Signature Not Available
Herbert Curl, Jr., PhD.
Science Advisor
Seattle Audubon Society
Pacific Marine Environmental
Laboratory NOAA (retired)



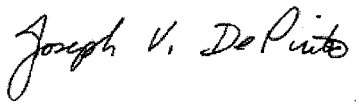
Kevin Czajkowski,
Associate Professor
University of Toledo

Signature Not Available
Robert T. Deck
Professor of Physics
Department of Physics and Astronomy
University of Toledo

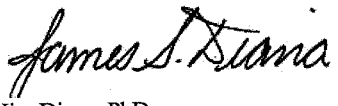
Pieter L. deHaseth
Professor
Center of RNA Molecular Biology
Case Western Reserve University



James W. Demastes
Associate Professor
Department of Biology
University of Northern Iowa



Joe DePinto, PhD.
Senior Scientist, LimnoTech, Inc

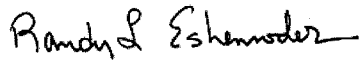


Jim Diana, PhD.
Professor, School of Natural Resources
and Environment
University of Michigan

Signature Not Available
Caroline Dieterle
Academic Adviser
University of Iowa

Fred C. Dobbs
Associate Professor, Department of
Ocean, Earth & Atmospheric Sciences,
Old Dominion University, VA

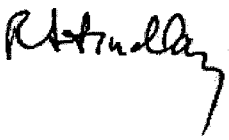
Gidon Eshel, Assistant Professor
Department of the Geophysical Sciences
University of Chicago



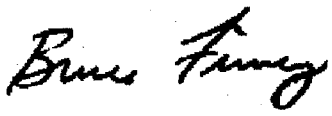
Randy L. Eshenroder
Science Advisor
Great Lakes Fishery Commission

Signature Not Available
Christine V. Evans, PhD
Professor and Chair, Department of Geosciences University of Wisconsin-Parkside

Signature Not Available
Steven Federman
Professor of Astronomy
University of Toledo



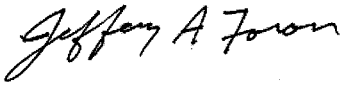
Rick Findlay
Director, Water Programme
Pollution Probe



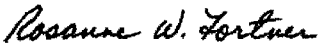
Bruce P. Finney
Professor, Institute of Marine Science
University of Alaska Fairbanks

Signature Not Available
Andrew T. Fisher
Board Member and Webmaster
Nutrition for Optimal Health Association (NOHA), IL

Signature Not Available
Sharon A. Fitzgerald
U.S. Geological Survey



Jeffrey Foran, Ph.D.
President
Midwest Center for Environmental Science and Public Policy



Rosanne Fortner
Associate Director
Stone Lab, School of Natural Resources
Ohio State University

Signature Not Available
Dr. Shannon Leone Fowler
University of California at Santa Cruz

Jed Fuhrman
McCulloch-Crosby Chair of Marine Biology
Department of Biological Science
University of Southern California

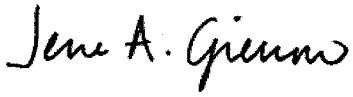
Signature Not Available
Diego Gabrieli
Engineer
Union of Concerned Scientists

Signature Not Available
Dr. Charles Gagen
Professor of Fisheries Science
Arkansas Tech University

Robert R. Gamache
Dean, Intercampus Graduate School of
Marine Sciences and Technology
Professor, Department of
Environmental,
Earth and Atmospheric Sciences
University of Massachusetts Lowell

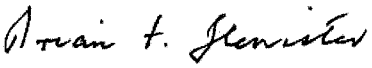
Donald Geiger
Department of Biology
University of Dayton

Signature Not Available
Charles C. Geisler
Professor, Development Sociology
Cornell University



Jesse Giessow
M.S. Plant ecology
President
Dendra Inc., CA

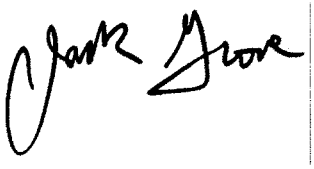
Signature Not Available
Claire W. Gilbert, Ph.D.
No Affiliation
Retired



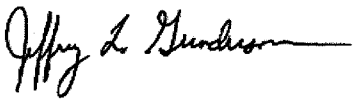
Brian F. Glenister
K. Miller Professor of Geology Emeritus
University of Iowa

C.J. Gobler
Stony Brook University, NY

Signature Not Available
David L. Gorchov
Associate Professor
Department of Botany
Miami University, OH

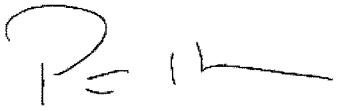


Jack Stein Grove, PhD
Research Associate
Natural History Museum
Los Angeles, CA

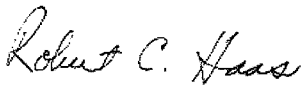


Jeff Gunderson
Interim Director Minnesota Sea Grant
University of Minnesota

Karlene Gunter
Assistant Professor
Department of Biochemistry and Biophysics
University of Rochester

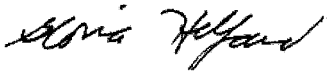


Peter M. Haas
Professor
Department of Political Science
University of Massachusetts



Bob Haas
Station Manager
Lake St Clair Fisheries Research Station
Michigan Department of Natural Resources

Signature Not Available
Robert T. Heath, Ph.D.
Professor, Biological Sciences
Director, Water Resources Research Institute
Kent State University



Gloria Helfand
Associate Professor
University of Michigan

Signature Not Available
Lee Hersh, PhD
Steuben Sierra Club Committee

Signature Not Available
Caroline Herzenberg, PhD
Physicist
Argonne National Laboratory (retired)

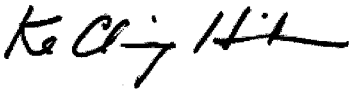
Signature Not Available
Deborah Hills-Haney
Sr. Research Chemist

Signature Not Available
David Hollenbach
Senior Research Scientist
NASA Ames Research Center

Thomas M. Holsen, Ph.D.
Professor
Clarkson University

Signature Not Available
Richard E. Hoskins, PhD MPH
Epidemiologist
WA State Department of Health &
University of Washington

Signature Not Available
George E. Host, Ph.D.
Director, Natural Resources GIS laboratory, Natural Resources Research Institute, University of Minnesota

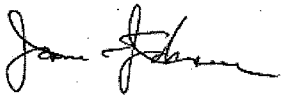


Ke Chiang Hsieh
Professor, Department of Physics, The University of Arizona

Signature Not Available
Laura L. Jackson
Professor of Biology
University of Northern Iowa

S. Taylor Jarnagin, Ph.D.
Research Ecologist, US EPA
Environmental Photographic
Interpretation Center (EPIC)

Signature Not Available
Barbara J. Javor, Ph.D
Consultant
Contractor to National Marine Fisheries
Service, La Jolla, CA
Consultant, Environmental
Microbiology



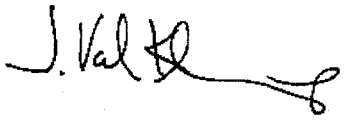
Jim Johnson
Station Manager
Alpena Fisheries Research Station
Michigan Department of Natural
Resources

Eugenia Kalnay
Distinguished University Professor
Department of Meteorology
University of Maryland

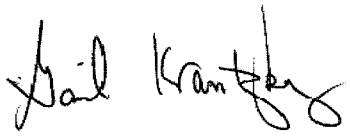
Signature Not Available
Les Kaufman
Professor of Biology, Boston University
Marine Program, Department of Biology

Jagjit Kaur, Ph.D.
Associate Scientist
CH2MHILL

Signature Not Available
Terry Kinzel, M.D., FACP
Associate Chief of Staff for Geriatrics &
Extended Care, VAMC



Val Klump
Director, Great Lakes WATER Institute
University of Wisconsin-Milwaukee

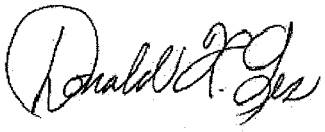


Gail Krantzberg
Professor and Director
Center for engineering and Public Policy
Mc Master University

Signature Not Available
Dr. Fred Kraus
Research Zoologist
Bishop Museum, Honolulu
Department of Natural Sciences
Bishop Museum

Signature Not Available
Doug La Follette
Secretary of State
Wisconsin

Signature Not Available
James M. Le Moine
Laboratory Manager
University of Michigan Department of Ecology & Evolutionary Biology

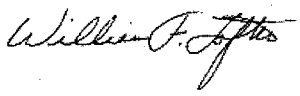


Dr. Donald H. Les, Professor
Department of Ecology & Evolutionary Biology
University of Connecticut

Signature Not Available
William Z. Lidicker, Jr.
Professor of Integrative Biology
Emeritus
University of California Berkeley

Signature Not Available
Irvin Lindsey
Director of Outdoor Science Exploration
California

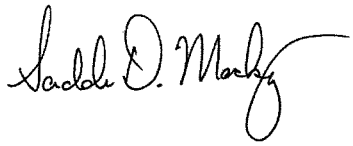
Signature Not Available
Lynn M. Little, PhD
Assistant Dean for Academic Affairs,
Southwestern Allied Health Sciences,
School The University of Texas
Southwestern Medical Center



William F. Loftus, Ph.D.
USGS-Florida Integrated Science Center
Everglades National Park Field Station

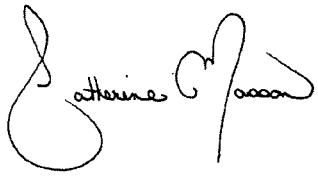
Eric D. Loucks, Ph.D., PE
Water Resources Engineer, CDM

Orie Loucks, Ph.D.
Miami University



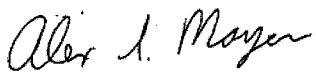
Scudder Mackey
Owner and Principal
Habitat Solutions

Jack Manno
Executive Director
Great Lakes Research Consortium



Catherine Masson
MES
Toronto, Ontario, Canada

Jack Mattice, PhD.
Director, New York Sea Grant
State University of New York



Alex Mayer
Professor
Department of Geological & Mining Engineering & Sciences
Michigan Technological University

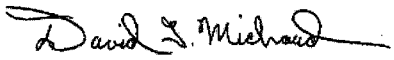
Signature Not Available
Carl N. McDaniel
Professor of Biology
Rensselaer Polytechnic Institute

R.M.L. McKay
Bowling Green State University

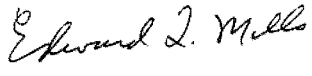
Signature Not Available
Richard H. McNutt
President
Tidewaters Gateway Partnership Inc.

Signature Not Available
Michael Nelson Melampy
Professor of Biology
Baldwin-Wallace College

Signature Not Available
John J. Metz
Associate Professor of Geography
Department of History and Geography
Northern Kentucky University



Dave Michaud, Principle Environmental Scientist, Wisconsin Energy Corporation



Edward Mills
Cornell University

Susanne C. Moser, Ph.D.
Institute for the Study of Society and Environment (ISSE), National Center for Atmospheric Research

Michael P. Moulton, Associate Professor
Department of Wildlife Ecology and Conservation
University of Florida

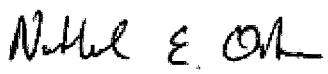
Signature Not Available
John P. Nelson, Ph.D.
Chair, Division of Science & Mathematics
Bethel College

Signature Not Available
Lusetta Nelson
Botanist
Native Plant Society of Oregon

Raymond M. Newman
Professor and Director of Graduate Studies, Water Resources Science
University of Minnesota

Eric Obert
Associate Director, Pennsylvania Sea Grant
Penn State University

Signature Not Available
Karl Ostrom, PhD
Co-Director
Network for Business Innovation and Sustainability



N.E. Ostrom
Michigan State University

Signature Not Available
Dr. Joseph F. Pachut, Jr.
Department of Earth Sciences, IUPUI
Indianapolis, IN

Signature Not Available
Ronald C. Parker, Ph.D.
University of California Cooperative Extension

Signature Not Available
Jae Pasari
PhD Student
University of California, Santa Cruz
Department of Environmental Studies

Signature Not Available
Michael Paterson MD
Colorado Nature Conservancy, Sierra Club

Gustav Paulay
Associate Professor/Curator
University of Florida

Alicia Perez-Fuenteteja
Director, Environmental Science Program
SUNY-Fredonia

Signature Not Available
Dan Petersen
Associate Professor
University of Cincinnati
Dept of Environmental Sciences

Signature Not Available
Daniel David Petersen
Supervising Biologist
USEPA, Office of Research and Development
University of Cincinnati

Signature Not Available
Louis Potash, Ph.D.
Director, Vaccine Development
Novavax, Inc

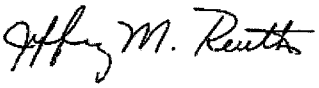
Ross D. Powell
Distinguished Research Professor
Department of Geology and
Environmental Geosciences
Northern Illinois University

Signature Not Available
Ana Isabel Prados
Assistant Research Scientist
University of Maryland, Baltimore
County

Charles Ramcharan
Department of Biology,
Laurentian University, Ontario

Jennifer Read
Assistant Director & Research
Coordinator
Michigan Sea Grant

Signature Not Available
Margaret Anga Rebane
Secretary, Nevada Natural Resource
Education Council



Jeff Reutter, PhD.
Director, Ohio Sea Grant
Ohio State University

Signature Not Available
Ann F. Rhoads, PhD
Senior Botanist, Pennsylvania Flora
Project Morris Arboretum of the
University of Pennsylvania

Signature Not Available
Anthony Ricciardi
Redpath Museum
McGill University, Quebec

Pete Richards
Water Quality Hydrologist
Heidelberg College, OH

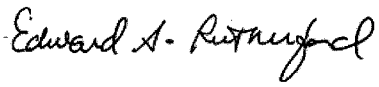
Signature Not Available
Don Richardson, M.D
Physician and board member of a
national medical organization

Signature Not Available
Kit Robinson
Coordinator
The WatershedWeb Initiative

Signature Not Available
Paul W. Rosenberger
Manhattan Beach, CA

Signature Not Available
Michael W. Rowan
Assistant Professor of Biology
Cuyahoga Community College

Signature Not Available
C. S. Russell, Ph.D.
Professor Emerita of Chemistry &
Biochemistry, City College of New York
(CCNY) of the City University of New
York (CUNY)



Edward Rutherford
Associate Research Scientist
University of Michigan

Signature Not Available
Robert E. Rutkowski
Topeka, KS

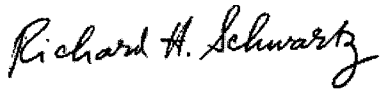
Signature Not Available
Dr. Carlton Salvagin, Professor Emeriti
Department of Technology
State University of New York – Oswego

Signature Not Available
Pete Sampou, Ph.D.
Union of Concerned Scientists

Signature Not Available
Dr. Katherine N. Schick
Assistant Curator, Essig Museum of
Entomology, University of California

Philip Schneeberger
Station Manager
Marquette Fisheries Research Station
Michigan Department of Natural
Resources

Signature Not Available
James F. Short, Jr
Professor Emeritus,
Department of Sociology and the Social
and Economic Research Center
Washington State University



Richard H. Schwartz, Ph.D.
Professor Emeritus, College of Staten
Island

Gerald Sgro,
Research Adjunct
John Carroll University

Signature Not Available
Harvey Shear, Ph.D.
University of Toronto at Mississauga

Signature Not Available
David Shepard
President
Sky WindPower Corporation

Signature Not Available
Dr. Brian R. Shmaefsky
Professor of Biology
Kingwood College, TX

Signature Not Available
Dr. Kristin Shrader-Frechette
O'Neill Family Professor
Department of Biological Sciences,
Department of Philosophy
University of Notre Dame

Signature Not Available
Robert Siebert,
Engineer, retired

Signature Not Available
Dr. C. J. Sing
President, TRIOID International Group,
Inc

Signature Not Available
Joseph Siry, UCSB, Ph.D. 1981
Environmental Historian, River, shoreline and wetland restoration specialist
Rollins College, Winter Park, Florida

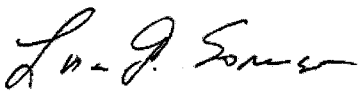
Clifford Slayman
Professor of Physiology
Yale School of Medicine, CT

Signature Not Available
John E. Smedley
Professor
Bates College, ME

Signature Not Available
Carey C. Smith, M.S.
Director of Regulatory Affairs
Merrimack Pharmaceuticals, Inc.

Signature Not Available
Gerald Smith Ph.D.
Curator Emeritus, Museum of Zoology
University of Michigan

Val H. Smith
Professor
Department of Ecology and Evolutionary Biology
University of Kansas



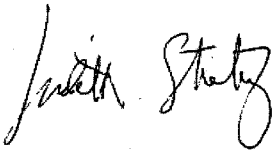
Lisa G. Sorenson, Ph.D.
Adjunct Assistant Professor
Boston University, MA

Signature Not Available
Gilbert Steiner
Professor Emeritus
Fairleigh Dickinson University
Vancouver

Alan Steinman, PhD.
Director, Annis Water Resources Institute
Grand Valley State, MI

R.D. Stevenson
Dept. of Biology
University of Massachusetts Boston

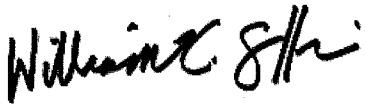
Signature Not Available
Dr. John M. Stewart
Emeritus Professor of Psychobiology
Northland College, WI



Judith Stribling, PhD
Associate Professor
Department of Biological Science
Salisbury University, MD

Signature Not Available
Anthony C Steyermark
Assistant Professor, Biology
Department of Biology, University of St. Thomas, MN

Signature Not Available
Dr. Barbara K. Sullivan
Senior Marine Research
Scientist/Adjunct Faculty Graduate
School of Oceanography University of
Rhode Island



William Sullivan, PhD.
Interim Director IN/IL Sea Grant
University of Illinois-UC

Signature Not Available
Dennis E. Sweitzer, PhD
Principal Statistician
AstraZeneca Pharmaceutical

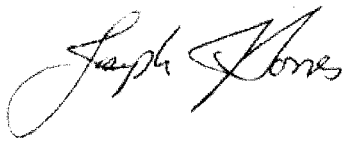
Signature Not Available
Dennis J. Taylor
Professor of Biology
Director of Academic Programs
James H. Barrow Field Station
Hiram College, OH

Signature Not Available
Walter K. Taylor, Ph.D.
Professor Emeritus of Biology
University of Central Florida

Signature Not Available
Gwendolyn H Tenney
Graduate Assistant
University of Toledo

David L. Thomas, PhD
Chief, Illinois Natural History Survey
Champaign, IL

Signature Not Available
Paul F. Torrence, Ph.D.
Professor of Chemistry and
Biochemistry
Northern Arizona University



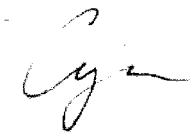
Joseph J. Torres
Professor
College of Marine Science
University of South Florida

Signature Not Available
Vicki Tripoli, PhD
Environmental Scientist, Research
Consultant, Headwaters & Ashland
School of Environmental Technology,
OR

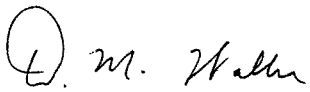
M.R. Twiss
Clarkson University

Dr. Donald G. Uzarski
Assistant Professor
Grand Valley State University
Annis Water Resources Institute
Lake Michigan Center

Signature Not Available
Douglas P Verret
IEEE Fellow
Texas Instruments, Inc., TX



Cyrus Wadia
PhD Candidate, UC Berkeley
Faculty - Part Time, College of Marin, CA



Don Waller
Dept. of Botany
University of Wisconsin

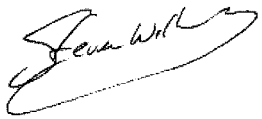
Signature Not Available
Charlotte R. Ward, Ph. D.
Associate Professor of Physics Emerita
Auburn University, AL

Dave Watkins Ph.D.
Associate Professor
Dept. of Civil & Environmental Engineering
Michigan Technological University

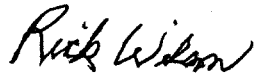
Signature Not Available
John M. Waud, PhD
Professor Environmental Science
Department of Biological Sciences
Rochester Institute of Technology

Signature Not Available
Leroy S. Wehrle
Professor Emeritus,
Environmental Economics, University of Illinois at Springfield

Signature Not Available
Julie L. Whitbeck
Assistant Professor – Research,
University of New Orleans



Steven Wilhelm, Ph.D.
Associate Professor
University of Tennessee



Rick Wilson
Coastal Management Coordinator
Surfrider Foundation, CA

James M. Winter
Professor Emeritus
Wentworth Institute of Technology, MA

Signature Not Available
Michael Wollman
Professor Emeritus of Electrical Engineering Cal Poly, CA

Signature Not Available
Donald J. Wuebbles
Executive Coordinator, School of Earth, Society, and Environment
Professor, Department of Atmospheric Sciences, University of Illinois

TESTIMONY OF CHARLES WOOLEY, DEPUTY REGIONAL DIRECTOR, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, BEFORE THE HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

September 13, 2006

Mr. Chairman and Members of the Subcommittee, I am Charles Wooley, Deputy Regional Director of the U.S. Fish and Wildlife Service's (Service) Midwest Region. I am pleased to have the opportunity to provide you an update on one of the Administration's environmental priorities, restoring and protecting the Great Lakes. With our partners, we have taken many promising actions since President Bush signed the Great Lakes Executive Order in May 2004. Specifically, I would like to discuss the Administration's ongoing commitment to restore and protect the Great Lakes, including progress regarding the Great Lakes Interagency Task Force and the Great Lakes Regional Collaboration.

The Great Lakes are the largest single source of fresh surface water in the Western Hemisphere. The Great Lakes ecosystem drains 288,000 square miles with 9,000 miles of shoreline, 5,000 tributaries and 30,000 islands. The Service's survey data indicate that fishing, hunting and wildlife watching generate nearly $18 billion in annual revenue in the Great Lakes region. In collaboration with others, the Service addresses natural resource issues that affect the fish, wildlife and habitats of the Great Lakes basin, as well as the 35 million people who live there.

In May 2004, the President signed Executive Order 13340 affirming the federal government's commitment to address environmental and resource management issues in the Great Lakes basin.

The Service's mission to conserve, protect and enhance fish, wildlife and their habitats, uniquely positions us to provide leadership in the areas of habitat, fish and wildlife, invasive species, and other natural resource information and indicators in the Great Lakes Basin. The Service has staff in 58 field stations, two regional offices and the Washington Office that serve the Great Lakes basin, coordinating and facilitating projects, working with partners, and leveraging resources.

Habitat and Fish and Wildlife

Great Lakes habitat loss and degradation is a pressing concern. The Great Lakes region has lost more than half its original wetlands and 60 percent of its forest lands, and the region only has small remnants of other habitat types such as savannah and prairies. These impacts are of concern to human health and prosperity, as well as the sustainability and biodiversity of Great Lakes wildlife, fish, and their habitats. Natural habitats and native fish and wildlife communities play a critical role in maintaining ecosystem health and function and contribute to the social and economic vitality of both the region and the nation.

The Administration strongly supports wetlands restoration efforts. In 2004, the President announced a bold initiative to restore, enhance, and protect three million acres of wetlands nationwide over five years. Specific to the Great Lakes region, the federal government,

including the Service, will join the states and private partners in an equally shared effort to develop wetland restoration plans that will enhance and protect a total of 200,000 acres over the next several years.

The Service implements a range of programs that contribute directly to restoring fish and wildlife species and their habitats in the Great Lakes. For example, in 2005 alone, the Service awarded $2.1 million in North American Wetlands Conservation Act grants to restore, protect and enhance 3,671 acres in the Great Lakes basin. We have worked with stakeholders through our Partners for Fish and Wildlife Program and the Great Lakes Coastal Program to restore and enhance wetlands and stream miles in the Great Lakes. We are often called upon to support protection of ecologically important coastal areas and wetland restoration, and through the Fish Passage Program we work to eliminate or modify barriers to allow passage of fish in Great Lakes waterways.

Through settlements under our Natural Resource Damage Assessment and Restoration Program, the Service restored and enhanced 955 acres of wetlands, and we awarded $3.8 million in National Coastal Wetlands Conservation Grants in FY 2005 for partners to acquire 1,859 acres of wetlands along lakes Michigan and Superior. National fish hatcheries have stocked more than 30 million yearling lake trout in the Great Lakes over the past 10 years, contributing to lake trout recovery in Lake Superior.

The Great Lakes region is the ancestral homeland of 33 federally recognized Indian tribal nations whose reservations are located in the basin or who retain treaty-guaranteed rights to hunt, fish or gather in the basin. Tribal communities rely on Great Lakes natural resources to meet their subsistence, economic, cultural, medicinal, and spiritual needs. The Service recognizes its tribal trust responsibility and the important role of the tribal nations in protecting the Great Lakes. Some examples of our stewardship responsibilities and cooperative efforts with our tribal partners include fisheries assessment work with coaster brook trout, sturgeon, lake whitefish, sea lamprey and Eurasian ruffe; bird assessment work with sora, Virginia and yellow rails; and work under the 1836 and 1842 Treaties and the August, 2000 Consent Degree in *U.S. v. Michigan*.

Invasive Species

Introduction and establishment of invasive species in the Great Lakes is occurring at an alarming rate. More than 160 non-native aquatic species are established in the Great Lakes, and during the last several decades, populations of non-native species have been discovered at an average rate of one every eight months. Invasive species can inflict ecological damage – 42 percent of the threatened and endangered species in the United States are affected by invasive species.

Prevention of invasive species introductions and control of established populations of invasive species are critical actions to sustain and enhance ecosystem integrity and the social, economic and cultural uses the Great Lakes ecosystem supports.

As co-chair of the Aquatic Nuisance Species (ANS) Task Force, along with the National Oceanic and Atmospheric Administration, the Service provides technical and financial assistance to the ANS Great Lakes Regional Panel to help develop State ANS management plans and to support

prevention, control and outreach activities in the region. Currently, as co-chair of the ANS Task Force, the Service is leading the development of a National Management and Control Plan for the Asian Carp.

In addition to the Asian carp, the Service works to combat the spread of other invasive species in the Great Lakes, including the round goby and zebra mussels. Working with our partners through outreach programs such as the Stop Aquatic Hitchhikers! Campaign and the 100th Meridian Initiative, the Service supports efforts to educate the public on ways to prevent the spread of these harmful organisms.

The binational Sea Lamprey Control Program, which is administered by the Great Lakes Fishery Commission, is one example of a successful collaborative effort to control aquatic invasive species. The program's efforts have resulted in a 90 percent decline in sea lamprey abundance in the Great Lakes. Acting as agents of the of the Great Lakes Fishery Commission, the Service, U.S. Geological Survey, Canada's Department of Fisheries and Oceans, and many other partners implement this program which is a model for integrated pest management programs to control other aquatic invasive species in the Great Lakes.

The Service is also working with the Midwest Natural Resources Group, a partnership of 13 federal agencies, to develop an action plan to coordinate and develop inventories, mapping and treatment for terrestrial invasive species in the basin.

Information and Indicators

A successful restoration strategy for the Great Lakes must also include an informed decision making process based on consistent methods to measure and monitor key indicators of the ecosystem's function. Such measurements need to occur before and after the initiation of restoration efforts on local and basin-wide scales. Once collected, information must be compiled and communicated consistently to inform the restoration process, decision makers and the public. These activities will provide resource managers, elected officials and other stakeholders with the timely, accurate and cost-effective information necessary for making decisions about the protection and restoration of the Great Lakes ecosystem to sustain healthy societies, economic activities and natural systems.

The Great Lakes Fish and Wildlife Restoration Act (Act), enacted by Congress in 1990, has enabled the Service to facilitate partnerships with a wide range of federal, tribal, state, and local governments and private entities, as well as with Canada, to create a basin wide program to assess the ecological status of the Great Lakes. Projects under the Act that provide important environmental indicators include the design of geographic information systems describing the state of fish and wildlife habitats in the Great Lakes and studies of issues such as the occurrence of Botulism type E in Lake Erie. The Service appreciates Congress' interest to reauthorize this important Act and looks forward to working with Congress in support of reauthorization.

In addition, the Service will continue to update the National Wetlands Inventory (NWI), which provides valuable information to help guide restoration efforts. The NWI is also important in

tracking the progress in achieving the President's goal of attaining an overall increase in the amount and quality of our Nation's wetlands.

In closing, Mr. Chairman, the Service, through its programs and partnerships with others, supports continued efforts to restore and protect the Great Lakes and surrounding waters. We are committed to working with our many partners to ensure healthy fish and wildlife resources in the Great Lakes and to enhance and restore the health of this ecosystem. I congratulate our many partners on the progress made in the collaboration, and I especially appreciate the Environmental Protection Agency's role in helping achieve our goals.

The Great Lakes ecosystem faces many threats – from invasive species to contaminants to loss of coastal habitats. The Service stands ready to continue our role in fish and wildlife restoration and to expand our work with partners to make the world's largest freshwater ecosystem a balanced and healthy environment.

This concludes my testimony. I appreciate the opportunity to appear before the Subcommittee, and I would be pleased to answer any questions you have.

HEALING OUR WATERS

Meeting The Challenge of Great Lakes Restoration

Before the House Transportation and Infrastructure's Subcommittee on Water Resources and Environment
Hearing on the Great Lakes Regional Collaboration's Strategy to Restore and Protect the Great Lakes

Testimony of Andy Buchsbaum
Director, Great Lakes Office of the National Wildlife Federation
Co-Chair, Healing Our Waters® – Great Lakes Coalition

September 13, 2006

Mr. Chairman, members of the Committee, thank you for this opportunity to submit testimony on this issue of critical national importance: Great Lakes protection and restoration. My name is Andy Buchsbaum, and I am the Co-Chair of the broad-based national Healing Our Waters®–Great Lakes (HOW) Coalition. The HOW Coalition is dedicated to the protection and restoration of the Great Lakes. We are truly national in scope with 85 national, regional, state and local organizations. These include Great Lakes state and regional conservation organizations such as the Alliance for the Great Lakes, Great Lakes United, and the Michigan United Conservation Clubs; national organizations like Ducks Unlimited, National Wildlife Federation, National Parks Conservation Association, Trout Unlimited, the Sierra Club, The Nature Conservancy, and the Audubon Society; educational institutions such as Shedd Aquarium and Brookfield Zoo; and government representatives such as the County Executives of America. A full list of the Healing Our Waters Coalition accompanies this testimony as Appendix A.

My testimony will focus on three areas: the importance of a healthy Great Lakes to our nation and families; the accelerating deterioration of the Great Lakes that is currently underway; and the critical role of the Great Lakes Regional Collaboration recommendations in stopping and reversing the lakes' precipitous decline. The bottom line is this: delaying investments in the Great Lakes will make future actions far more costly and likely result in irreversible damage to this national and global treasure. Investing in Great Lakes restoration and protection now will earn a significant economic and ecological return for the families of the region and the nation.

The Great Lakes: A <u>National</u> Priority

The Great Lakes certainly define the region for the 42 million people who live there. They mean more to us than places to swim or fish or hike; more than places to watch a beautiful sunset or hike through some of the world's most beautiful dunes, national parks and lakeshores; more than our source of drinking water; more than the lifeblood of commerce and industry. For those of us who live here, they are part of our way of life and how we define our future and ourselves. When I was growing up outside Chicago, the high points of each summer were my

trips to Chicago's North Avenue Beach, the Indiana Dunes, and Michigan's Warren Dunes. My friends and I would play in the water, race down the dunes, and watch the incredible sunsets over waters so vast you cannot see the other side. And now my family is reprising those wonderful memories. The best part of my sons' summers are when we go up north to roam the shoreline of Lake Superior, swim in the bone-biting cold of its waters, and watch the sun set over its vast expanse of blue. The lakes create the memories that bind my family and millions of others, and link my generation with my parents' and my children's. They are the defining features of our community and our world, our continuing constant.

So it is no surprise that the Great Lakes are a top priority for those of us who live there. A 2003 Joyce Foundation poll asked Great Lakes residents if protecting and restoring the Great Lakes is important. Ninety six percent said yes! This response shows how closely we identify with our home.

The health of the Great Lakes is important not to just those that live there, however, but to every American as well. These Lakes define our nation's geography and history. They constitute 95 percent of the surface freshwater in the United States. They have a coastline of 10,000 miles – longer than the combined U.S. coastlines of the Atlantic and Pacific Oceans. They supply the drinking water, shipping, recreation, and economic lifeblood to millions of people in eight states. They constitute a 1,000-mile border between the U.S. and Canada. They are continental features that attract migratory birds from the Canadian Arctic to South America. Millions of migratory waterfowl breed in the Great Lakes and then fly to the eastern and southern U.S. to supply hunters and birdwatchers from New Jersey to Louisiana.

The Great Lakes are truly a national treasure. Tom Kiernan, the President of the National Parks Conservation Association and co-chair of the Healing Our Waters Coalition puts it this way: "The Great Lakes are national icons, a beautiful natural treasure you can see from space. Like the majestic Grand Canyon and Everglades, these inland oceans help define the soul of a region and the landscape of a nation." Their national importance has prompted 11 national organizations to actively participate in the Healing Our Waters campaign to protect and restore them. Leaders from around the country – including those from the Chesapeake Bay, Restore America's Estuaries, Everglades, and Coastal Louisiana, each of which also have pressing needs for restoration – understand the national importance of the Great Lakes and their need for protection and restoration:

"Like the Chesapeake Bay, the Great Lakes are resources of national significance. They have helped shape our history as a nation and they have provided immeasurable recreational, economic, and cultural opportunities for our citizens. Unfortunately, they share a history of insufficient investment in their protection and restoration. National attention, national funding, and national commitment to the restoration of natural resources like the Chesapeake Bay and the Great Lakes is critical for us, as a nation, to ensure a legacy of clean water, abundant fisheries, and economic development for future generations." Roy A. Hoagland, Esq., Vice President, Environmental Protection and Restoration, Chesapeake Bay Foundation

"The Great Lakes are extraordinary resources of national importance, and they require national attention and funding to get back to health. Like the Great Lakes, many of our nation's Great Waters - such as Puget Sound, the Louisiana Coast, the Everglades or

Chesapeake Bay -- are in grave condition. Investments in the restoration of these critical ecosystems will repay us many fold, and will benefit the nation as a whole." Mark Wolf-Armstrong, CEO of Restore America's Estuaries.

"The Great Lakes are of national importance. If we can't save Coastal Louisiana, we can't save the Great Lakes, and vice versa. It can't be that we have to choose one place over another, or we'll be set up to fail everywhere. The consequences to the nation of inaction or delay are enormous. We cannot afford to wait, either here in Coastal Louisiana or in the Great Lakes." Mark Davis, Director, Coalition to Restore Coastal Louisiana

"As America's Everglades is a unique national treasure, so too are the Great Lakes. The people of the Great Lakes region support restoring the Everglades, and we support restoring the Great Lakes." Everglades Coalition

Our Coalition appreciates their support and we support their efforts to protect these national resources as well.

The Great Lakes' economic importance to the Midwest and the nation is also immense. The Great Lakes annually generate billions of dollars of economic revenue directly:

- Tourism in Ohio is a $7 billion industry sustaining over a quarter of a million jobs.
- In Michigan, tourism generates $16 billion annually, and in Wisconsin, $11.8 billion.
- Hunting, fishing and wildlife watching account for more than $18 billion annually in the Great Lakes states.

But the economic impact of the Great Lakes is far greater than this. Twenty-five million people rely on the Great Lakes for their drinking water. Industries such as auto, power, agriculture, and steel depend on them to supply their industrial processes. Consumers and businesses throughout the region and the nation rely on them for the shipment of goods such as grain, steel, and manufactured goods. The Great Lakes define not just the recreational and ecological footprint of the region; they drive the economic opportunities in the Midwest.

The economy of this region is vitally important to the nation. The Great Lakes region produces one-third of the nation's economic gross state product. The Great Lakes are the natural infrastructure that supports this productivity; their health is critical to economy of the Midwest and the nation.

The Healing Our Waters Coalition will be better able to demonstrate what we already know: investing in Great Lakes restoration and protection is good for our nation's economy as it is for our families and environment. We are partnering with the Council of Great Lakes Industries, the Great Lakes Cities Initiative, and the Brookings Institution to produce an independent study of the ways in which investing in Great Lakes ecosystem restoration will support the economy of the region. We will be happy to share it with the Subcommittee when our work is complete next year.

A Resource In Peril: "Ecosystem Breakdown"

Despite their vast size, the Great Lakes are fragile and need our nation's help. In recent years, the Great Lakes have been increasingly plagued by beach closings due to untreated sewage; invasions by harmful exotic species (on average, one new invasive species enters the Great Lakes every eight months); contamination of sport and commercial fisheries; and loss of habitat for wildlife. Each of these and other problems has been viewed as a separate challenge to be researched and addressed independently; few have tried to assess the condition of the Great Lakes as an ecosystem and design solutions on that basis. Until last year.

Last December, over sixty of the leading scientists in the Great Lakes region issued an alarming report. In a paper titled "Prescription for Great Lakes Ecosystem Protection and Restoration"[1], the scientists concluded that the Great Lakes are experiencing an historic crisis. Deterioration of large sections of their ecosystem is accelerating dramatically, and if not addressed now, the damage is likely to be irreversible. In their own words:

> "There is widespread agreement that the Great Lakes presently are exhibiting symptoms of extreme stress from a combination of sources that include toxic contaminants, invasive species, nutrient loading, shoreline and upland land use changes, and hydrologic modifications. . . . .In large areas of the lakes, historical sources of stress have combined with new ones to reach a tipping point, the point at which ecosystem-level changes occur rapidly and unexpectedly, confounding the traditional relationships between sources of stress and the expected ecosystem response. *There is compelling evidence that in many parts of the Great Lakes we are beyond this tipping point. Certain areas of the Great Lakes are increasingly experiencing ecosystem breakdown*, where intensifying levels of stress from a combination of sources have overwhelmed the natural processes that normally stabilize and buffer the system from permanent change."[2] (Emphasis added)

Over 200 scientists from around the country, including from California, Hawaii, and Tennessee, have endorsed the report.

The scientists' report was a surprise to the public because to many, the Great Lakes and their tributaries seem to be improving. Due to fundamental policy shifts like the Clean Water Act, massive government investment in better sewers, and responsible private initiatives, rivers no longer catch fire, Lake Erie has come back from the dead, the water often looks clearer, and many pollutant indicators have improved. But such observations only scratch the surface, and the scientists looked much deeper to find an ecosystem in crisis. They have documented:

- The destruction of the foundation of the Great Lakes food web in many of the Great Lakes. Populations of the basic food group for most fish, a freshwater shrimp called *Diporeia,* have declined from over 10,000 per square meter of lake bottom to virtually zero over vast stretches of Lake Michigan and the other Great Lakes. The scientists cannot be sure, but they believe the decline is linked to the infestation of the Great Lakes

[1] http://restorethelakes.org/PrescriptionforGreatLakes.pdf
[2] http://restorethelakes.org/PrescriptionforGreatLakes.pdf, P.1

by an invasive species, the zebra mussel, which colonizes the lakebeds in thick mats of shells that extend for acres and leaves the surrounding lakebeds barren of life. The National Wildlife Federation produced a report describing the devastating impact that invasive species have had on the Great Lakes in a report titled *Ecosystem Shock* that can be found on the Healing Our Waters Coalition website at www.restorethelakes.org/reports.html.

- Lake Erie's so-called "dead zone," an area deprived of oxygen, has reappeared in central Lake Erie. Accompanying this anoxic zone is the return elsewhere in the lake of blue-green (toxic) algae blooms and episodic die-offs of fish and fish-eating birds from avian botulism. Scientists are seeing similar eutrophication problems in Lake Huron's Saginaw Bay and Lake Michigan's Green Bay.

- Many fish populations are showing signs of stress and decline in the Great Lakes. Scientists have found "widespread decline in growth, condition and numbers of yellow perch, lake whitefish, and other valuable fish species in Lake Michigan and portions of Lake Huron."

The scientists concluded that these and other large-scale ecosystem changes result from the loss of the Great Lakes' capacity to buffer themselves against sources of stress – essentially, damage to the Great Lakes immune system. Much of the buffering capacity for the Great Lakes comes from healthy near-shore communities and tributaries. As these areas are damaged by pollution, hydrologic modifications, invasive species, and shoreline development, they lose their capacity to buffer the Great Lakes. Without that buffering capacity, each new stress – whether it be an invasive species or additional pollution – can set off a cascade of damage to the ecosystem that occurs rapidly and unexpectedly. In the scientists' words:

> "In the Great Lakes, nonlinear changes are no longer a future threat–these types of changes are taking place now. While in some areas some indicators of ecosystem health have continued to improve over the past decade, other large areas of the lakes are undergoing rapid changes where combinations of effects of old and new stresses are interacting synergistically to trigger *a chain reaction process of ecosystem degradation. The rapidness of this chain-reaction process, seen over the past five to fifteen years and involving sudden and unpredictable changes, is unique in Great Lakes recorded history.*"[3] (Emphasis added)

As alarming as the scientists' diagnosis is, they have also identified concrete and achievable remedies:

- *Restore* Great Lakes buffering capacity (their immune system) by restoring the ecological functions of their near-shore communities and tributaries. On the ground, this means restoring coastal and riverine wetlands, making shorelines and watercourses more natural, and improving tributary health;

[3] http://restorethelakes.org/PrescriptionforGreatLakes.pdf, P.8

- *Remediate* the practices that cause the sources of stress. This means reducing pollution and new damaging habitat alterations and stopping the entry of new invasive species;

- *Protect* the functioning parts of the ecosystem from new impairments, particularly through sustainable development practices; and

- *Measure* the health and health trends of the Great Lakes to evaluate the effectiveness of the measures taken above.

As discussed below, these remedies are reflected in the Great Lakes Regional Collaboration's Strategy to Restore and Protect the Great Lakes.

Saving the Great Lakes: The Great Lakes Regional Collaboration

Given the national significance of the Great Lakes and their accelerating deterioration, the Great Lakes Regional Collaboration ("GLRC") recommendations come just in time. The Collaboration is truly an historic event in two important respects. First, it is the first time that all levels of government and virtually all private stakeholders have come together to draft and support a single Great Lakes restoration plan, the "Great Lakes Regional Collaboration Strategy." Over 1,500 people participated in the drafting of the final plan, including cities, counties, state agencies, tribal representatives, federal agencies, Congressional staff, businesses, conservation organizations, university scientists, and concerned citizens. Many of the scientists who drafted the "Prescription" report actively participated in the Collaboration, helping to shape it to reflect the diagnosis and solutions in the report. Healing Our Waters Coalition members also were highly engaged, as were members of industry.

The resulting Strategy sets a second precedent: it is the most comprehensive Great Lakes restoration and protection plan in history. It documents virtually all of the problems besetting the Great Lakes; it recommends concrete solutions; it identifies programs to implement those solutions; and it recommends the funding needed for those programs to succeed.

The Healing Our Waters Coalition is fully supportive of the Strategy's recommendations. Because it is the product of a large and arduous negotiation process, it certainly is not perfect, but it is by far the best blueprint the Great Lakes have ever had for protection and restoration. And if it is implemented quickly, it will give the lakes a chance to reverse the "chain reaction of degradation" the scientists have identified.

The Strategy's recommendations are a mix of improvements to existing programs, new program recommendations, and substantial new investments of federal, state, tribal and private resources. This mix is appropriate. Some efficiencies and progress can be gained by improving existing programs and improving coordination among them. So, for example, modifying the Great Lakes Legacy Act will improve delivery of funds to clean up Areas of Concern. But simply improving existing programs is not nearly enough; even if the Legacy Act cleanups are made more efficient, they are woefully underfunded – only $29 million this year, when the AOC cleanup costs could exceed $3.0 billion. For that reason, the GLRC Strategy did not only

recommend modifying the Legacy Act program; it also recommended substantial funding of $150 million annually.

Likewise, improvements to existing programs are not enough when no effective program exists. The primary example is invasive species. Scientists generally agree that invasive species are the worst problem facing the Great Lakes. Over 185 invasive species have been discovered to date with the most recent being the discovery of an invasive snail introduced through ballast water near Duluth, Minnesota. Invasive species wreak havoc on the Great Lakes, its fisheries, and its businesses. The GLRC estimates that the economic costs of invasive species to the Great Lakes are over $4 billion per year. The most common pathway of invasive species into the lakes is via the discharge of ballast water from ocean-going ships. Yet there is no effective program for stopping those discharges. The Coast Guard acknowledged in the Federal Register that its current programs to control those discharges are ineffective. To address invasive species the GLRC recommends a bold comprehensive new program: new legislation and regulations to set and implement ballast water discharge standards that reflect the best technology available and protect the Great Lakes.

For the purposes of today's testimony, I will focus on the larger programmatic and funding recommendations of the GLRC Strategy; but I want to emphasize that there are also important recommendations to improve existing programs that I will not discuss today. The major changes recommended by the Strategy and fully endorsed by the Healing Our Waters Coalition include:

- Create a net increase of 550,000 acres of wetlands and 335,000 acres of buffer strips by 2010. This recommendation, made by both the habitat and nonpoint source strategy teams, is not only critical to restoring the buffering capacity of the Great Lakes, it also aligns perfectly with the scientists' "Prescription" report. Losses of wetlands and riparian buffers have impaired coastal and tributary health; they have magnified pollution pathways; and they have disturbed native species, facilitating the establishment of invasives. In addition to their well-known filtering capacity for chemical pollutants, wetlands can actually repel invasive species and reduce an outbreak after they have become established. More fundamentally, they stabilize aquatic systems, making them more resilient to stress. Implementing this recommendation will not only require new federal and state funding; it will also require changes to the way that agencies make decisions in selecting the wetlands to be restored.

- Eliminate the discharge of untreated or inadequately treated sewage into the Great Lakes system through new funding and better enforcement. This recommendation would provide $13.75 billion of federal, state, and local dollars over five years to upgrade sewage treatment practices to stop untreated sewage from damaging the Great Lakes and their tributaries. These funds are critical both to protect the health of summer beach-goers and to reduce one of the largest sources of stress to the near-shore coastal communities so important to the Great Lakes immune system. The federal share (in a 55/45 match) would be $7.355 billion.

- Stop the introduction of new invasive species through new laws and regulations (described above) and by erecting barriers in canals and waterways to repel invaders. Also, determine the feasibility of separating the Great Lakes and Mississippi River systems. As invasive species are the worst source of stress to the Great Lakes ecosystem, implementing these recommendations are essential; the Great Lakes cannot recover without them.

- Provide adequate funding – $150 million per year – for cleaning up Areas of Concern under the Legacy Act (see above). These sources of toxic pollution permeate the sediments in regions that historically were some of the most biologically productive. These toxic sediments not only add new sources of stress to the system; they also prevent the lake bottom from performing its natural buffering functions. They are a major factor in the accelerating pattern of Great Lakes ecosystem breakdown, and their remediation is essential to restoring the Great Lakes immune system.

- Double the federal research budget for the Great Lakes. Research funds at the state and federal level have declined in recent years, just as the ecosystem is exhibiting new and complex responses to accumulating sources of stress. To ensure that we are taking the right steps and spending our federal and state investments wisely, we need to be able to measure impacts on the ground and in the water. Significant increases in research dollars are vital to making sure our investments are being used efficiently. A substantial portion of those increases need to be directed at academic research institutions; it is essential to bring together all of the brightest minds and innovations that academia brings to bear to complement the efforts in Federal laboratories.

Next Steps

The Great Lakes Regional Collaboration Strategy expresses the consensus that these and other significant new actions, policies, and funding are urgent and essential for the Great Lakes. Delay may lead to massive and rapid deterioration of the lakes and cost far more than the actions recommended in the Strategy. If we wait, the costs will grow. However, if we make the necessary investments now, we will see excellent returns, both ecological and economic.

To implement the Strategy's recommendations in a timely way, several concurrent steps need to be taken:

1. Pass the Great Lakes Collaboration Implementation Act (HR 5100/S 2545). This bill reauthorizes, strengthens, and expands the National Invasive Species Act of 1996. It authorizes comprehensive research to ensure that our efforts to prevent, control, and eradicate aquatic invasive species are based on the best science and done in the most cost-effective and environmentally sound manner. It reauthorizes the Great Lakes Fish and Wildlife Restoration Act, a program designed to provide competitive grants to states and tribes to restore fish and wildlife. These grants can be used to implement the Collaboration strategies habitat/species recommendations. It provides $20 billion over 5 years to assist communities with the critical task of upgrading and improving their wastewater infrastructure through low-interest loans. The bill amends the Great Lakes

Legacy Act to increase the authorization from $54 million per year to $150 million per year, a key GLRC recommendation. This legislation reduces polluted run-off entering our streams and rivers by protecting wetlands, which serve as natural filters. It establishes the new Great Lakes Mercury Product Stewardship Strategy Grant Program at EPA. It also authorizes increased resources for the federal agencies already conducting important scientific research and monitoring activities in the Great Lakes – NOAA's Great Lakes Environmental Research Lab and USGS's Great Lakes Science Center. In addition, it also authorizes extramural grants to universities and other private-sector research institutions. It authorizes the National Oceanic and Atmospheric Administration (NOAA) to restore and remediate waterfront areas. Lastly, this legislation authorizes the Great Lakes Interagency Task Force and the Great Lakes Regional Collaboration process.

2. Key policy measures can and should move independently. For example, rapid enactment of the National Aquatic Invasive Species Act or equivalent legislation is absolutely critical in addressing invasive species, which scientists agree is the worst problem plaguing the Great Lakes.

3. In the short term, next year's appropriations should fund the GLRC Strategy's recommendations. The Healing Our Waters Coalition has culled the top budget recommendations from the Strategy, consulted with the Great Lakes Mayors and the Great Lakes Governors, and identified fiscal year 07 budget priorities. Those are attached as Appendix B.

4. One of the FY 07 priorities deserves special mention: funding to make permanent and operate the electric barrier in the Chicago Sanitary Ship Canal. This barrier, now temporary and lacking funds for operations, is the only obstacle between a voracious invasive species, the Big-Headed Asian Carp, and the Great Lakes. These carp eat every aquatic organism in their path. Once into Lake Michigan, they will out-compete all native fish and turn the Great Lakes into a giant carp farm. Funding for the barrier is absolutely critical to saving the Great Lakes, their fisheries, and their economy.

It is also critical that GLRC members continue to meet with its technical advisors, participants, and observers in order that it can forward meaningful recommendations that are based on current science and reflect the progress being made on how to implement the Strategy. The GLRC should not be convened, however, just to gather and share information. Instead, it should continue to serve as a forum for what needs to be done to restore and protect the Great Lakes. It should also serve as the clearinghouse for what the restoration priorities should be for each calendar and fiscal year. The GLRC should be able to tell Congress and the public each year what projects and programs are significant towards achieving the goals established through the collaborative effort. The benefit of using the GLRC for priority setting is that it builds a strong political constituency who all agree on specific steps and benchmarks for achieving success. This process also ensures fiscal accountability at every level of government.

The last full GLRC meeting was in December 2005. Because we cannot wait to begin implementing the recommendations in the GLRC Strategy, the Healing Our Waters Coalition has begun to identify what concrete actions our nation and region can take immediately to restore

and protect this resource. Our Coalition is using its own resources to undertake a process that will develop scientific and policy criteria for identifying the projects necessary to implement the GLRC Strategy. We plan to use those criteria to identify the highest priority projects for consideration by Congress and federal and state agencies next year as they set their own priorities for spending and program implementation in the Great Lakes. The criteria will ensure that these projects are scientifically significant, important to the people who live in the Basin, spend taxpayer money wisely, and result in rapid on-the-ground restoration and protection of the Great Lakes. Our intent is to produce a guidebook for Congress, agencies, and the public at the beginning of next year. We hope the other GLRC collaborators will join us in our effort to produce a list that demonstrates how we can meet the GLRC's goals and strategy.

Conclusion

The Great Lakes Regional Collaboration's Strategy to Restore and Protect the Great Lakes provides a first-ever comprehensive blueprint to return the Great Lakes to health, and just in time. According to leadings scientists, the lakes are suffering ecosystem breakdown, a chain reaction of degradation that could become irreversible if action is not taken quickly. This deterioration, if unchecked, will have massive ecological and economic consequences for the Midwest and the nation.

As essential and useful as the Collaboration's Strategy is, it is only a first step. Without implementation, it will simply become yet another Great Lakes plan, sitting on a shelf and gathering dust.

We commend you, Mr. Chairman, and the members of this Subcommittee for your leadership in scheduling this hearing and maintaining the momentum for Great Lakes restoration. We particularly would like to thank Representative Ehlers and the other Great Lakes members on the Subcommittee for their longstanding efforts as champions of the Great Lakes.

This Subcommittee is uniquely situated to transform the Collaboration's Strategy into concrete action. We encourage you to exercise your outstanding leadership to ensure that the Strategy's recommendations are implemented and carried out.

The Great Lakes are the natural infrastructure of the Midwest, the industrial center of the nation. Just as bridges and roads crumble without adequate investment, so are the Great Lakes deteriorating. The longer the wait, the more expensive the investment will be and the more we will lose because of the delay. On the other hand, if we act now, the Great Lakes will return to health, bringing with them jobs, recreation, tax revenues, wildlife, and the future on an entire region.

Appendix A: HOW Coalition list

Appendix B: HOW's appropriations priorities

Healing Our Waters-Great Lakes Coalition

Steering Committee

- National Wildlife Federation
- National Parks Conservation Association
- Alliance for the Great Lakes
- American Rivers
- Audubon New York
- Clean Water Action
- County Executives of America
- Ducks Unlimited
- Great Lakes United
- Michigan United Conservation Clubs
- Ohio Environmental Council
- Sierra Club- Great Lakes Program
- The Nature Conservancy
- Tip of the Mitt Watershed Council
- Trout Unlimited
- University of Michigan School of Natural Resource and the Environment
- U.S. PIRG
- Wisconsin Wildlife Federation

Coalition Members

- Audubon
- Audubon Minnesota
- Audubon New York
- Audubon Ohio
- Audubon Pennsylvania
- Biodiversity Project
- Brookfield Zoo
- Center for Environmental Information
- Citizens Campaign for the Environment
- Clean Wisconsin
- Corps Reform Network
- Delta Institute
- Ecology Center
- Environmental Advocates of New York
- Environmental Association for Great Lakes Education
- Friends of Milwaukee's Rivers
- Georgian Bay Association
- Grand River Sailing Club
- Great Lakes Aquatic Habitat Network and Fund
- Great Lakes Boating Federation
- Institute for Agriculture and Trade Policy
- Illinois Council for Trout Unlimited
- Illinois PIRG (ILPIRG)
- Indiana PIRG (INPIRG)
- Izaak Walton League of America
- John G. Shedd Aquarium
- John Ball Zoological Gardens
- Kalamazoo River Protection Association
- Lake Erie Coastal Ohio
- Lake Erie Region Conservancy
- Lake Michigan Interleague Organization
- Lake Superior Alliance
- League of Ohio Sportsmen
- League of Women Voters of Michigan
- League of Women Voters of Ohio
- League of Women Voters of Wisconsin
- Michigan Council of Trout Unlimited
- Michigan Environmental Council
- Michigan Land Use Institute
- Michigan League of Conservation Voters
- Michigan Wildlife Conservancy
- Minnesota Center for Environmental Advocacy
- Minnesota Conservation Federation
- Minnesota Council of Trout Unlimited
- Minnesota Environmental Partnership
- Natural Resources Defense Council
- Nature Quebec
- New York Rivers United
- New York State Zoo
- Ohio League of Conservation Voters
- Ohio PIRG (OPIRG)
- Pennsylvania Environment
- PIRG in Michigan (PIRGIM)

- Praire Rivers Network
- River Alliance of Wisconsin
- Save the Dunes
- Save the River
- Union of Concerned Scientists
- Watershed Center Grand Traverse Bay
- West Michigan Environmental Action Council
- Western Lake Erie Waterkeeper
- Winous Point Marsh Conservancy
- Wisconsin Association of Lakes
- Wisconsin League of Conservation Voters
- Wisconsin PIRG (WISPIRG)
- Wisconsin Trout Unlimited

Healing Our Waters-Great Lakes Coalition
Fiscal Year 2007 Appropriations Request

Interior-EPA

Great Lakes Legacy Act
HOW-GL Recommendation: *$54 million*

Clean Water State Revolving Fund
HOW-GL Recommendation: *$1.35 billion*

Beaches Environmental Assessment and Coastal Health (BEACH) Act
HOW-GL Request: *$10 million*

Great Lakes National Program Office
HOW-GL Request: *$25 million*

Great Lakes Fish and Wildlife Restoration Act
HOW-GL Request: *$5 million*

Energy and Water

Great Lakes Fishery and Ecosystem Restoration Act
HOW-GL Request: *$3 million*

RAP Assistance (Sec 401)
HOW-GL Request: *$4 million*

Chicago Sanitary Ship Canal Barrier
HOW-GL Request: *$6 million*

Science, State, Justice and Commerce

Great Lakes Environmental Research Laboratory
HOW-GL Request: *$10.9 million*

Sea Grant
HOW-GL Request: $72 million

National Coastal Zone Management Grants
HOW-GL Request: *$70 million*

Great Lakes Fishery Commission
HOW-GL Request: *$18.9 million*

International Joint Commission
HOW-GL Request: *$7 million*

Agriculture

Wetland Reserve Program
HOW-GL Request: *Support President's request to support the national enrollment cap of 250,000 acres in FY 2007.*

Conservation Reserve Program
HOW-GL Request: *Support the President's request to support the national enrollment cap of 39.2 million acres in FY 2007.*

Great Lakes Basin Program for Soil Erosion and Sediment Control
HOW-GL Request: *$3 million*

TESTIMONY

OF

JAMES E. ZORN

EXECUTIVE ADMINISTRATOR
OF THE
GREAT LAKES INDIAN FISH
AND
WILDLIFE COMMISSION

Before the

HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

September 13, 2006

Testimony of James E. Zorn, Executive Adminstrator
Great Lakes Indian Fish and Wildlife Commission

Mr. Chairman and Members of the Committee, I am James E. Zorn, Executive Administrator of the Great Lakes Indian Fish and Wildlife Commission (GLIFWC).

I am offering this testimony in consultation with the *ad hoc* Tribal Caucus of the Great Lakes Regional Collaboration and on behalf of GLIFWC's member Tribes, which include eleven Ojibwe Nations in Minnesota, Wisconsin and Michigan that retain off-reservation rights to hunt, fish and gather on treaty-ceded territory, including lands and water in the Great Lakes basin. GLIFWC exercises powers delegated by its member Tribes to assist them the exercise of their off-reservation rights as well as to provide natural resource and environmental management expertise, conservation enforcement, legal and policy analysis and public information services.

I am pleased to update the Subcommittee by expressing perspectives and sentiments that speak to: i) the significant positive impact that the GLRC Strategy has already had as it relates to Great Lakes protection and restoration, and ii) the way forward toward implementation of priorities set forth in the Strategy while preserving this Nation's treaty obligations and trust responsibility toward Tribal Nations.

The Tribal Caucus has and continues to coordinate Tribal participation under the Collaboration's Framework Agreement, on the Executive Committee and on the various Strategy Teams. In providing this testimony on behalf of GLIFWC's member Tribes and in consultation with the Tribal Caucus, I do not presume to officially represent any particular Tribal government or Tribal governing body beyond that voice.

I. SUMMARY OF OVERRIDING TRIBAL PERSPECTIVES

At the outset, I wish to highlight some primary points from the Tribes' perspective. The remainder of my testimony then provides background information and additional detail to support these points:

- **The Collaboration partners and the Great Lakes regions can and should be proud of the unified effort that the Collaboration's Strategy to Restore and Protect the Great Lakes represents.** The Strategy exemplifies the region coming together to support protection and restoration of the Great Lakes. The Strategy is not an all encompassing solution to Great Lakes' problems. Nevertheless, its priorities and recommendations create an effective blueprint worthy of the political, economic and community commitment that will be necessary to realize its vision. It must be used as the guide to make correct fiscal and substantive policy decisions by all levels of government, by the private sector and by households throughout the Great Lakes Basin.

- **The Tribes are very pleased that the Strategy aligns so well with the values, traditions, and needs of Tribal communities.** We all can be very proud that the Great Lakes region answered President Bush's call to set forth a consensus-based, action-oriented Strategy for preserving and restoring Great Lakes ecosystems. The Collaboration represents an unprecedented alignment of priorities and guiding principles among Tribal Nations, states, cities, industry and business, non-governmental organizations, and everyday citizens.

- **The Strategy has made a difference in the approach that people both inside and outside the Great Lakes basin take toward restoration and protection of the Great Lakes.** There are a number of positive developments relating to restoration and protection of the Great Lakes that can be tied directly to the Collaboration and its Strategy. Whether in the form of a redoubling of efforts within an existing program, the continuation of funding for an existing program that might otherwise have been cut or in the form of a new effort, actions are being taken under the umbrella of the Strategy to achieve its goals. Examples include: i) provisions in the recently passed Great Lakes Fish and Wildlife Restoration Act tying funding of projects and programs to the goals of the Strategy; ii) the development of initiatives and strategy teams to develop plans to begins addressing the goals of the Strategy relating to toxic pollutants and habitat restoration. There has not been a unified singular effort to implement all that the Strategy calls for, but it is serving its function as a blueprint for a restored, protected Great Lakes.

- **Leadership in this effort, whether from the administration, the states, the cities, the Tribes or from a non-governmental source, needs to be in the form of real action to achieve the goals of the Strategy.** Very simply, leadership is as leadership does. It is time to stop worrying about making lists or what is on paper and to start worrying about rolling up our collective sleeves and getting started on the task of building a restored and protected Great Lakes. Although much can be done within existing authorizations and programs, part of getting started on the effort means the political will to establish new programs through new funding sources as well.

- **While there is a recognized need for efficiency and streamlining of Great Lakes programs, there is a fine line to walk between being efficient and undoing good work simply for the sake of change.** The Great Lakes region faces many problems. There is no "silver bullet" for Great Lakes protection and restoration. One of the reasons for the multiplicity of programs in the region is the diversity of the problems and the need for a diversity of mechanisms to address them. An overly streamlined approach to Great Lakes programs threatens to eliminate beneficial programs simply for the sake of change.

- **The Strategy is a sound and effective blueprint for better focused and more efficient programs to address its priorities, yet we must be vigilant in implementation to not**

oversimplify the nature and extent of the ecological imperatives we face or the programs and actions that must be undertaken to address them. The Tribes recognize the need to prioritize immediate actions and budgetary commitments as we begin to implement the Strategy. However, we are concerned that even further shortening of the list of priorities contained in the Strategy, simply for the sake of improved program efficiencies or cost savings, will short-change what needs to be done. We must keep in mind a number of key points as we proceed with implementation:

- The Great Lakes region is comprised of a number of complex and diverse ecosystems. There is a risk of over-portraying the Great Lakes as a single ecosystem. Creating a "short list" of priority actions carries the associated risk of abandoning or undercutting currently successful programs, such as the lakewide management planning efforts. It also creates a risk of proceeding on a "least common denominator" basis or on a pared down list of actions developed for immediate political expediency.

- The Tribes are sensitive to this Nation's current fiscal and budgetary climate. Tribal Nations face many of the same dilemmas as others in this regard. Nevertheless, we must not sacrifice our ability to achieve the Strategy's goals under the guise of trying to achieve "more bang for the buck." Ours is a Nation of vast financial wealth and resources. Great Lakes protection and restoration clearly falls within primary governmental functions at all levels. The political will to make correct budgetary and substantive policy decisions must be nurtured. The correct decisions will lead to the appropriate application of our Nation's wealth and associated actions to the task at hand.

- The federal government must maintain a leadership role in setting the appropriate tone and taking the appropriate actions in response to this unprecedented Strategy. We are encouraged by the significant commitments and actions already undertaken by other Collaboration partners – Tribal, state and local governments, industry and business, non-governmental organizations and everyday citizens. We are witnessing an amazing momentum and confluence of energy among all Collaboration partners to make good decisions and significant financial commitments from tight budgets. We ask Congress and the Administration to do its part as well.

- The federal government plays an important role in ensuring the continuing capabilities of Tribal natural resource and environmental management programs. Those programs are particularly vulnerable to budget reductions. Any reduction in funding for a Tribal program, even a reduction that would be considered small by others, could result in the elimination of that program. In some cases, simply losing funding for a single Tribal staff member can eliminate or significantly reduce the ability of a Tribal Nation

or Tribal agency to hold up their end of the bargain relating to the protection or restoration of Great Lakes ecosystems.

- The Strategy goes a long way to identify actions that can be undertaken to progress toward better-protected and more-restored Great Lakes ecosystems. Nevertheless, we can and should do more whenever possible. For example, the Tribes would like to see a more aggressive schedule for reducing mercury emissions from coal-fired utility plants. Moreover, there are other areas where the Tribes would like to see a more rapid and effective response to compelling problems, such as the control of invasive species through the implementation of more effective ballast water controls both under existing Clean Water Act authority and under new legislation.

The Tribes appreciate the Subcommittee's sensitivity toward and consideration of these perspectives. The other Collaboration partners have been particularly welcoming and supportive of Tribal concerns. The Collaboration has engendered mutual trust and respect among those interested in advancing Great Lakes protection and restoration. The Great Lakes Tribal Nations remain committed to that end, and will support and advance both the terms and the spirit of the Strategy wherever and whenever possible. They trust that Congress and the other partners involved will do the same.

II. TRIBES OF THE GREAT LAKES BASIN

The United States portion of the Great Lakes Basin is home to over 35 federally recognized Indian Tribal Nations who, although distinct and unique in their own right, have common history, culture and traditions, especially in their relationship to the natural environment and dependence on natural resources for subsistence, economic, cultural, spiritual and medicinal purposes.[1]

Great Lakes Tribal Nations have historical, spiritual and cultural roots in the Great Lakes Basin stretching from time immemorial. Tribal Nations continue to occupy and use their ancestral homelands with a notion of geographic place that embodies views of their origin, migrations and historical identity, the way Tribal cultural reality is perceived in the modern world, and the social and political means to partitioning and distributing resources. These connections between Tribal Nations and the Great Lakes are evident in the willingness to accept the responsibility of restoring and protecting the Great Lakes.

---

[1]For additional background on the culture and history of Great Lakes Tribal Nations and their relationship to the natural environment, the following documents from the Great Lakes Regional Collaboration Appendix are attached and incorporated by reference: 1) *Tribal Nations Issue and Perspectives*; 2) *Haudenosaunee Environmental Task Force Position on the Great Lakes.*

Tribal Nations understand that the whole earth is an interconnected ecosystem. The health of any one part is related to the health of the whole. Tribal Nations have a spiritual and cultural responsibility to protect the waters of the Great Lakes as part of a greater overall effort to protect Mother Earth.

For Tribal Nations of the Great Lakes Basin, ecological sustainability and Tribal sustainability go hand in hand. Tribal Nations recognize the reciprocal relationship between humans and the rest of the natural world. Spiritual beliefs, including a spiritual interdependence and connection between all living and non-living things, guides Tribal members in the harvest and use of natural resources for subsistence, ceremonial, medicinal, ceremonial, spiritual or economic purposes.

The use of traditional foods is uniquely beneficial for members of Great Lakes Tribal Nations, including:

- the improvement of diet and nutrient intake;
- the prevention of chronic diseases associated with the consumption of non-traditional foods;
- the opportunities for physical fitness and outdoor activities associated with harvesting traditional foods;
- the opportunity to experience, learn, and promote cultural activities; and
- the opportunity to develop personal qualities desired in Tribal culture such as sharing, self-respect, pride, self-confidence, patience, humility and spirituality.

For Tribal Nations of the Great Lakes Basin and their members, the relationship to the natural environment, especially the Great Lakes, and dependence on natural resources for subsistence, economic, cultural, spiritual and medicinal purposes means little if there are insufficient resources, or if the available resources are contaminated or degraded to the point that they are unusable. It is important to remember the health benefits of traditional foods are quickly outweighed by the risks posed by the contaminants contained therein. For Tribal members "food security" means having traditional food sources that are both sufficient and free from contaminants.

III. ENVIRONMENTAL AND NATURAL RESOURCE PROGRAMS OF GREAT LAKES TRIBAL NATIONS AND TRIBAL AGENCIES

In light of the importance of the Great Lakes to Tribal Nations within the basin, many Tribal Nations and several intertribal agencies engage in a diversity of significant environmental and natural resource management programs that are consistent with the Great Lakes Regional Collaboration Strategy. The nature of the programs of each particular Nation or agency is contingent on the funding available and the needs or priorities of the community involved. With regard to the relationship between funding and these programs:

- Important federal funding sources for Tribal programs include but are not limited to:

  - Bureau of Indian Affairs funds provided pursuant to the Indian Self-Determination and Educational Assistance Act;
  - United States Fish and Wildlife Service funds provided under a variety of project-specific authorizations; and
  - Environmental Protection Agency funds provided under the Clean Water Act, the Clean Air Act, the Tribal General Assistance Program, and other authorizations.

- Discretionary revenue generated from Tribal economic enterprises serves to supplement federal and other funding for these programs for some Tribal Nations.
- The myriad of funding paths for Tribal environmental and natural resource programs dictates that individual Tribes must ensure their ability to pursue their own funding path and work with whatever resources are available to them.
- Tribal environmental and natural resource management programs are particularly vulnerable to budget reductions, so that any reduction in funding for a Tribal program, even a reduction that would be considered small by others, could result in the elimination of that program. In some cases, simply losing funding for a single Tribal staff member can eliminate or significantly reduce the ability of a Tribal Nation or Tribal agency to hold up their end of the bargain relating to the protection or restoration of the Great Lakes ecosystem.

The Strategy recognizes that maintaining base level funding for Tribal programs is necessary so that Tribal Nations are able to both provide for the health and welfare of their communities and so that Tribal Nations can remain effective partners in Great Lakes protection and restoration efforts. Despite their fiscal and staffing limitations, Tribal Nations and their agencies are particularly efficient delivery systems for environmental and natural resource programs. More importantly, they often provide the only delivery mechanism of such programs for Tribal members. Tribal Nations need to provide services, such as fish contaminant testing and consumption advisories focused on the specific waters fished by Tribal members, because no other government or agency does so in such a focused manner. Tribal members need to know which fish are safer to eat from the waters that they fish. Generalized fish consumption advisories do not accomplish this.

In addition to the value of Tribal environmental and natural resource programs to Tribal members, there are significant overall public benefits that result from Tribal programs. If Tribal Nations fulfill their responsibilities toward Tribal members, benefits will flow to federal, state and local governments, their constituents and surrounding communities. These benefits include enhanced water quality, increased numbers of fish with reduced levels of contaminants, improved aquatic, wetland and upland habitat, and protection from invasive species, as well as numerous others.

Depending on the availability of funding and the extent of the particular governmental infrastructure, efforts Great Lakes Tribal Nations undertake in their role as partners in the protection and restoration of the Great Lakes ecosystem include:

- Operation of fish hatcheries and involvement in a variety of fish stocking programs in the Great Lakes.
- Harvest management, monitoring and regulation for a variety of fish, plant and animal species within the basin.
- Development of natural resource management plans and conservation codes.
- Population studies and assessments for a variety of fish, plant and animal species within the basin, including lake trout studies.
- Monitoring and restoring water quality of Great Lakes tributary streams and rivers through development of watershed management plans, repair of road and stream crossings, stream bank stabilization, habitat inventories, invertebrate surveys and fish assessments.
- Participation in joint efforts to protect Great Lakes tributary waters by placing watershed land in conservation easement status.
- Adoption of burn barrel ordinances and initiation of burn barrel outreach and elimination programs.
- Habitat enhancement within the basin for various plants, fish and animal species including wetland protection and restoration as part of the Circle of Flight initiative in conjunction with the United States Fish and Wildlife Service and Bureau of Indian Affairs.
- Exotic species control including work in conjunction with the United States Fish and Wildlife Service to control and reduce sea lamprey populations.
- Voluntary efforts to reduce the presence of mercury by providing thermometer exchanges, cleaning up household hazardous waste and progressing toward making Tribal facilities mercury free.
- Research projects and fish consumption advisories, based largely on sampling of fish or other traditional foods, to help prevent contamination of natural resources and to help Tribal members maximize the health benefits from a traditional diet.
- Incorporation of alternative energy technologies and incorporation of energy conservation

measures in new construction.

- Establishment of household and agricultural waste disposal depots.

- Conducting public information, outreach and education activities.

Many of the programs just mentioned are the result of Tribal Nations or Tribal agencies partnering with federal, state and local governments, colleges and universities, non-governmental organizations, conservation groups and private landowners in cooperative efforts to protect and restore the Great Lakes Ecosystem. Such partnerships are necessary for several reasons:

- Because treaty rights often extend to areas of shared jurisdiction and use, other governments are compelled, whether legally or practically, to acknowledge the rights and associated self-regulatory systems and to integrate Tribal Nations as natural resource management partners.

- When dealing with fish and wildlife, the tendency of the resource to migrate across governmental boundaries necessitates co-management of the resource to ensure collection of accurate information on state and Tribal harvests and on the status of natural resource populations.

- Pollution in air and water is transient. Contaminants discharged upstream or upwind directly affect those downstream and downwind. Cross-jurisdictional partnerships help to track pollutants as they move and to monitor levels of contaminants in resources such as fish and plants.

Importantly, inter-governmental and other partnerships allow the parties to achieve public benefits that no one partner could achieve alone. Some examples of the public benefits of these partnerships include:

- Identifying mutual natural resource concerns, and implementing joint conservation and enhancement projects (*e.g.* wild rice restoration, waterfowl habitat restoration and improvement projects, and exotic species control projects).

- Providing accurate information on state and Tribal harvests and on the status of natural resource populations (*e.g.* joint fishery assessment activities and jointly prepared reports).

- Maximizing financial resources to avoid duplication of effort and costs (*e.g.* coordinating annual fishery assessment schedules and sharing personnel/equipment).

- Contributing scientific research and data regarding natural resources and public health (*e.g.* furbearer/predator research, fish consumption/human health studies, and other fish

contaminant research particularly regarding mercury).

- Engendering cooperation rather than competition (*e.g.* cooperative law enforcement and emergency response, joint training sessions, mutual aid emergency services arrangements, and cross-credential agreements).

IV. IMPLEMENTATION OF THE GREAT LAKES REGIONAL COLLABORATION STRATEGY

Although there has been no unified singular act to implement the entirety of the Strategy, such as Congress passing the Great Lakes Collaboration implementation act, the Collaboration partners and have used the existence of the Strategy to their advantage to achieve positive results with regards to restoration and protection of the Great Lakes. Things are different both in and out of the Great Lakes basin since the release of the Strategy as a blueprint. For example, Congress recently passed the Great Lakes Fish and Wildlife Restoration Act, which now contains a requirement that funding for programs and regional projects under that Act be consistent with the strategies outlined by the GLRC. In this context the GLRC Strategy has already begun to function as a roadmap for Great Lakes restoration and protection.

In certain priority areas, new programs are being developed in the basin using existing authorizations. This is particularly true with respect to areas such as toxic pollutants and habitat protection and restoration. The Mercury Product Phasedown Strategy Team is a collaborative effort of US EPA, states and tribes to develop a strategy to gradually phase down the use of mercury in several key products and sectors in the Great Lakes basin. This project is a direct result of the stated goals of the Strategy. Additionally, the US Army Corps of Engineers is spearheading the Great Lakes Habitat Initiative to focus on wetlands and aquatic habitat and help bridge the gap between general recommendations for protection and restoration and actual site-specific actions. Partners in this effort include federal, state, local tribal and non-governmental participants. These collaborative efforts are vital steps in the Great Lakes restoration and protection process and flow directly from the recommendations of the Strategy.

At the very least, the Strategy, and the spirit and support is has engendered, has been an effective "goal line stand" for the region to preserve and protect existing programs and projects within the region in a difficult political and economic climate. Tribes have seen firsthand that the call for full funding of Tribal natural resource and environmental programs set forth in the Strategy has help to avoid serious cuts to these programs and at least maintain the status quo for the time being.

While good things are happening and progress is being made there is clearly a need for all of the collaboration partners to do more. Too much time has been spent on trying to figure out how to implement the strategy and who is going to foot the bill for restoration and protection. The time has come for action. All of the collaboration partners need to do their part. Each partner has a different capacity to contribute to effort, but the bottom line is that all of the partners need to start doing

whatever they can do to move the effort forward. Each of the partners expects something from the others when what they need to be doing is leading by example. The other partners know Congress wants to do its part as well. For Congress, this is a crucial time to find the means to put something extra on the table in terms of funding for Great Lakes projects and programs. Although the region is making progress using existing programs and authorizations, any additional "seed" money will breathe life into the effort to implement the strategy by creating something new along with a renewed enthusiasm within the region.

When viewed through the lens focused on protection and restoration, the needs of the Great Lakes are many and diverse. The Great Lakes Regional Collaboration Strategy aims to identify and prioritize those needs. It is crucial to remember, however, that the Strategy is neither a cure all nor an end all.

To fully address the goal of protecting and restoring the Great Lakes and to ensure that important needs of the region are not left behind, the priorities set forth in the Strategy should serve as a substantive and fiscal policy decision making guide for the region, but not an exclusive set of actions. As the Strategy is implemented by the partners and the greater stakeholder community, it will be important to follow the Strategy priorities while allowing room for parties to engage in programs utilizing resources and funding outside of the parameters of the Strategy. A program beneficial to the Great Lakes should not be turned away or cast aside simply because it does not fit into the neat box created by the Strategy.

As the Strategy is implemented the partners must keep an eye on the "Big Picture." That is, the focus must be on addressing the challenges of the Great Lakes ecosystem by making the Collaboration greater than the sum of the particular actions carried out in its name. This requires the ability to look past any "action" lists that are developed and even past the specified Strategy team priorities to remember that, as set forth in the Strategy, the end is to protect and restore the Great Lakes and the means must be by whatever vehicles are available. Implementation must include continued support for currently successful programs in the region in addition to the creation of new programs. For Tribal Nations and their treaty ceded territory agencies such as the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), the Chippewa Ottawa Resource Authority (CORA) and the 1854 Authority, at the very minimum this means continued support for existing programs.

V. FUNDING FOR ENVIRONMENTAL AND NATURAL RESOURCE PROGRAMS

As noted, the focus of implementing the Strategy needs to be on the "Big Picture" goals of protection and restoration of the Great Lakes ecosystem. Similarly, the focus within the context of funding Great Lakes environmental and natural resource programs must look beyond the four corners of the Strategy document to ensure continued support for programs that may not have been specifically captured by the Strategy or its appendices, but that still relate directly to it or will further its priorities and principles. For both Tribes and the Great Lakes region, this means keeping all doors open when it comes to the goals of protection and restoration of the Great Lakes. By doing so, our

opportunities to engage in beneficial programs are not constrained by a set of priorities or funding sources that are artificially limited by the current political or budgetary climate.

While Tribal Nations recognize the need, from both the standpoint of efficiency and fiscal responsibility, to prioritize and coordinate programs within the region, this cannot serve as a justification or excuse for giving the region as a whole, and Tribal Nations in specific, less from a funding perspective. As these streamlining efforts go forward, the federal government's unique trust and treaty obligations to Tribal Nations must remain an overarching consideration and cannot be compromised in the process.

The Strategy should not be used as a means to force us into a situation where we have to bargain against ourselves as a region or within the Tribal stovepipe itself to get funded as we should or even simply to maintain our base funding. Despite the uncertainties of the budgetary process, the Strategy must serve as a guide for all levels of government, the private sector and households throughout the Great Lakes Basin for making to correct fiscal and substantive policy decisions at every opportunity.

VI. CONCLUSION

The Great Lakes Regional Collaboration Strategy sets forth important priorities for protection and restoration of the Great Lakes. The collaborative effort to achieve these goals is moving forward, guided by, but not limited by, the priorities and principles enumerated in the Strategy. A key to successful implementation of the Strategy, both for Tribal Nations and for the region, is to support and promote the spirit of the Strategy by whatever means possible. To date, this has meant that the Collaboration partners have been doing what they can using the resources they have available. To truly move forward beyond this point additional commitment in the form of action and funding is needed throughout the region.

Tribal Nations and Tribal agencies have been and will continue to be valuable partners in this process, providing a multitude of environmental and natural resource programs that efficiently deliver services to Tribal communities that in turn benefit surrounding communities. The need for continuing Tribal programs is given patent recognition by the Strategy, as is the coexisting need for base funding for these programs. As guided by the blueprint of the Strategy, Tribal Nations will and must maintain their ability to engage in beneficial programs notwithstanding artificial limitations imposed by priorities, funding sources or potential misguided substantive policies controlled by others.

The Strategy provides us all with an agreed upon path to follow to achieve the "Big Picture" goal of protection and restoration of the Great Lakes. Both the region and the Nation must continue to build on the priorities and principles set forth in the Strategy by using the Strategy as their guide for making the right choice at every fork in the road.

Canadian Embassy Ambassade du Canada

501 Pennsylvania Avenue, N.W.
Washington, DC 20001

September 27, 2006

The Honourable John J. Duncan, Jr., Chair
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
2165 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Duncan,

I understand that the House Transportation and Infrastructure Subcommittee on Water Resources and Environment held additional oversight hearings on Great Lakes water quality and restoration on September 14. I would like to thank you for your continued interest in Canada's approach to the management and protection of the Great Lakes ecosystem. As requested, I have attached a statement for the record, bringing up-to-date the statement provided to you following the hearings in 2004.

Yours sincerely,

Kevin O'Shea
Minister, Political Affairs

c.c.
Representative Don Young, Chair, Transportation and Infrastructure
Representative James L. Oberstar, Ranking Minority Member, Full Committee
Representative Jerry F. Costello, Ranking Minority Member, Subcommittee

September 28, 2006

WRITTEN SUBMISSION
THE GOVERNMENT OF CANADA
TO THE U.S. SENATE ENVIRONMENT & PUBLIC WORKS COMMITTEE
REGARDING
THE GREAT LAKES

INTRODUCTION

Water is a critical component of the environmental, cultural, social, and economic landscape. Canada holds 20% of the world's freshwater, 25% of global wetlands, and a wealth of aquatic biodiversity. Canada's healthy watersheds provide services, such as water filtration and flood management. Canada's hydroelectricity constitutes 59% of the gross energy generation. The agriculture and agri-food industry is worth 8.3% of the GDP. Recreational activities such as swimming, beach use, boating, and fishing allow Canadians to experience the beauty of the lakes, rivers and other coastal areas. A significant portion of the $12 billion that nature-based tourism and recreation contribute to the Canadian GDP results from activities that depend on clean, abundant water.

Containing approximately one fifth of the world's total fresh surface water, the Great Lakes basin is the largest fresh water ecosystem on the planet. 8.5 million Canadians take their drinking water from the Great Lakes and another 3 million living downstream drink the water of the St. Lawrence River. Further downstream the quality and quantity of fresh water entering the Gulf of the St. Lawrence has a significant influence on that estuary ecosystem.

The waters of the Great Lakes do not recognize political boundaries. In the Great Lakes Basin ecosystem, environmental problems in one jurisdiction can have significant effects on other areas in the system and on the environmental quality of the Great Lakes and the downstream reaches of the St. Lawrence River and Gulf.

The Government of Canada is committed to effective water resource management and in this context recognizes the significant contribution made by the Canada-United States Great Lakes Water Quality Agreement.

CANADA-UNITED STATES PARTNERSHIP

The Canada-U.S. partnership in the Great Lakes draws strength from a very simple reality: two nations, one shared ecosystem and the recognition that the protection of the waters of the Great Lakes is vital for the health and economic prosperity of citizens on both sides of the border.

Canada and the U.S. share a long history of effective cooperation on water-related environmental issues that stretches back almost a century. The Boundary Waters Treaty (1909) set the pattern of Canada-U.S. environmental relations by establishing the principle of joint stewardship of the rivers and lakes that lie along or flow across the Canada-U.S. border.

In the Great Lakes, the framework for binational partnership was further enhanced in 1972 with the signing by Canada and the U.S. of the first Great Lakes Water Quality Agreement. The Agreement marked a commitment from both countries to restore and protect the Great Lakes basin ecosystem. It created the shared vision for binational cooperation and coordination and articulated that both Canada and the U.S. are working towards achieving the same goals.

The Agreement also established a clear decision-making and accountability framework. This framework facilitates joint study by Canadian and American experts drawn from government, industry and academia. This process of joint study enables the Parties to investigate and reach agreement on the facts of an issue. More importantly, it serves to develop a solid foundation upon which governments on both sides of the border can work jointly at developing practical and pragmatic solutions.

The Governments of Canada and the U.S. have established the Binational Executive Committee (BEC), which is comprised of senior level representatives from Canadian and U.S. federal, state and provincial agencies that are responsible for delivering environmental and natural resource programs in the Great Lakes basin ecosystem. The BEC has been instrumental in coordinating and managing Great Lakes programs on a binational basis. The BEC meets twice a year and its work includes: setting priorities and strategic direction for binational programming in the Great Lakes; coordinating binational programs and activities; responding to new and emerging issues in the Great Lakes, including tasking existing or creating new working groups to undertake designated activities; providing input on the evaluation of progress under the Great Lakes Water Quality Agreement; and providing advice, comment or other input for the preparation of various binational reports.

BEC manages a number of programs, including: Binational Areas of Concern (AOCs); Lakewide Management Plans (LaMPs); the Binational Toxics Strategy (BTS); the Integrated Atmospheric Deposition Network (IADN); cooperative monitoring; and the State of the Lakes Ecosystem Conference (SOLEC) and reporting. These and other existing binational mechanisms under the Great Lakes Water Quality Agreement allow both countries to maximize their investments, resulting in an improvement of environmental quality of the Great Lakes.

The overall contaminant picture in the Great Lakes has dramatically improved, with significant declines in overall concentrations of most critical contaminants. Some bird species, such as the bald eagle and peregrine falcon, are returning to the Great Lakes basin. Fish communities are improving, with species such as the Lake Trout showing signs of recovery in most of the Great Lakes.

However we recognize that there remain significant challenges. There a number of chemicals of emerging concern, such as fire retardants and certain pharmaceuticals which when released into the environment have resulted in deformities in the reproductive systems of fish and frogs.

Some species such as the black tern and the American coot are declining, largely because of the loss of wetlands and other important habitat. A significant proportion of fish are still contaminated enough that they should be eaten in limited amounts or not at all. Climate change and the ongoing inadvertent introduction of invasive species into the lakes continue to pose long term threats to the Great Lakes Basin ecosystem.

CANADIAN MANAGEMENT

The objectives provided by the Great Lakes Water Quality Agreement are clearly reflected in the Canadian Great Lakes Program. The Canadian Program is a highly partnered, horizontal program that coordinates Canadian activities and those joint activities undertaken with the provincial government, and U.S. federal and state agencies.

The Canada-Ontario Agreement respecting the Great Lakes Basin Ecosystem (COA), first signed in 1971, facilitates the efforts between the Governments of Canada and Ontario. The current COA renews and strengthens planning, cooperation and coordination between federal and provincial departments. COA places an emphasis on four priorities: restoration of Areas of Concern, reduction of harmful pollutants, improvement of lakewide management, and improvement of monitoring and information management.

Under this domestic framework, the Governments of Canada and Ontario have made significant progress including delisting two Areas of Concern (AOCs) identified under the Great Lakes Water Quality Agreement: Collingwood Harbour in 1984 and Severn Sound in 2003. Of the remaining ten AOCs entirely on the Canadian side, actions required to restore the Spanish Harbour AOC have been completed and ecosystem recovery is being monitored prior to delisting, and work is nearing completion in six other areas.

CONCLUSION

The Government of Canada applauds U.S. efforts on the Great Lakes Regional Collaboration. However, as we continue to take action on each side of the border, we must remember that the protection of the Great Lakes does not stop at national boundaries, and that we must continue to use existing binational mechanisms to work together

A common vision for the ecosystem, as provided in the Great Lakes Water Quality Agreement leads to positive results on both sides of the border. The Great Lakes Water Quality Agreement provides for information sharing, and cooperative research and monitoring. With this basis of sound science common goals and priorities can be established to direct both domestic programs and binational cooperation for the protection of the tremendous resource which is the Great Lakes Basin ecosystem.

Canada believes it is critical that the importance of binational collaboration be recognized in restoration plans in Canada and the U.S., and in any new initiatives. The binational review of the Great Lakes Water Quality Agreement, now underway, has brought together a diverse group

of individuals from both sides of the border. Federal, state, provincial and municipal officials, together with representatives from tribes, First Nations, industry, environmental organizations and concerned citizens, have come together over the past six months to undertake an exhaustive review of the operation and effectiveness of the Agreement. This review has provided Canada and the U.S. with an opportunity to examine our progress in restoring the Great Lakes and to build on the strengths of the existing binational vision and framework of cooperation, collaboration and coordination under the Agreement. The Government of Canada looks forward to receiving the final Agreement review report and recommendations in 2007, and to continuing our partnership with the United States in the restoration and protection of the Great Lakes Basin Ecosystem.

○