LAKE LEVELS IN THE GREAT LAKES

(110–118)

FIELD HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

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April 16, 2008

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Water Resources and Environment

FROM: Subcommittee on Water Resources and Environment Staff

SUBJECT: Hearing on Lake Levels in the Great Lakes

PURPOSE OF HEARING

On Friday, April 18, 2008, at 9:00 a.m., the Subcommittee on Water Resources and Environment will hold a field hearing regarding Lake Levels in the Great Lakes at the University of Wisconsin - Green Bay, located in Green Bay, Wisconsin. The Subcommittee on Water Resources and Environment will receive testimony from representatives from the State of Wisconsin, the United States Army Corps of Engineers, the International Joint Commission, the Port of Green Bay and the Lake Carriers' Association.

BACKGROUND

This memorandum summarizes issues surrounding lake levels in the Great Lakes. It provides a summary of historic lake levels in the Great Lakes, as well an overview of possible causes and those who are affected.

Great Lakes Basin

The Great Lakes are comprised of Lakes Erie, Huron, Michigan, Ontario and Superior. The Great Lakes Basin is shared by eight states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin) and two Canadian provinces (Ontario and Quebec). The Great Lakes system includes the Lakes' connecting waterways; the St. Clair, the Detroit, the Niagara and the St. Lawrence Rivers, as well as the Straits of Mackinac, Lake St. Clair and the Welland Canal.

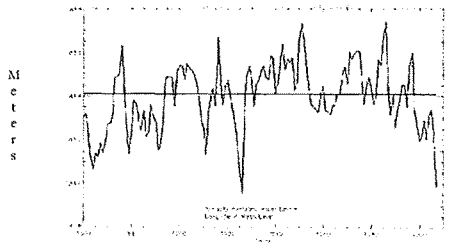
The Great Lakes are significant nationally and internationally because of their abundant natural resources and relationship to the economies of both the United States and Canada. The volume of water stored in the Great Lakes accounts for 20 percent of the world's and 95 percent of North America's surface freshwater. The Great Lakes basin also supports an expanding population and resulting development. An estimated 40 million people rely on the Great Lakes Basin to provide jobs, drinking water, and recreation. Approximately one-seventh of the total population of the United States and one-third of the population of Canada live in the Great Lakes Basin. On average, less than one percent of Great Lakes water is renewed annually.

Historic Lake Levels in the Great Lakes

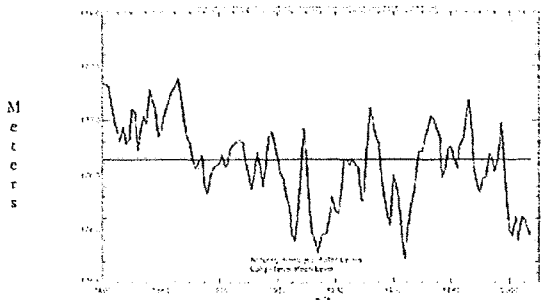
Historically, Great Lakes water levels have experienced significant fluctuation. The National Oceanic Atmospheric Association ("NOAA") keeps detailed data of historic levels in the Great Lakes. The Great Lakes Environmental Research Laboratory ("GLERL"), based in Ann Arbor, Michigan, conducts physical, chemical, and environmental modeling research and closely monitors lake levels along with the Detroit District of the U.S. Army Corps of Engineers. The following charts, provided by NOAA, display the average annual water levels for Lakes Superior, Michigan, Huron, Erie and Ontario. They depict a graphical representation of the historic annual averages for these Lakes from 1800-2007.

Levels of Lakes Michigan and Huron experienced record highs in both 1886 and 1986. These lakes also experienced record low water levels that coincided with the Dust Bowl during the 1930s. It is important to note that all of the Great Lakes have exhibited sharp decline since 1997. Lakes Superior, Michigan, and Huron have displayed a drastic decline in that time. Although Lake Superior is still below its historical annual average, it is about eight inches higher than it was at this time last year.

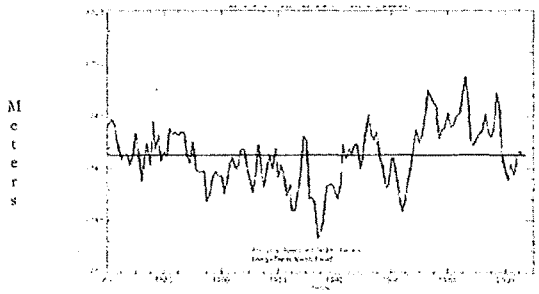
Lake Superior Water Levels in Meters (1800-2007)



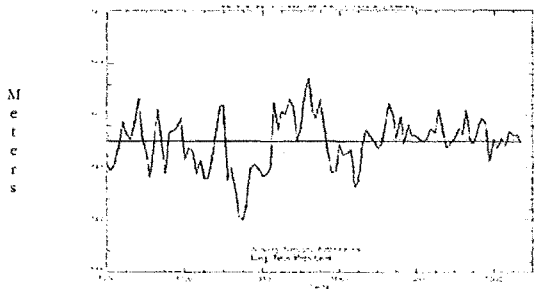
Lakes Michigan and Huron Water Levels in Meters (1800-2007)



Lake Erie Water Levels in Meters (1800-2007)



Lake Ontario Water Levels in Meters (1800-2007)



Causes of Fluctuating Lake Levels

In general, lake levels are directly related to the amount of water in the Great Lakes Basin and its hydrologic cycle. The amount of precipitation falling on the lakes and runoff from the basin's watershed directly impacts lake levels. By natural processes, the Great Lakes Basin experiences declines in water levels through evaporation and transpiration, and by way of the outflow through the St. Lawrence River.

Lake levels also fluctuate seasonally. These variations of water levels are based mainly on rainfall patterns and runoff to the Great Lakes. Lake levels are at their lowest point during the winter when runoff from precipitation is locked up in snow and ice, and cool dry air passes over the lakes increasing evaporation. Lake levels are generally at their highest during the summer when snow has melted and runoff increases.

The natural hydrologic cycle of the Great Lakes Basin is marked by high or low lake levels. Global climate change, affecting the current warming trend, has been cited as a potential cause of low lake levels in the Great Lakes. For instance, shorter, warmer winters result in less ice cover allowing more water to escape through evaporation. Climate change causes more frequent cycling of high and low water levels events. While the lakes are currently experiencing low lake levels, as recently as the 1980's the region experienced a period marked by near record high water levels.

Current Status of the Great Lakes Lake Levels

The Great Lakes' levels are currently much lower than their average annual water levels. The region is experiencing a prolonged period of higher air temperatures. These increased air temperatures result in higher rates of evaporation, as well decreased ice cover over the Great Lakes. This changing hydrologic cycle has contributed to decreased water levels in the Great Lakes Basin.

The U.S. Army Corps of Engineers ("Corps") releases a "Monthly Bulletin of Lake Levels for the Great Lakes"[1] as a public service. For April 2008, precipitation was below average in the Lake Superior Basin, near average in the Lake Michigan-Huron Basin, and well above average in Lakes Erie and Ontario Basins. In addition, precipitation in the Lakes Superior, Michigan-Huron, and Ontario Basins was near average over the last year, while Lake Erie Basin experienced precipitation that was 12 percent above average.

While recent precipitation levels have been high, lake levels continue to vary across the region. According to the Corps, the average water levels for the month of March for Lakes Superior and Michigan-Huron were 11 and 21 inches below their long term monthly average (1918-1999), respectively. Lake St. Clair was an inch lower than its long term average, and Lakes Erie and Ontario were eight inches above their long term averages.

[1] Data for the USACE monthly bulletin is provided by the National Ocean Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, and the Marine Environmental Data Service, Department of Fisheries and Oceans, Canada. Historic and projected lake levels are derived by the U.S. Army Corps of Engineers, Detroit District.

The Corps is currently advising boaters to be aware of hazards to navigation due to the conditions, especially during periods of high winds when levels can fluctuate greatly.

Effects of the Current Water Levels in the Great Lakes

Periods marked by high or low water levels in the Great Lakes place a tremendous amount of stress on the economy and hardships on those who live in the surrounding area. High water levels are just as common as low lake levels and often result in as much damage. For instance, from 1985 through 1987, the region endured above average rainfall causing record high water levels. These high water levels combined with storm waves caused a remarkable amount of destruction on the shoreline as a result of rapid coastal erosion. In particular, the shoreline of Lake Superior in Northwestern Wisconsin was undercut by large waves and eroded as much as 15 to 20 feet in one day.

The current status of the declining water levels impacts a number of aspects of the environment as well as human interests:

Aquatic and Coastal Ecosystems: Low water levels greatly impact aquatic and coastal ecosystems. From the standpoint of the natural coastal ecosystems surrounding the great lakes, fluctuating lake levels are a natural process that benefits those systems. Fluctuating levels result in periodically inundated phases, followed by dry phases. In general, plants and wildlife life benefit from warmer, shallower phases that allow for more sunlight. With a decrease in water levels, the region has experienced a net gain in wetlands. A shallower interface between the water line and shores has stimulated growth of wetlands plants in some areas.

However, threats to those systems occur when human intervention results in modifications that alter these natural processes. For instance, an owner of a lake front property could see the benefit in destroying aquatic vegetation along a shoreline, without realizing the environmental ramifications of these actions. As these shoreline plants are destroyed, the lakes have a reduced capacity to process nutrients and to produce food for smaller organisms that provide the basis of the food chain.

Commercial Navigation: Lake levels are of critical importance to the shipping industry in the Great Lakes Basin. 80 percent of the American steel industry is based in the Great Lakes Basin and relies on water transportation. A number of steel mills in the Basin were built without rail access in order to take advantage of waterborne commerce and the ease and accessibility provided by their shoreline location. As water levels drop steel mills and other factories will be adversely affected. Declining lake levels inhibit access to existing docks and cause commercial ships to engage in a process called 'light loading'. Light loading is a term used when a barge or ship is forced to leave dock carrying less cargo than the ship's designed carrying capacity.

According to the Lake Carrier's Association, depending on the size of the vessel, a ship is forced to 'light load' by as much as 50 to 270 tons of cargo for each inch of draft. For example, last fall, Lake Superior was at a record 30 inches below its average annual water level. Their largest vessel was forced to 'light load' by 8,100 tons of cargo which would provides enough material to produce 6,000 cars.

Power Production: The region is home to a significant amount of our nations' industry, including energy production, mining, steel production and automobile manufacturing. Low water levels greatly reduce the ability of existing hydroelectric stations to generate power because there is less water to power the systems. There are currently two hydroelectric power plants on the United States side of the St. Mary's River. To remain efficient, these plants rely heavily on the flow and timing of this river. When flows are low and energy production falls, consumers are forced to purchase power from other sources.

Recreational Boating: The Great Lakes Commission estimates that there are more than 1,800,000 recreational boats in the Great Lakes States and Ontario. The viability of the recreational boating industry is closely tied to water levels and is adversely affected by low water levels. Owners of property with water-only access, such as a dock or a pier, may lose their access to the water. Boaters are also put at risk of running aground on previously unexposed objects such as rocks, sand bars, submerged vessels and tree stumps.

Water Quality: Low lake levels adversely affect water quality in three ways. First, lower lake levels potentially affect water quality by inhibiting the ability of the waters to naturally process excessive levels of nutrients and toxic substances. Second, as a result of increased dredging to keep shipping corridors viable, water quality may be affected by the toxins that are contained in sediment which are distributed and reintroduced into the water. Third, as the volume of water decreases, a concentration of toxins in the remaining water is likely.

Council of Great Lakes Governor's

The Council of Great Lakes Governors ("CLGC") is comprised of the Governors of the Great Lakes States as well as the Canadian Provincial Premiers from Ontario and Quebec. The CLGC, through the Great Lakes Water Management Initiative, is responsible for creating innovative and common conservations standards for the Great Lakes that will manage water diversions, withdrawals, and consumptive use proposals.[2] On December 13, 2005, the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement was signed by the Great Lakes Governors and Canadian Premiers of Ontario and Quebec. At the same time, the Great Lakes Governors endorsed the Great Lakes-St. Lawrence River Basin Water Resources Compact.

Once ratified, the Great Lakes-St. Lawrence River Basin Sustainable Resources Compact establishes a Great Lakes Basin Water Resources Council, comprised of the Governors of the signatory parties, that reviews proposals for water withdrawals, diversions, and consumptive use proposals involving water from the Great Lakes Basin. In addition, the Compact requires signatory states to develop and implement water conservation programs that will protect and improve the Great Lakes Basin ecosystem. In order to be achieve full enactment as an interstate compact, the Compact needs to be approved by each state legislature, as well as the United States Congress. If fully ratified, the Compact would serve as a binding agreement among all parties to implement conservation standards for regulating water withdrawals from the Great Lakes Basin.

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[2] According to the Great Lakes-St. Lawrence River Basin Compact adopted by the states of Illinois, Indiana, Michigan, Minnesota, New York, Ohio and Wisconsin and the Commonwealth of Pennsylvania, "Consumptive use means that portion of the water withdrawn or withheld from the basin that is lost or otherwise not returned to the Basin due to evaporation, incorporation into products, or other processes."

The Great-Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement (Agreement) is a non-binding agreement containing the commitment of the Great Lakes States and the Provinces of Quebec and Ontario to utilize a standard for regulating water diversions and withdrawals from the Great Lakes Basin. The Agreement essentially serves as an informative guide for signatory parties to develop and utilize water management and withdrawal procedures.

Outlook

The Great Lakes Environmental Research Laboratory working under NOAA makes monthly and annual water supply and lake level forecasts based on current conditions in the Great Lakes Basin in conjunction with NOAA's long term climate predictions. NOAA has predicted the re-emergence of a La Niña event that will result in above average temperatures as well as a slight increase in precipitation for the lower Great Lakes. NOAA anticipates that the average annual water levels for all the Great Lakes will remain at or below last year's historically low average. A similar La Niña event during 1997 produced historic low water levels in the across the region.

The International Joint Commission is currently engaged in a five-year, $14.6 million study to examine the declining water levels in the Great Lakes. The study examines water management practices used in the Upper Great Lakes and potential factors that affect water levels, including climate change. The study also evaluates the impacts of water levels on the ecosystem and human interests. The physical changes to Lake St. Clair are being examined as one potential reason for the declining levels, and a remediation option. A report based on this study will be released in 2012.

More importantly, there is a general agreement that total water withdrawal and consumptive use of water from the Great Lakes will increase. Increasing stress on an already overwhelmed system could have a drastic impact on the Great Lakes ecosystem as well as the 40 million residents in the region who rely upon the Lakes for recreation, power production, economic viability and transportation.

WITNESSES

PANEL I

The Honorable Matt Frank
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Wisconsin Department of Natural Resources
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The Honorable Rob Cowles
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2nd Senate District
Madison, Wisconsin

The Honorable Dave Hansen
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30th Senate District
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Wisconsin Department of Natural Resources
US Co-chair of the Ecosystem Technical Workgroup for the International
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Mr. Dean Haen
Port Manager, Port of Green Bay
Green Bay, Wisconsin

Mr. Charlie Imig
Clean Wisconsin
Madison, Wisconsin

Mr. James H. I. Weakley
President, Lake Carriers' Association
Cleveland, Ohio

LAKE LEVELS IN THE GREAT LAKES

Friday, April 18, 2008

HOUSE OF REPRESENTATIVES,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT,
Washington, DC.

The Subcommittee met, pursuant to call, at 9:00 a.m., in in the Phoenix Room, University Union Building, Green Bay, Wisconsin, Hon. Eddie Bernice Johnson [Chairwoman of the Subcommittee] presiding.

Ms. JOHNSON. I call this hearing of the Subcommittee on Water Resources and Environment to order.

And I ask unanimous consent that Representative Petri, a Member of the Committee of Transportation and Infrastructure, be allowed to sit on the Subcommittee of Water Resources and Environment for the duration of the hearing and ask any questions that he would like.

Having no objection, so ordered.

Today, the Subcommittee will receive testimony on the issue of lake levels in the Great Lakes. And let me express my appreciation for the facility and for the invitation from Congressman Kagen and from the welcoming of Congressman Petri. We appreciate all of you being here.

During this session of 110th Congress, this Subcommittee has already examined the issue of ecological and environmental health of the Great Lakes. Because of the importance of the Great Lakes to the sustainability of the states and provinces surrounding the Great Lakes basin, we again return our focus to the Great Lakes.

Today we turn our attention toward problematic low water levels in the Great Lakes. The Great Lakes are of the utmost importance to the health and environmental vitality in not only the Great Lakes region but for all the Nation.

The 95,000 square miles of water that make up the Great Lakes happen to be the largest surface area of fresh water in the world. Nearly 40 million people in the Great Lakes region depend on the Great Lakes for drinking water. In addition, the Great Lakes provide 56 billion gallons of water per day for municipal, agricultural and industrial use. Demand upon this precious resource is high, and it is important that we all are gathered here today to discuss this key issue.

Low lake levels in the Great Lakes affect the daily lives of Great Lakes residents in a number of ways. Low water levels have a negative impact on the water quality of the region, as well as commercial navigation and recreation. As water levels decline, recreational

boaters and commercial shippers are forced to dredge or to abandon their docks. Simply put, water access issues pose a grave threat to boaters.

I hope today's testimony will clarify the impacts that the current water levels in the Great Lakes are placing stress on the larger economic ecosystem, as well as the local communities in the basin. I also hope to hear potential remedies aimed at easing the stress causes by the low lake levels that extend and that exert upon the basins' residents.

We are scheduled to hear testimony from international, Federal, State and local witnesses, and I believe that we will greatly benefit from that knowledge.

I would like to thank, again, Congressman Kagen for bringing the Subcommittee's attention to the need for such a hearing. He has shown that he has passion for the Great Lakes and all that they provide the people of this region.

I rode the plane with him, and he never stopped talking yesterday about the Great Lakes. Because of Congressman Kagen's leadership on this issue, we will gain awareness on the Water Resource and Environment Subcommittee and will bring back this knowledge to be shared with our colleagues in Washington.

I'd like also to welcome our witnesses here today. I look forward to hearing your testimony.

And before I yield to my colleague, Congressman Petri, I ask unanimous consent to allow Members 5 additional legislative days to submit statements for the record of this meeting.

And I now yield to Mr. Petri.

Mr. PETRI. First of all, I'd like to thank my colleague from Dallas, Texas, Eddie Bernice Johnson, for coming here to the upper Midwest and to a beautiful Wisconsin. Our Nation is a whole continent that varies a lot, and the conditions in Texas with regard to water are quite different than the conditions in Wisconsin. And we're very proud of the beauty of our State and its natural endowment. And I know you are of Texas, and it's quite different.

Ms. JOHNSON. Yes.

Mr. PETRI. And so we're happy that you took the time and trouble to, instead of going directly back to Dallas from Washington, to come up to Green Bay and hold this important hearing.

The Great Lakes are obviously a high priority to all of us from Wisconsin, Minnesota, Michigan, Illinois, Indiana, Ohio, Pennsylvania and New York, as particularly in the districts such as that of my colleague, Dr. Steve Kagen, and mine, that border on the lakes. But the Great Lakes are important to people in Texas and the entire Nation.

With 6 quadrillion gallons of water, the Great Lakes account for 18 percent of our entire globe's fresh water supply and 95 percent of the U.S. fresh water supply. Over 33 million people live in the Great Lakes region, representing one-tenth of the U.S. population and 25 percent of the Canadian population. 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 to nations abroad.

Recreational benefits in the Great Lakes region amount to over $35 billion in economic activity each year 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. About 240 million tons of cargo is transported on the Great Lakes annually. The United States fleet of 63 vessels has lost 8,000 tons of cargo capacity for every inch of water the lakes have fallen below normal. These 8,000 tons correspond to enough iron ore to produce 6,000 cars, enough coal to provide electricity to the Detroit metropolitan area for 3 hours, or enough stone to build 24 houses. Some of the larger Great Lakes vessels are transporting 1,800 tons less per trip this year than compared to last year. While commercial navigation is negatively impacted by low lake levels, many other sectors of our economy are also impacted, including recreation, hydropower production and water supply.

So I look forward to hearing from the witnesses today, and I also again thank Chairwoman Johnson and Dr. Kagen for holding this important hearing here in Green Bay, Wisconsin.

Also, pleased that Senator Cowles is here to testify and that his colleagues in the State legislature have come to an agreement on the Great Lakes Basin Compact, and hoping they will be voting favorably on that next week. The sooner a compact is agreed upon by the eight Great Lakes States, the sooner Congress can have its say on the legislation.

So I look forward to the discussion of these matters today. Thank you very much.

Ms. JOHNSON. Thank you.

Congressman Kagen?

Mr. KAGEN. Well, thank you very much, Chairwoman Johnson. I would like to express my deep appreciation to you personally and also to Ranking Member Tom Petri, not just for allowing me to hold this hearing today on this important issue but also for helping me as a new legislator in Washington, to shoehorn me into the job and help me, guide me in the legislative process.

Today is a great opportunity for our community and for everyone listening, not just here today but over the internet, and by other means in the future, to understand the importance of the falling water levels in Lake Michigan and Lake Superior. This is a tremendously important challenge for all of us, and it affects not just the health of our waters but human health as well. It affects our economy. It affects our vitality of our economic region. And today we'll hear testimony about the environmental and economic impacts caused by falling water levels in the Great Lakes, and also a bit on the presence of the non-native species that have infected and infiltrated our waterways.

It really is in the spirit of Wisconsin's own Aldo Leopold and our Gaylord Nelson that we're here, and even before them, the ideas and philosophies of the Native Americans who cared for Mother Earth. Much in everything they did, they asked the question, how will this affect us, our village and Mother Earth? And if it wasn't good for Mother Earth, they wouldn't be doing it. And in that same

tradition, Wisconsin has a longstanding history of doing what's best for its people and for the environment.

I want to thank all the members of the panels for appearing before the Water Resources and Environment Subcommittee. I look forward to your testimonies. I'm very eager to hear your views on the decreasing water levels and potential solutions to ensure the long-term environmental, economic and navigable vitality of the Great Lakes system.

As we are all aware, the Great Lakes are a tremendous and extraordinary piece of our nature. It is our duty to be good stewards of our waterways, not just the surface water but also the aquifers and waters below our surface as well.

The U.S. Army Corps of Engineers is responsible for monitoring channel outflow for channel conditions and water levels to the Great Lakes. According to the lake level measurements recently taken by the Corps, there has been a consistent decline in water levels in the Great Lakes. With the Great Lakes system handling 30 percent of exports and generating $3.8 billion of our national gross domestic product annually, it is critical that Congress continue to investigate this matter.

In addition, Congress should thoroughly examine the linkage, if any, with declining water levels and erosion of the St. Clair River channel. I, along with Senators Cowles and Feingold and Ranking Member Petri, have serious concerns about this matter, which is of great importance to the 8th District of Wisconsin and the entire Great Lakes region.

Moreover, the adverse effects of invasive species in the Great Lakes are the cause of significant anxiety as well. The serious economic consequences and financial cost associated with attempting to manage and control these aquatic invaders in the Great Lakes are quite substantial. And even though ships have in large part complied with mandatory ballast water management regulations in the Great Lakes, over 180 non-native aquatic invasive species now call the Great Lakes their new home.

Let us commit ourselves today and in the days ahead to sharing what we know about the health of the Great Lakes, and then let's put our minds together and guarantee that our children will inherit waters cleaner than we inherited them from our own parents.

It's my hope that the witnesses today will enlighten the Subcommittee and Congress about the importance of what lies ahead, laying down the foundation for what we know and what we don't know. And if there are some studies that need to be done, I hope that Congress will be able to do it in short fashion.

Thank you again, Chairwoman Johnson and Ranking Member Petri, for holding this important hearing. And I yield back my time.

Ms. JOHNSON. Thank you very much, Congressman.

We are pleased to have a very distinguished panel of witnesses this morning. In our first panel we have the Honorable Matt Frank, Secretary of the Wisconsin Department of Natural Resources.

And we are pleased that you could join us this morning. Your full statement will be placed in the record, so if you could limit your remarks to 5 minutes, we'd appreciate it. You may proceed.

TESTIMONY OF HON. MATT FRANK, SECRETARY, WISCONSIN DEPARTMENT OF NATURAL RESOURCES, MADISON, WISCONSIN

Mr. FRANK. I will. Thank you, Chairwoman Johnson, Members of the Committee. I am Matt Frank, Secretary of the Wisconsin DNR. It's a privilege to be here with you this morning.

And I would like to echo the sentiments to you, Chairwoman Johnson, for bringing this Committee here to the heartland, to the edge of the Great Lakes this morning. We really appreciate your attention on this issue and the Great Lakes.

We firmly believe here in Wisconsin that this is a national issue, that the Great Lakes are a great national resource. And we're looking forward to working with Congress and the Federal Government to address the challenges that we have in the Great Lakes.

I would also like to thank Congressman Kagen for his leadership on this issue. He has been a strong advocate, and we appreciate that. And, Representative Petri, I thank you for all your work as well.

You're also going to be hearing from Senator Cowles and Senator Hansen, a Republican and Democrat, who are here to speak on these issues. And I want you to know, Chairwoman Johnson, this not a partisan issue in Wisconsin. This is something everybody cares about. Wisconsin is defined by its waters.

Ms. JOHNSON. None of these issues are partisan.

Mr. FRANK. Thank you. We are passionate about our water. We're defined by our waters. We're a land of over 15,000 lakes and 44,000 miles of streams and rivers. A third of Wisconsin lives in the Great Lakes basin. We depend on Great Lakes for our economy, for recreation, for tourism, for fishing, for growth in business and so many things, and our quality of life. This is a beautiful area of the country, and the Great Lakes are a central part of that.

A few things I just want to highlight for my testimony, Chairwoman Johnson. Two years ago—I should mention before I proceed, I'm here on behalf not only of the Wisconsin DNR but on behalf of my boss, Governor Jim Doyle of Wisconsin, and also speaking on behalf of the Council of Great Lakes Governors.

Two years ago, the Great Lakes Governors got together and developed a Great Lakes Regional Collaboration Strategy. And a lot of folks were involved in this at the local level around every State in the Great Lakes. They identified nine priorities. One of the issues that we are really focused on and concerned about is the level of the Great Lakes, and I appreciate you focusing on that.

You're going to be hearing later from Chuck Ledin, who is the head of our Office of Great Lakes, to provide more detailed information to you on our view of that issue. But one of the things I want to bring up in that context is the environmental impact of those low lake levels.

We have economic impacts, which were referred to earlier. One of the environmental impacts is the impact of aquatic invasive species. As the lake levels drop, what we're seeing, especially in this region, in the Green Bay area, is you have invasive species moving in to the shore line that is exposed as the lakes drop, and we get this plant called phragmite.

Oh, I don't have a picture. We'll have to get a picture for you at some point.

But this is a large weed that grows and is very difficult to get rid of. It is overtaking our shoreline. That's something we're struggling with here in Wisconsin. We're working with locals on that, but it's an issue that I think is just one small piece of the overall environmental impacts of low lake levels. It means a great deal to us to deal with that.

Another issue that's related to the overall health of the Great Lakes is the issue of ballast water and the issue of international shipping. We want ships coming into the Great Lakes. It's part of our commerce, it's part of our economy. But we really need to deal with the issue of ballast water being discharged in the Great Lakes, releasing exotic invasive species that are having a tremendous impact on the Great Lakes region.

And I know that this hearing is primarily on the low lake levels, but all of these issues have to be looked at on an interconnected basis. And I really want to make the point that we want to work with Washington and work with Congress to address this issue. The best solution here is for the Federal Government to act, and we really hope that we can accomplish that.

We also are very interested in reauthorizing the Great Lakes Legacy Act at $150 million annually. Also, there is another $28 million pending on restoration work that could begin on 200,000 acres of wetland in the Great Lakes. These issues are related to lake levels. We look at the impact of lake levels on our wetlands. There are things that we need to be doing to investing into address these issues.

We have been participating with the International Joint Commission to assess the water level management efforts and develop recommendations. We will continue to be very involved in that, and we agree that we need to look at the St. Clair River and the impacts of what may be going on there and have a good understanding of what's happening before we take action.

And it was just mentioned by Congressman Petri about the Great Lakes Compact. We're very proud of the fact that we are going to be passing the compact in Wisconsin. We expect legislation to be passed in the next few weeks. It's very important, not only to protect against diversions, which is an important part of it, but for the first time to have all the Great Lake States and two Canadian provinces coming together to say we need to sustainably manage this resource in this area, and we think it's important for the future of the Great Lakes. It will have and can have an impact on water levels as a piece of the puzzle. And ultimately, we look forward to coming back to you, Chairwoman Johnson, and Congress to deal with Congressional ratification of the compact.

So we've got a lot of work ahead of us. And again, we really appreciate you shining a light on this, and we very much look forward to working with you.

Ms. JOHNSON. Thank you very much.

Secretary Frank, you mentioned that water quality goal of the Great Lakes Regional Collaboration remains unmet and requires action by the administration and Congress to move from vision to reality. What two or three steps are most urgent?

Mr. FRANK. Well, I just mentioned some of those. I mean, there are bills pending with some appropriations, and I've got that in my testimony, that we would like to see Congress move ahead on the Great Lakes Restoration efforts, to have those dollars invested in the Great Lakes. And to authorize the money to be released, we think is an important first step.

This is an incredible resource, and it has such an impact not just on our environment, on our economy, that is going to be money that is very well-spent. And if we don't address those problems, what we'll end up spending on these problems in the future will dwarf with the investment we're going to make now.

I would mention that, since you gave me the chance, I mean, I think ballast water is an issue that's very important. We look at the quality of the lakes, the impact on our commerce, the impact on our environment, having action on ballast water and having a workable solution that addresses that I think is very important.

And the compact—we think, you know, the compact doesn't finally become the law of the land until Congress ratifies it. You don't have an opportunity to do that until all the States ratify it. But we're moving to that; I think we're going to get there. And I'm hopeful that in the next congressional session starting in 2009 that we'll be back working very closely with you to get that done. I think that's a very important step forward.

Ms. JOHNSON. You spoke of the need for better coordination between Federal agencies. Give me an idea of what you mean by that.

Mr. FRANK. Well, first of all, let me just say, our Federal agency partners, and many of them are here today, we thank them for our partnership with us. The U.S. Army Corps of Engineers and so many other agencies do a lot of work on Great Lakes issues.

From our perspective, however, we would like to see some effort be made—and we're not about to tell the agencies exactly how they should do this, but we would like to see better coordination among the Federal agencies with a focus on the Great Lakes. Look at this as a holistic situation, that we have to look at the watershed as a whole, look at not only policy but the agency action and have a better way to coordinate all these efforts across the agencies.

That's certainly what we're trying to do when we're working across State lines. We know that in Wisconsin we can't solely protect the Great Lakes; we've got to work with other States. So we would like to see better coordination not just among the States but working with Federal agencies and Federal Government policy.

Ms. JOHNSON. Thank you.

Representative Petri?

Mr. PETRI. Thank you.

I'd just like to pick up on that point, and wonder if you could discuss at all what sort of things are currently being done or being worked on to be done at the agency level by the Department of Natural Resources to set up channels of communication or collaboration with Michigan, Minnesota, the Canadian provinces and so on.

A lot of these issues are better dealt with by experts in consultation with people who have a stake in the community, whether they're sportsmen or users of the Great Lakes in other ways. And

there is obviously an important aspect of a political level to it, but a lot of that can be dealt with almost more effectively if the time is taken to actually coordinate and to identify and to work through problems with specificity, which we really can't do in the national Congress very well.

Mr. FRANK. Thank you, Congressman. And, yeah, my point is not—we're not looking to hand this issue and problem over to the Federal Government. I appreciate your thoughts, which are very well-taken, that we need to be working on this at a local and regional level, but we want to do it in partnership with Federal agencies.

And I think, to directly answer your question, the Council on Great Lake Governors has been an excellent forum for coordination between the States. I think that kind of collaboration with the Governors, indicating by their personal participation how important it is, that sends a message to every agency in the State government that this is a high priority. And I think that is a good vehicle for us to continue to look at these issues comprehensively, work through the Governors.

That means that, you know, our Wisconsin DNR, we're building our relationships, working with our sister agencies in other States. That's all got to be done. But we need to do it with a strong Federal partnership. The fact is, we need to have input at the State and regional level, but there needs to be attention on this issue, and there needs to be some Federal resources devoted to us. It's that important, I think, not just for the region but for the country.

Mr. PETRI. Thank you.

Ms. JOHNSON. Mr. Kagen?

Mr. KAGEN. Thank you.

Secretary Frank, you've done a great job in combating invasive species. Can you name one invasive organism that has been eradicated?

Mr. FRANK. I wish I could.

Mr. KAGEN. All right.

Mr. FRANK. Yeah.

Mr. KAGEN. What obstacles are you facing as Wisconsin tries to work with other States along the Great Lakes, in terms of the speed bumps and the hurdles of how you work together with other Departments of Natural Resources? Is it all about money? How are you getting along with them?

Mr. FRANK. Well, I think we've got a lot of good cooperation going on. We've got a lot of problems that we're facing together.

I'll give you an example. When we talk about invasive species and the ballast water issue, in the absence of Congressional action, all the States are looking at this issue. We're looking at this issue right now, looking at the possibility, the potential for onshore ballast water treatment, which, when the ships come in to one of our ports here in Milwaukee or Green Bay or Superior, that we could do onshore treatment.

Minnesota, we're working closely with them. They actually put some rules out this week that we're working with them closely on and looking at how they're proceeding on this issue.

But other States are looking at this issue, and the problem we have on ballast water is, even as great as these efforts are, we're

still approaching it piecemeal. The invasive species don't stop at the political boundaries. And, you know, we're here to work with the Federal Government to provide information and so forth, but we really need some Federal policy in this area.

Mr. KAGEN. Would you agree that once we establish a Federal standard for the treatment of ballast water, that then private industry can create the technology and move up to that standard?

Mr. FRANK. We're very open. We know that industry—we know how important this—the shipping in the Great Lakes is important to our economy. And I think as you develop legislation, that it's important that we do it in a way that's workable for the industry.

But I think we've got to set standards and we've got to move towards it. The industry, in conjunction with the Great Lakes research in Superior, is doing some research about onboard treatment. We kind of look at all the options, and we need to set the goal and set the standard and then, I agree, Congressman Kagen, drive towards that solution, working with the industry. But it's really time to act.

It's really unfortunate what's happened with—I mentioned phragmites earlier. We're looking at zebra mussels and quagga mussels and so forth, and what they're really doing to our watershed, what they're doing to our fisheries potentially. And that's just several invasive species. And the best solution here is prevention. When we know what is happening, what the problem is, let's stop doing it and let's prevent the further invasion of additional species.

Mr. KAGEN. Very good.

I yield back.

Ms. JOHNSON. Thank you.

Thank you very much for appearing.

Mr. FRANK. Thank you very much, Chairwoman Johnson.

Ms. JOHNSON. We now have our second panel.

If you will approach the table.

The Honorable Rob Cowles, State Senator from Wisconsin's 2nd Senatorial District; and the Honorable Dave Hansen, State Senator from Wisconsin's 30th Senatorial District.

And as I noted to the first panel, your full statements will be placed in the record. We ask that you try to limit your testimony to about 5 minutes, as a courtesy to other witnesses.

And we will proceed as the names are listed. Senator Cowles?

TESTIMONY OF HON. ROB COWLES, STATE SENATOR, 2ND SENATE DISTRICT, MADISON, WISCONSIN; AND HON. DAVE HANSEN, STATE SENATOR, 30TH SENATE DISTRICT, MADISON, WISCONSIN

Mr. COWLES. Thank you very much, Madam Chairperson Johnson. And thank you very much for being here. Congressman Petri, thank you for being here. Congressman Kagen, thank you for being here.

I submitted a statement. I don't want to read that. I'll just speak straight from the heart.

Secretary Frank, I think, fully ventilated our need for a Federal law on invasive species. Michigan has passed a law; it's being challenged in court. We tried to pass a law in Wisconsin; it was stopped by certain forces. We need you folks to pass a national law. I know

that there is debate over the purity standard. Resolve it, and move on.

There has been incredible damage. It's a travesty what's happened to our Great Lakes through invasive species.

On the Great Lakes Water Compact. I've spent the last year-and-a-half of my life working on this through a study committee that ultimately deadlocked. We moved forward in recent days. Secretary Frank mentioned it's a bipartisan effort, and indeed it has been. Senator Hansen's a Democrat here today; I'm a Republican. There are people of all shapes and sizes working on this.

We're on the verge of passing a compact in Madison. It's not only the raw compact of the 44 pages like other States have done, it's also the difficult implementation language that's been worked on by our DNR and other folks. Todd Ames and others will be testifying today, possibly, on that.

We're going to get this done. We think it will be a model for other States in regard to conservation and return flow. Those straddling counties that will be applying for water will have to meet a new level of accountability that they're not now. Now they've come around; they've accepted that.

We're going to get this done, and now we need you folks to grab the ball after the eight States are done. And I'm optimistic those other three States will get it done. We need you folks to carry the ball and finish it.

The Great Lakes cannot handle more leaks. There are leaks in the system. We only have 1 percent regenerated. These lakes are our redwoods, metaphorically speaking. They're our Yosemites. They're our Yellowstones. The national Government has protected those resources on a regional basis. This is a regional resource.

Maybe somebody from Texas or somebody from Arizona doesn't have a stake—I would say they do have a stake because we cannot drain these resources, And there are folks out there that want the water. So we're counting on you to carry the ball to the final finish ground here.

And I'll, I guess in the words of Congress, yield the rest of my time and look forward to questions. Thank you.

Ms. JOHNSON. Thank you very much.

Mr. Hansen?

Mr. HANSEN. Thank you. It's great to have you at University of Wisconsin-Green Bay. I was class of 1971, and we were the original ecological university. Way ahead of our time, I would believe. But it's great to have you here.

Thank you, Madam Chair and Members, for convening this hearing today and for the invitation for me to testify.

I am State Senator Dave Hansen. I'm in the 30th District, Northeastern Wisconsin, which goes from the city of Green Bay up to Marinette. And the Great Lakes, as has been mentioned, is vital to the life, the health and economic vitality of our area. We rely heavily on Lake Michigan every day for our drinking water, for our economy and for our recreation.

I'm also a member of the Great Lakes Commission, and I've been involved firsthand with the initiatives of that organization to restore, protect and sustain the Great Lakes. As part of this initiative, the Great Lakes Commission is calling Congress to strengthen

national investment in the Great Lakes. We need help from the Federal Government to stop the influx of invasive species, to do more comprehensive study on lake levels, and to fix the problems that are causing our lake levels to drop.

And I was happy to stand with the Governor last week as we announced an agreement on ratifying the Great Lakes Compact. Wasn't an easy task. But, as Senator Cowles has said, this is not a partisan issue. It is us, together, doing the right thing to protect this tremendous natural resource.

But while the approval of the Great Lakes Compact will provide a framework for future protection of the lakes, we all know that our Great Lakes are in trouble today. A new study says Lakes Michigan and Huron are losing 2.5 billion gallons per day. Our Great Lakes levels are dropping nearly two inches per year. And from 1999 to 2003, lake levels have dropped by over three feet. Last summer Lake Superior reached its lowest level since 1926.

Whatever the cause, it is clear that the falling lake levels in Lake Michigan and Superior are affecting commerce in the Great Lakes, causing increased cost for dredging, affecting tourism, homeowners' properties, and wildlife habitat.

Unfortunately, it is about money and having the money necessary to implement a lot of what we're looking for.

What is causing this? It's been argued, it's been mentioned, that a 40-year-old dredging project on the St. Clair River has caused an increased flow to Lake Erie. And some say that the climate change is affecting rain and snowfall patterns and increasing evaporation. Or maybe it's a combination of factors. I will let the experts speak to that. However, it is clear that the Great Lakes need more attention and commitment to their preservation.

As we all know, the Great Lakes, and it's been mentioned, 18 percent of the world's fresh surface water and 95 percent of all the fresh water in North America. I will do my part as a member of the Great Lakes Commission and as a State Senator, but I also urge the Committee and the Federal Government to do all it can to protect this valuable resource.

You have mentioned phragmites today. Tremendous problem in Marinette and all along the bay of Green Bay. We do need research to help remedy the situation, and we do need dollars to do what we can to get this done. So please consider that also. The exotics have been a problem, and they will continue to be a problem.

I was with the Port of Green Bay symposium yesterday, and they talked about the desperate need for dollars to dredge so that our ships can actually get into these harbors and unload. Tremendous economic investment here. We need it. We need your help in that area.

So as time goes forward, it is an approach that the Federal Government's got to play a role. State and local, regional government has to play a role, but we ask for your help to protect this absolutely great resource.

And I'll yield back my time. Thank you.

Ms. JOHNSON. Thank you very much.

Would a compact prevent the fluctuation of the water levels? Would it solve the issue?

Mr. COWLES. No, Chairwoman Johnson. There is a natural fluctuation. I read about this a little bit, and there is. I'm sure there will be people today that will know far more about this. It's a 30- or 40-year cycle. There will always be a fluctuation. What we're trying to do with the compact is prevent catastrophic loss of water that would go far beyond that natural fluctuation.

You know, it's been mentioned, the St. Mary's River, and you've got the Chicago River situation, those are leaks that probably aren't going to be reversed. Then there is an input point up in one of the Canadian provinces that neutralizes the Chicago River loss.

The question, I think, for us as policymakers is, are we going to let this get worse? And if we don't prevent a long-range diversion, it will be inevitable requests for it, the problem could get much worse. And the compact is—I'm speaking to the choir here—it's a vehicle that will unlikely be penetrated by Congress because a compact, as I understand, has never been abrogated by Congress. Statutes, however, and the current statute, which is very weak in Water Resources Development Act, that could be stricken and thrown out at a whim. But a compact, to the best of my knowledge, once it's been signed into law, has never been abrogated. And that's why we need this compact to protect the overall viability of the Great Lakes.

Mr. HANSEN. And just a quick follow-up on that. The one-State veto has been discussed a lot in the Great Lakes compact, that any State can prevent a diversion outside of the Great Lakes basin. That has to be maintained. Now, if a community like Waukesha or New Berlin can prove through conservation measures that they can return the water, we don't have a problem, but we do have to retain the right to protect the water outside of the basin.

Michigan is not an issue. I think 99 percent of Michigan is in the basin. But in Wisconsin we have some straddling communities that want our water badly, and we have to do what we can to protect the water levels by not allowing diversion unless they can return the water.

Ms. JOHNSON. Okay. Are there any other solutions besides the compact?

Mr. COWLES. Well, Senator Hansen touched on the St. Mary's River issue. And I know that—I believe the Corps of Engineers is studying whether they can slow down that flow of water outside the Great Lakes. I think maybe somebody else can update us on the status of that, but that's a big leak in the system.

But, again, what we're trying to do here is prevent even bigger leaks. So some things we can't change, but the compact is something where we can, once it's instituted, passed by you folks and all the eight States, we can say no. Peoria wants the water or someplace far outside the watershed, we'll be able to say no; there will be no way for them to sue us.

Mr. HANSEN. Madam Chair, there's been a lot of concern that in the election, or redistricting, 2010, and then the pursuing elections, the Great Lakes States may lose as many as seventy congressional seats. And obviously Georgia would like our water. My kids just moved back from Las Vegas; Nevada would love to have it. California. And there is a concern that with that many seats being lost—I feel bad for the dry States, but we have to do what we have

to do to protect any kind of diversion from our Great Lakes. Tremendous natural resource; the opportunity economically to provide many jobs into the future. It's a treasure that we must maintain.

Ms. JOHNSON. You indicated that Federal Government needs to do more. Could you enumerate some of the things you want the Federal Government to do?

Mr. HANSEN. Having been with the Army Corps yesterday and illustrating the need for dredging on particular harbors, they say to get money to put it in an area where it's really needed, they have to pull it from a different community or different State. So robbing Peter to pay Paul. And it's very difficult to say, well, we're going to take it here, but we're going to take it away from there.

You know, I know it's tough at the Federal level with funding and financing, but I think it's key for our economy, our economic well-being, that those harbors be maintained and be dredged to a level where shipping may continue. And I think that's a huge thing. And I think finances obviously come into play here.

Ms. JOHNSON. You want Federal Government money.

Mr. COWLES. I'm not asking for it today. Others will. I want to focus on the compact and invasive species. I think those are bigger threats right now.

Mr. HANSEN. Except, to follow up on that, with phragmites, you don't do that cheaply either, and it is such an urgent—if you've been to Marinette and the town of Peshtigo, where you can no longer see the bay because of the growth of phragmites, they're 15 to 20 feet high—incredible. And it's an exotic from Europe. We've got to do something to try to find a solution to that tremendous problem.

Ms. JOHNSON. Thank you.

Mr. Petri?

Mr. PETRI. Thank you.

Thank you both for taking the trouble to prepare the testimony and for delivering it so ably today.

You touched on the thing that I think is central to this, and that is that the Great Lakes is an almost unique ecosystem, in that it doesn't have much of a drainage area in relation to the amount of water that's there. The Mississippi River drains all the water to the west of here away, and most of the water that replenishes the Great Lakes comes right onto the Great Lakes when snow and rain land on the surface of those lakes.

So the issue of diversion is very important because it could be, going back to the days of glaciers, that this is a gradually, naturally diminishing pool of water in any event, and anything that we do to accelerate that would be very, very—it would be very, very foolish, long term. We want to do everything we can to preserve and, if we can, to kind of delay or stop that, what could be a natural erosion of the Great Lakes.

I know you discussed that with this compact. I wonder if you could talk a little bit—you're both from the Senate. You passed it right away. The Assembly took longer. There were issues and concerns on the part of the watershed that goes right through Wisconsin. I think a third of our State, by territory, is in the Great Lakes watershed, and the rest is outside of it, but by population

it's probably a majority of people live in the Great Lakes watershed in Wisconsin.

But along that line, west of Milwaukee and here, the drainage goes into the Mississippi River, and so I think there is a lot of concern that any Governor can veto this. And there may be local arrangements that make sense and that people need in order to be viable as communities, and they don't want to surrender, you know, their autonomy to a Governor in Ohio or whatever.

Could you discuss how that's been worked out?

Mr. COWLES. Well, they conceded on the one vote. They backed off on it. I mean, that was a point of contention from some folks, some senators and some representatives. They backed off on that, and the debate has shifted towards the fine points of implementation.

And I believe that the final package that we get will be very adequate on conservation and return flow. It must be, otherwise we change that dynamic, which Congressman Petri used, so ably depicted, that you've got this pool of water left by Mother Nature, and there is very little being recirculated on an annual basis. So if we violate that, we're going to drain this big body of water over a period of time. It wouldn't be next week or next year or maybe 10 years, but we're looking at a long period of time, and so we're the custodians right now.

But they backed off on the one vote, and the fine points—I call it tweaking. It's a big, complicated 140 pages of implementation, but I believe that it's going to be resolved in a way that will get a giant vote, if possibly unanimous vote, in the legislature.

Mr. HANSEN. And, Congressman Petri, in the State Senate, we did pass it 26 to 7. And I think the basic concepts in the compact that the Assembly has agreed upon with the Governor and the Senate are going to still be there. As Senator Cowles said, it is about tweaking it. It may be some minor language detail. But the basic concept, the one-State veto, will continue. And we're going to pass it, and it's going to be by a large majority. But it takes a long time to get it drafted. It's a huge document, and it will come back to us probably within a week or 2, and we will have it done.

Mr. PETRI. Is it true that communities that are not entirely within the watershed may be able to use some of the water from the watershed, but only on the condition that they then return after treatment the runoff or the sewage back into the Great Lake watershed——

Mr. COWLES. That's the straddling community.

Mr. PETRI. —so it's expanding the watershed, not diverting from the watershed?

Mr. COWLES. In a way, it is expanding it, but that is built into what I call the raw compact that allows those communities to apply to the eight Great Lakes Governors under certain circumstances. But the Great Lakes Compact gives each State discretion how you define the diversion, how do you define conservation, how you define return flow. In Wisconsin, we believe we'll decide that in a very strict point of view from sustainability, which will hopefully create a precedent for the other States as they do their implementation language.

We've got to return it, so—and this was a big barrier in the whole debate on this, because some of those communities that knew that they were eligible early on, through the raw compact, didn't really want to return it in any substantial way. They didn't want that harsh accountability. But we fought through that, and I think we have acceptance. They realize in order to get approval from the eight Great Lakes States, they're going to have to go the extra mile to do things that they've never done in their communities. Otherwise, the water won't be able to go back, the water would be dissipated.

So this will play out. If we get this done, Congress passes it also, there will be some additional battles over these fine points or the fine administrative rules that will be designed by our Department of Natural Resources. But from my point of view, you've got to return as much of it as possible. Otherwise, you create a—the precedent of just dissipating the lake over a period of time.

Mr. PETRI. Thank you.

Ms. JOHNSON. Thank you.

Mr. Kagen?

Mr. KAGEN. Thank you, Madam Chairwoman.

First of all, let me thank both of you and your colleagues for working together on this tremendously important issue. I appreciate the difficulties that you've had, and I want to congratulate you just before you get to the finish line. And how proud I am to say I'm from Wisconsin, where we work together across all party lines to guarantee that our environment is protected.

And thank you both for pointing out the importance of the water level and, as the water levels decline, how important it is that we invest in our harbors and dredge them sufficiently to get our goods into our market and out of our market at the same time. And there is a limit to the amount of water we have on our planet. We're not going to be making any more H2O. We have what we have, and we have to care for it.

And in the same way, our economic resources are limited as well. The amount of dollars, the hard-earned tax dollars that we send to Washington, where we invest our tax dollars should be a measure of our values and where we want to invest our time and our hard-earned money. In my opinion, spending $12 billion every month rebuilding Iraq, that money could be spent over here.

And Secretary Frank talked about the interconnections between invasive species and water levels. Well, there's an interconnection with everything that we're doing in Washington today, but we have to, in my view, refocus our placement of our bets, where we're going to invest our tax dollars.

If I might turn on the slide and show you what we're talking about, because I like pictures.

Well, these are the Great Lakes that State Senator Cowles and State Senator Hansen have been referring to. These are the precious waterways that we're trying to protect and defend and enhance.

And you talked about the watershed. The broken line here is the watershed of the Great Lakes. And the reason I'm using this slide is not just to illustrate in picture form the watershed we're talking about but to ask a question.

With the Great Lakes compact, how will the State of Wisconsin determine and control what Cleveland is going to do with regard to drinking water, where they're going to send their water? How will this be executed? Who will decide? Is it going to be an agency? Is it going to be the Department of Natural Resources?

You know, the devil is always in the details. So, Senator Cowles, I'll ask you that question.

Mr. COWLES. Well, it would be consultation with the respective Department of Natural Resources, working with that Governor. For example, if Cleveland—I can't tell from that circle, but if part of Cleveland is outside the watershed, and they were trying to get—if they were in a straddling situation—I don't know if they are—if they're inside the watershed, there is no say, they can do what they want. But if it's a straddling situation where they're somewhat outside, they can apply under the compact, the raw compact that I mentioned, and then all the States have to agree. Whoever our Governor is at that point, when that comes in, if one Governor says no, it's over.

Now, that's current law also, but current law under the Water Resource Development Act says that you can't—that there's no scientific reason—you don't have to give a reason, I should say, for saying no. So some State right now could just say no even if we went to the nth degree in Waukesha, which I expect Waukesha to do. They're going to do all sorts of special things to return that water. And when they do make their application to the eight Great Lakes of Governors—so you've got to convince all the Governors that your application has merit, and then you—then it's something that you can challenge.

Under current law there is no challenge; all you have to do is say no. And that's what people say, well, why does this benefit those straddling communities in our State? It benefits because if they do the things in the compact and have a defensible scientific reason, as far as what they're going to return, they'll probably get the water. In return for the entire basin, we all are able to say, hey, we block those far-away diversions outside the watershed, outside the straddling communities.

So it's a carefully balanced compact.

Mr. KAGEN. My next question has to do with the fact that we're drawing water out of the ground so the water table is declining and we're not allowing our water table to be recharged. And indeed, this is a slide that depicts the amount of water taken out by each of the cities. Green Bay, I think, was 27 million or 23 million gallons per day taken out of our underground water.

So isn't it also true that the Great Lakes need to be recharged, that if communities outside of one State are drawing more water, then we may not be allowing that water to be recharged? What does the Great Lake compact have to say about ground water?

Mr. COWLES. Well, the public trust doctrine has been debated heavily, and we don't think that it would have the impact that some—we don't think it would do what some say.

For example, in the Green Bay circle, it would have no impact. Some think it might have an impact on some of those bordering communities, but I would like to leave that question for Todd Ames or Chuck Ledin from our DNR. I don't believe it has an impact.

For water from somewhat outside the watershed, you might be grabbing some outside the watershed and moving it in or moving it out. But there is some room for discretion there, so it's not a hard and fast situation.

Mr. KAGEN. Just so I understand, does the Great Lakes compact address ground water aquifers at all in the language?

Mr. COWLES. I don't believe that it does. Some say that it does.

Mr. KAGEN. Do you think that it should?

Mr. COWLES. I don't want the Great Lakes Governors to go back and have to renegotiate this. From what I studied, I think that they've got a pretty good deal, and to go back and renegotiate would start the whole thing over.

Mr. KAGEN. Thank you very much.

I yield back.

Ms. JOHNSON. Thank you, gentlemen, for testifying, and thank you very much for your efforts and leadership to preserve this God-given treasure of having these wonderful lakes.

I attended a little college over at the south bend of Lake Michigan and graduated a long time ago.

Thank you.

Mr. COWLES. What college?

Ms. JOHNSON. St. Mary's of Notre Dame.

On the next panel, we'd like to invite Mr. George Meyer, the executive director of Wildlife Federation and former Wisconsin Secretary for the Department of Natural Resources, to join this panel.

Thanks to all of you for coming. And you consist of our final panel. And we will listen with great interest to what you have to offer us.

Dr. Roger Gauthier, program manager and hydrologist from Great Lakes Commission and U.S. Army Corps of Engineers; Lieutenant Colonel William J. Leady of the Detroit District of the Corps of Engineers; Mr. Chuck Ledin, director of Wisconsin's Department of Natural Resources, Office of the Great Lakes and U.S. co-chair of the Ecosystem Technical Workgroup for the International Joint Commission of Upper Lakes Levels and Flows Study; and Mr. Dean Haen, port manager of the Port of Green Bay, Wisconsin; Mr. Charlie Imig of Clean Wisconsin; and Mr. James Weakley, president of the Lake Carriers' Association; and, of course, Mr. Meyer.

We will start now as you were listed and go right down the panel.

TESTIMONY OF MR. ROGER GAUTHIER, PROGRAM MANAGER AND HYDROLOGIST, GREAT LAKES COMMISSION AND U.S. ARMY CORPS OF ENGINEERS, EISENHOWER CORPORATE PARK, ANN ARBOR, MICHIGAN; LIEUTENANT COLONEL WILLIAM J. LEADY, DETROIT DISTRICT, U.S. ARMY CORPS OF ENGINEERS, DETROIT, MICHIGAN; MR. CHUCK LEDIN, DIRECTOR OF THE OFFICE OF THE GREAT LAKES, WISCONSIN DEPARTMENT OF NATURAL RESOURCES, U.S. CO-CHAIR OF THE ECOSYSTEM TECHNICAL WORKGROUP FOR THE INTERNATIONAL JOINT COMMISSION UPPER LAKES LEVELS AND FLOWS STUDY, MADISON, WISCONSIN; MR. DEAN HAEN, PORT MANAGER, PORT OF GREEN BAY, GREEN BAY, WISCONSIN; MR. CHARLIE IMIG, CLEAN WISCONSIN, MADISON, WISCONSIN; MR. JAMES H.I. WEAKLEY, PRESIDENT, LAKE CARRIERS' ASSOCIATION, CLEVELAND, OHIO; AND MR. GEORGE MEYER, EXECUTIVE DIRECTOR, WILDLIFE FEDERATION, FORMER WISCONSIN SECRETARY OF THE DEPARTMENT OF NATURAL RESOURCES

Mr. GAUTHIER. Madam Chair, Congressman Kagen and Congressman Petri, I would like to thank you for this opportunity to share the perspectives on lake level conditions from the Great Lakes Commission.

I am program manager with the Commission and have been a retired hydrologist for the U.S. Army Corps of Engineers. Please let the record show that I'm not a doctor. I have not attained that noble rank, but it does look good.

In my capacity as hydrologist, I have learned a lot about the lakes and how they've changed over the last 30 years. Water levels on the Upper Great Lakes have been significantly lower than average over the last 8 years, since the year 2000. Water levels fell nearly four feet on Lakes Michigan and Huron in a 2-year period from 1999 to 2001 that corresponded with a very significant la nina event that hit the continent.

The current low-water period running for 8 years rivals the last long low-water period that occurred during the Dust Bowl era in the 1930s. The Great Lakes as a system is a very young system and has endured water level fluctuations for the last 4,800 years, based on the geologic evidence that we know today. So that is a very short time period, and the extremes have been in the order of six to seven feet between extreme highs and extreme lows.

I need to be clear at the outset that the largest factor affecting water levels is nature, not human activities. It has been said that man influences lake levels in the matter of inches, Mother Nature influences them in the matter of feet. By far, the largest natural factor effecting change in water levels are long-term climactic changes.

I'd like to confine my remarks, however, to the anthropogenic or human-induced causes of lake level changes, because I think that that's an area that is of most relevance to this discussion.

Outflows from Lake Superior and Ontario are regulated by national agreements which effectively compress the ranges, the natural ranges that have occurred for the better part of the last 100 years on Lake Superior, the last 50 years on Lake Ontario. The diversions into and out of the Great Lakes system have been nearly

constant over the last 30 years, which do not have an influence on this current period of low lake levels.

However, the changes in the outflows from the rivers, from the lakes, have a very material influence on the lake levels upstream and downstream. Changes in the rivers are both anthropogenic and natural. For instance, on the St. Clair/Detroit River system, there has been numerous alterations of that channel configuration since the 1850s. The change in conveyance has been a function of natural features of erosion and accretion. It's also been exacerbated by dredging and sand mining in the early 20th century.

The International Joint Commission and studies in the 1960s noted that Michigan and Huron are permanently 13 to 18 inches lower today as a consequence of just the human changes to that system. So what we know today, the lake levels out here on Lake Michigan, they're actually a foot lower at least as a function of changes in the St. Clair River.

In 2004, a study commissioned by a private foundation concluded that Lakes Michigan and Huron may have actually been lowered an additional nine inches or more because of erosion prospectively in the upper end of the St. Clair River. This private study has been a subject of much controversy warranting more scientific investigation. The IJC, the International Joint Commission, International Upper Great Lakes Study has been tasked to investigate this assertion, with preliminary findings expected next spring. The Great Lakes Commission fully supports this effort being undertaken by the Upper Lakes Study team to examine the physical changes that may be occurring causing the current lake level lowering throughout the system.

The recent lower water period cannot yet be directly linked to climate change or global warming. The majority of global climate models indicate, however, that the Great Lakes region will be warmer and drier due to global warming. One of the principal concerns is that changes in the heat retention of the lakes are not well-understood and not well-monitored. We need to know that in advance.

The Great Lakes Commission has called for some strategic investments from Congress to help address these current conditions that are included in the testimony.

In conclusion, action on Great Lakes low water levels are timely. We urge you to consider implementing the strategic federal legislation identified in this testimony. Thank you very much for inviting us for our comments.

Ms. JOHNSON. Thank you very much.

Lieutenant Colonel?

Colonel LEADY. Madam Chair and Members of the Subcommittee, I am Lieutenant Colonel Bill Leady, commander of the Detroit District of the U.S. Army Corps of Engineers. Thank you for the opportunity to testify before you today.

In support of the nation, the U.S. Army Corps of Engineers provides expertise to monitor and forecast Great Lakes water levels and technical support to the International Joint Commission, or the IJC, by regulating outflows of Lake Superior and Lake Ontario. Lake levels directly affect the natural environment, commercial navigation, recreational boating, shoreline property, municipal

water intakes, and many other features that affect our quality of life.

Before I discuss current lake levels, I would like to provide some background on the main factors that affect lake levels. As illustrated in this Hydrological Components poster here, I think you have a copy of in front of you, the information shown on this poster uses long-term averages and doesn't reflect a specific time period. The poster illustrates four components, precipitation onto the lake in red, runoff from rivers and streams that feed into the lake in orange, evaporation from the lake surface in yellow, and outflows from the lake in blue. Man-made diversions are also shown.

The relative importance of each of these factors shifts as water flows from the basin's headwaters at Lake Superior to the basin's outflow at the St. Lawrence River. For example, 57 percent of Lake Superior's inflow comes from precipitation directly onto the lake. Precipitation directly onto the lake accounts for only 7 percent of inflow for Lake Ontario.

I would note that Lake Michigan-Huron are, for many purposes, treated as a single lake since they are joined at the Straits of Mackinac and rise and fall together.

There are five man-made diversions. The Long Lac and Ogoki diversions bring water into Lake Superior. The Lake Michigan Diversion at Chicago removes water for water supplies, sewage disposal and commercial navigation. The Welland Canal provides a shipping route around Niagara Falls. And the New York State Barge Canal diverts a small amount of water from the Niagara River. These last two diversions are internal and don't affect the Great Lakes as a whole.

Water levels on the Great Lakes fluctuate in three distinct cycles: short-term, annual and longer-term. Water levels fluctuate on short-term basis usually due to winds and changes in barometric pressure, lasting from a couple hours to several days. These can affect lake levels by several feet within a matter of hours.

Lake levels fluctuate on a seasonal cycle. On the Great Lakes, water levels decline to the lowest part in the winter because more water leaves the lake through evaporation than enters. And as snow melts in the spring and runoff increases, the lake levels rise and peak in the summer.

Long-term fluctuations occur over periods of consecutive years. Continuously wetter and/or colder-than-average years will cause levels to rise, while warmer and drier than average years will cause levels to decrease. Ice cover has a significant effect on lake levels because ice acts as a lid preventing evaporation which is, as you can see, a major source of outflows on the Great Lakes.

The IJC, with the Corps as one of its supporting agencies, does have some ability to influence relative lake levels. Lake Superior outflows have been regulated since 1921 by the IJC's Lake Superior Board of Control. The objective of the Lake Superior Outflow plan is to balance lake levels on both lakes relative to their long-term averages. Regulation of Lake Superior's outflow has a small effect on the relative lake levels of the lakes, but to a far lesser extent than precipitation and evaporation.

Outflow from Lake Ontario is managed by the IJC's International St. Lawrence River Board of Control. Criteria for regu-

lating outflows on this board recognizes three criteria, the interest of riparian property owners, hydropower, and commercial navigation.

Now I'll turn to historic water levels on the Great Lakes and current conditions. The Corps began monitoring water levels on the Great Lakes in the 19th century. The Great Lakes Water Levels poster and the chart in front of you graphically shows long-term fluctuations from 1918 to present. On these graphs, the blue line represents—on each lake represents the annual monthly average, and the red line represents the long-term average.

Several observations about the Great Lakes become apparent when the information is presented in this format. First, lakes are rarely at their average level. Also, even at this scale, annual cycles with lakes peaking in the late summer and dipping to the lowest point in winter are apparent. The level of each lake is somewhat independent. That is to say, one lake may be in an extended above average period while at the same time another lake may be an extended below average period, and a third lake may be near average. Lastly, from 1918 until the present, there are no definite or predictable patterns or fluctuations on any lake or the system as a whole.

For the reasons I mentioned earlier, lake levels on the Great Lakes have gone through periods of highs and lows over the past 90 years. Following the period of above water levels from the 1970s to 1990s, the upper Great Lakes have experienced low levels from the late 1990s. Increased water temperatures, reduced ice cover, reduced precipitation, increased evaporation have contributed to decrease in water levels on the upper lakes. Lakes Superior and Michigan-Huron are currently significantly below average, while Lake Erie and Ontario are currently above average.

But there is some good news this year. A very active winter storm track has brought abundant snow to most of the Great Lakes basin. Also, ice cover began much earlier this year in the northern lakes, limiting evaporation. Soil moisture across the Great Lakes is also above average.

These conditions hold promise for increasing water levels this spring and summer. Specifically, Lake Superior has been below it's long-term average since 1998 and is currently in its longest period of below average levels since the 1918 to 2000 period of record. The lake set new monthly average lows in August and September of 2007. These new records were brought on by drought conditions over the basin for the previous 15 months. Then the basin was inundated with about 10 inches of rain, and water levels responded by raising nine inches. Lake Superior is expected to be below average for the next 6 months, though it will be 8 to 17 inches higher than last year when it was setting record lows.

Lake Michigan-Huron has been below average since 1999 and is currently in its second longest period of below average water levels in the 1918 to 2000 period. The longest period was in the 1930s. The lake is currently below average, below last year's levels, and will remain 9 to 13 above its records lows and 18 to 21 inches below average over the next 6 months.

Lake Erie has fluctuated around average for the past 2 years. The March monthly average level was eight inches above average

and two inches below last year's levels. Lake Ontario has fluctuated around average for the last 2 years.

Another issue that has received recent attention as a possible cause for low levels on Lake Michigan is the flow of the St. Clair River. In order to answer these questions about the changes in St. Clair River and their impact over the rest of the system, the IJC, or the International Joint Commission, has included these issues in the International Upper Great Lakes Study which is ongoing. The study will re-evaluate the regulation plan of Lake Superior and investigate those issues involving St. Clair River. The Corps believes the IJC study is the appropriate vehicle to investigate the recent changes. The Corps is one of the several agencies that is supporting the study with technical work.

To close, I would like to thank you once again, Madam Chair, to allow the Corps of Engineers the opportunity to appear before the Subcommittee. Thank you.

Ms. JOHNSON. Thank you very much.

Mr. Ledin?

Mr. LEDIN. Thank you, Madam Chairperson, Congressman Kagen, Congressman Petri. We really appreciate the hearing being held in Green Bay today and bringing the visibility to the Great Lakes.

I'm a life resident of Wisconsin, and I've been with the DNR for 35 years. And in my tenure I've seen the highest all-time lake levels, and I've seen the lowest lake levels in Lake Michigan and the near-record lows in Lake Superior. And what everyone is—if we had been here 20 years ago, the issues would have been what can we do to get rid of the water, rather than what can we do to bring the water back.

And while some of this is natural cycling that can be explained, the biggest issue is this is a huge, complex system under a whole series of very complicated large-scale stresses. Whether it's exotic species, whether it's climate change, whether it's toxic chemicals, whether it's agricultural runoff or urban runoff, all of these issues are assaulting the lakes and the ecosystem of the lakes and our ability to use the lakes for the many social needs we have.

No State, no province, no collection can do what's needed to do to solve the issues that we face on the lakes. It needs to be a comprehensive campaign at a State and Federal level with full partnership between the appropriate agencies.

As you've heard earlier, we lose a little ice cover in Lake Superior in the month of February in 2007, we lose two inches more of water. That's measured in trillions of gallons that don't go through the system. Lake Michigan averages 26 billion gallons of evaporation a day. The warming trend—the warmer water is not going to be solved by what we do with the water. It's going to be solved by what we do with what's making the water warmer.

On the issue of resiliency, which is a key to these stresses and a key to our ability to manage, we've lost that resiliency, we've lost the buffering capacity of the natural system here. Some of these maps that you've shown, if you looked a little deeper into them, there is a 400-foot depletion of the deep aquifer in southeastern Wisconsin because of use in northwest Indiana, northeast Illinois and southeast Wisconsin.

There is a 200-plus-foot depletion here in Green Bay, which really is the reason that ultimately water was taken from the lake rather than from the groundwater supplies. As this region was developed, all the shallow aquifers were drained because an easy source of water was the shallow point, shallow aquifer, and then as they urbanized, what we ended up with was people wanted to go get rid of the water because they didn't want the hazard of storm water or flooding or those issues. So we stopped the recharge of the shallow aquifer, we depleted the deeper aquifer, and along the way, we tried to do things with wetlands to make them more socially acceptable.

And in all of those activities, we eliminated or greatly reduced the ability of the system to protect itself from a hydrologic standpoint. All of those things could have been sponges that would have moderated the high-flow system situations, as well as moderating the low-flow situations.

In the Great Lakes regional collaboration, two of the key items that all of the governments agree to, and the Federal agencies and the tribes and the Great Lakes and St. Lawrence cities, were that we need to restore the hydrologic integrity of the rivers and we need to restore the wetlands. By moving ahead on those two issues, we will be able to bring a great deal of improved stability to the hydraulics and hydrology and hydrogeology of this system.

There are some factors that complicate our ability to do that, and I'll address wetlands as one issue we've previously identified and requested some assistance. When we look for the Federal-State partnership on wetland restoration, we find ourselves working with Fish and Wildlife, with the Corps, with NOAA, with EPA, with USDA, all with differing eligibility, all with differing cost shares, all with differing time periods, and it makes it extremely difficult for either a private landowner who wants to participate or a State in conjunction with the landowners or nonprofits to try to string together a systemic approach to do a large-scale wetland project where we really can have the impact.

So if there are some things that could be done to look at some of those programs, and, I think, that an assessment of the current strategies that drive those, there is some opportunity to bring those together in a more resource-oriented approach that will benefit everyone and will really take some of the overhead costs out of the system so that more money can go into the implementation project rather than running the system to get to the implementation project.

So again, as I said, this is a complex system. It's not easily solved. There is no silver bullet. But these are not things we don't know how to do. We can do them if there is the will and there is the will to work together at the Federal, State and local levels to make these projects a reality and protect the lakes that really are a natural wonder of the world.

Thank you.

Ms. JOHNSON. Thank you very much.

Mr. Haen?

Mr. HAEN. Good morning. Thank you, Madam Chairman and Congressman Kagen, Congressman Petri, for this opportunity to

speak before the Subcommittee on Water Resource and Environment here in Green Bay today.

My name is Dean Haen. I'm the port manager for the Port of Green Bay, and I wanted to share with you a little overview of the Port of Green Bay.

The Port brings in over 200 ships a year, and that carries over 2 million tons into the area. And that fuels our manufacturing, our farming and our construction industry in northeastern Wisconsin. The area that the Port of Green Bay serves goes south to Sheboygan, west to Wausau, and up into the UP of Michigan. So we're reaching over a third of our State through the Port of Green Bay.

In 2007 the Port of Green Bay had an economic impact of over $76 million and supported over 600 jobs, according to our 2007 economic impact study done by Bay-Lake Regional Planning. The study found that port activities produced an estimated $23 million in income, $2.5 million in State taxes, $2.1 million in local taxes, and provides an estimated $36 million in gross State product here in Green Bay.

The cargo that are carried into Green Bay are valued at over $300 million a year. The shipping industry continues to be the most cost-effective method to transport commodities and generate employment opportunities for the region. Since 1999, the total economic output of the port has increased by more than 20 million, and the number of jobs supported increased by 57 percent here in Green Bay.

And that's under low-water conditions. The numbers I presented here are significant and could be enhanced if lake levels were near normal. For the last 5 to 7 years, the port has been operating anywhere from 12 to 24 inches below normal. For every inch of water that is unavailable to our ships, they have to leave a hundred tons of cargo behind. This means that ships entering Green Bay today leave between 1200 and 2400 metric tons of cargo behind. This is 10 to 15 percent of their carrying capacity.

Leaving cargo behind means more shipments to Green Bay, higher costs to users and consumers, and puts businesses at risk of not receiving the raw materials before the winter close-up. In addition, it decreases our fuel efficiencies, our environmental efficiencies and our cost efficiencies.

The Port of Green Bay requests that further research be conducted to determine if man-made withdrawals or the deepening of the St. Clair River are contributing to sustained low water levels in the Great Lakes. If this research determined that these efforts have lowered the lakes, we ask that corrective efforts be made to reverse those effects or we would request that the lakes, the ports of the lakes, which is one system on the Great Lakes, all be dredged uniformly, the same water depth.

On the ballast water issue, the Great Lake ports are all located in the manufacturing hub of America and significant percentage of our population lives in the Great Lakes region. Our ports are and will continue to be essential, but we need Congress to solve the aquatic invasive species problem that is tainting our industry's perception and ability to grow.

Port transportation-related associations and industries oppose State regulation of interstate and international shipping, and we

believe that the State-by-State patchwork of varying regulations of ballast water will lead to chaotic regulatory environment that will cripple the shipping industry and fail to solve the problem.

The port industry endorses a strong, uniform, Federal approach to protection of the Great Lakes and our waters and elimination of invasive species. Currently the Coast Guard Reauthorization Act addresses that under H.R. 2830. We're open to any solution, any laws, bills that are passed that address this, but this is the one that's before you today, and we urge you to support that.

Thank you for your time, and I'm available for questions afterwards. Thank you.

Ms. JOHNSON. Thank you very much.

Mr. Imig?

Mr. IMIG. Madam Chairman, a sincere thank you to the honorable Members of this field Subcommittee for allowing me to appear today, and a special thank you to Representative Steve Kagen who is exhibiting extraordinary commitment in listening to and acting on Door County environmental water issues.

My name is Charlie Imig. I'm speaking as a private citizen and not a member of any organization. I've lived on Washington Island, Wisconsin, as a summer resident since 1943. Washington Island is approximately 4.5 miles by 5 miles in size, located 5 miles off the tip of Door County Peninsula. It's the home of 680 year-round residents. In the summer, our population swells to several thousand as summer residents return and families of tourists abound.

Yachtsmen from all around Lake Michigan make Washington Island a must-see destination. Tourism, the main industry in Door County, brings the county 453 million per year and Washington Island 19 million per year.

Our only commercial year-round access to the mainland is via a locally owned ferry line system. All cars, trucks, passengers, food, freight, mail, emergency services must use this ferry service to access our island. Last year the Washington Island Ferry Line completed approximately 3,700 round trips to the mainland, carrying approximately 225,000 passengers, 75,000 vehicles, and countless tons of freight. This is no small operation.

The entire economy of Washington Island depends upon water. Problems with our waterways means problems for the Island's small business owners and their family. Lake Michigan water levels have hit record lows. A person can now walk to islands that were once only accessible by boat. One harbor, where sports fishermen stay at local resorts, is closed even to small boat traffic because the channel is too shallow.

Throughout the winter, our ferry line has been dredging its island and mainland ports and rebuilding its dock to accommodate low water levels. This has been done at the small-business owner's expense so the ferries can maintain a normal schedule.

All these efforts do not solve the whole problem. Our main channel coming into the Island, which is a federal waterway, hasn't been dredged since 1939. The low water conditions and the shallow depth of this channel, plus larger, deeper draft ferries making more trips than years ago, present a threat of interruption of our service if the waters continue to recede.

In addition, our local marinas have been forced to dredge. Even with these efforts, access to their docks is limited. Keep in mind, their peak tourist season is approximately 3 to 4 months long. The additional cost to dredge will hit the bottom line of the ledger sheet, and we'll all have to pay for it.

To compound our problems, Lake Michigan has been polluted with invasive species which have arrived in untreated ballast waters in ocean freighters. Because of the low water level, our Island and Door County beaches have become mud flats and are littered with zebra mussels and quagga mussels and are infested with invasive plant species. You cannot walk barefoot on the beaches because the mussels are razor sharp when stepped on. Algae is accumulating on beaches and rotting. The stench is so great that it's a nuisance to residents and tourists in the peak of our summer season. Local waterfowl are dying from botulism, further compounding our plight.

When yachtsmen can no longer access our harbors, and tourists and summer residents can no longer find the island the precious treasure it once was, our island economy will no longer support the people who make their living here. Obviously our beautiful waters are in harm's way, and the health of our island and the whole Door County economy is in jeopardy. We need your help.

What can you do? To assure reliability of the Washington Island Ferry Service, you need to place the Detroit Harbor West Channel on the list of urgent Army Corps of Engineer dredging projects.

Number two, the most immediate solution is to act upon restricting water flow through the St. Clair River. Numerous studies have been conducted and solutions have been recommended in the past. Latest estimates indicate that the drain hole continues to erode and we're losing 2.9 billion gallons per day out of Lake Michigan and Huron. The most logical solution is to install an interim flexible control measure to bring Lake Michigan and Huron out of crisis levels. The current IJC study board should put their present work on hold, review the 1993 study in light of the current water conditions, and get to it.

Number three, Congress needs to focus on reducing water diversions from Lake Michigan and Huron. One such solution is for the United States government to immediately support and ratify the Great Lakes Compact once it reaches Washington, DC.

Number four, enact and enforce strong legislation to control nonindigenous aquatic species coming into our waters on ocean ships with untreated ballast water.

Successful resolutions of these problems take bipartisan cooperation and dedication. If we don't act now, these trends will become terrible legacies. Restoring our Great Lakes is a moral issue and needs the utmost priority. I beseech you to rise to the level of the solution for current and future generations. Please act now.

Thank you.

Ms. JOHNSON. Thank you very much.

Mr. Weakley?

Mr. WEAKLEY. Thank you.

When high water levels offset the decades of inadequate dredging, Great Lakes ports and our members can move 115 million tons of cargo a year. It's no exaggeration to say that water levels make

or break our industry. Depending on the size of the vessel, our members can carry anywhere from 270 to 50 tons of cargo per each inch of vessel draft. Again, depending on the vessel, loaded vessels draft vary from 19 to 28 feet.

In the late 1990s, Mother Nature was very generous in terms of perception or precipitation and lake levels rose to record highs. As a result, a number of cargo records were also established in 1997. The benchmark for iron ore trade through the Sault Locks was 72,300 tons in 1997. 70,903 tons was the largest cargo of coal that same year. However, starting in the late 1990s, water levels on the lakes plunged. In fact, Lake Superior reached a new record low last fall. It's little surprise that the top cargos carried in 2007 paled in comparison to those carried a decade ago. The largest iron ore cargo was 65,252 tons. The coal trade peeked at a mere 64,450 tons.

My members earn their living carrying cargo, so less cargo means less revenue and less funds to modernize vessels or build new homes. However, there is much greater impact from falling water levels and inadequate dredging.

Let's consider those two iron ore cargos. The difference between the 1997 and 2007 is 7,048 tons. 7,000 tons of iron ore represents a single day's production at a Minnesota or Michigan iron mine. 7,000 tons of iron ore will make about 4,700 tons of steel at an Indiana, Michigan or Ohio mill which employs thousands of men and women. In turn, those 4,700 tons of steal will make nearly 6,000 automobiles.

Your typical auto plant turns out about 600 cars a day, so the cargo we lost from a single trip due to the dredging crisis represents 2 weeks of production to the end user at the automobile factory.

Water levels are cyclical. For example, we had a period of very low water in the early 1960s. In fact, water levels were so low that there was consideration for compensating work in the St. Clair River, but then water levels quickly returned and those plans were shelved.

Variances in water levels primarily reflect precipitation and evaporation. No one can control the forces of nature. There is, however, something we can do to cope with the cyclical nature of the Great Lakes, and that is, adequately maintain the Great Lakes and its waterways.

Funding for the dredging has been inadequate for decades. So much of what the Army Corps estimates in its backlog is dated. We estimate it would be as much $230 million to restore the Great Lakes navigation system to its designed depths. That may sound like a lot of money, but $230 million is less than what was spent to reconfigure a single intersection south of Chicago.

Thanks to the efforts of the Great Lakes delegation, in fiscal year 2008, the Corps will have nearly $140 million to maintain the Great Lakes system. That's an increase of over $40 million from the administration's proposal. Unfortunately, the administration's fiscal year 2009 budget slashes the Great Lakes by $50 million.

No law can make it rain, but Congress does have the power to increase the lakes dredging appropriation. Not only do we need to provide the, quote, ″adequate money to maintain the system,″ we

need to add an additional line item called the Great Lakes Navigation Restoration and fund it with at least $25 million until this backlog is removed.

Money is available to do that. The Harbor Maintenance Trust Fund currently has a $4.1 billion surplus. $230 million is merely 6 percent of that. On the April 30th hearing, you will hear more about that from Pete Risak from the Port of Freeport, Texas, about the Harbor Maintenance Trust Fund and how it takes in $1.2 billion a year and yet has only spent about $750 million. That delta will continue to increase as world trade increases, and the Trust Fund Surplus will do nothing but grow and be diverted to balance other funding deficits. It's time to put the trust back in the Harbor Maintenance Trust Fund.

The heartland of North America's manufacturing base deserves sufficient maritime transportation, and the best way to do that is by vessel operation.

With regard to ballast water, we urge you to pass the Coast Guard authorization H.R. 2830. We applaud the States and the Great Lakes Region Collaboration in that they made a clear and present distinction between the vessels that operate within the enclosed aquatic ecosystem and those that import invasive species from beyond that boundary.

Thank you for your time. I look forward to your questions.

Ms. JOHNSON. Thank you very much.

Mr. Meyer?

Mr. MEYER. My name is George Meyer. I'm executive director of the Wisconsin Wildlife Federation, which is comprised of 160 hunting, fishing and trapping groups in the State. I'm also speaking today on behalf of the Wisconsin Federation of Great Lakes Sport Fishing clubs, which are a major part of our organization and clearly of a major interest in this issue.

On their behalf, we just want to say thank you to Chairwoman Johnson, Congressman Kagen and Congressman Petri for being here today. We know how busy you are, and your broad responsibilities, and the effort and time you're taking today is greatly, greatly appreciated.

The Great Lakes are part of the fundamental fabric of the citizens of the State of Wisconsin, and that's why you have a large audience here today. You've heard a lot about the adverse impacts on commercial uses, and those are very important, but I'd also like to point out the adverse impacts of the lower levels on the recreational use on the Great Lakes, sport fishing and hunting. And this isn't just a recreational impact, it is a major economic impact. It rivals and exceeds the economic impact of the commercial use of our ports.

Sport fishing and hunting in the Great Lakes has a billion-dollar impact on Wisconsin's economy. If you took a tour of the State from Superior and Ashland in the north to Kenosha and Marinette along the Lake Michigan shoreline, you go in any of the large or small communities, you would see their riverfronts or lakefronts totally redeveloped, new hotels, motels, harbors, retail businesses, based on the vital sports fishing industry that has developed in this state. Literally hundreds of millions of dollars of redevelopment based on recreational uses.

Fishing and hunting, especially in the near-shore area, has been dramatically impacted by the low water levels. It's that shallow part near the edge of the water that is impacted when you lose feet and the additional impacts of potential dredging—lowering from the dredging have had along those vital shore lines. Can't get boats in the water in many places. It's difficult to navigate up the tributaries as a result. Our organizations are greatly concerned with the discussion or the impact of the over-dredging in St. Clair River and its impact on the use of our near shore areas.

We would ask, and we join Mr. Imig in asking, that the studies be done as quickly as possible, determine what happened, and then if in fact it shows, as has been indicated by some previous studies, that the Federal Government remediate the damages that may have been caused by inadvertent over-dredging and natural processes that then overtook the St. Clair River.

I would also like you to address the issue of ballast water. You've heard a lot of testimony on that today. 186 species—it took us 20, 30, 40 years to get all those species, and we're finally getting to the discussion of doing something about it. The Wisconsin Wildlife Federation, the Great Lakes sports fishing clubs, National Wildlife Federation, and other conservation organizations are greatly concerned over this issue.

We appreciate that the Congress is tackling this issue in both the House and the Senate, H.R. 2830, the Coast Guard Restoration Act. We're glad to see—and please don't take this wrong, but it's been a long time coming, and we're glad to see it moving. However, we are concerned with some of the provisions in that act, and we are concerned that the treatment implementation deadlines extend too far out in the future. We're talking 2015, 2016. Will we have another 20 or 30 invasive species?

One of the latest possibilities to have come in that way has been not a species but a virus, viral hemorraghic septicemia, which last year in Wisconsin caused fish kills on the Great Lakes, their inland waters. One of the likely sources being thought of is it came in through ballast water. We can't wait a long period of time because the invasive species have had a devastating impact on our Great Lakes sport fisheries.

We're also concerned that the federal or the House and Senate bills preempt the Federal Clean Water Act and state law. Why are we concerned about that? Well, the Wisconsin Wildlife Federation, the Great Lakes Sport Fishermen, petitioned the Wisconsin Department of Natural Resources the end of last year to use their existing State Clean Water Act authority to regulate ballast water. And to their credit, the Department of Natural Resources, the Natural Resources Board in February said, yes, they did have that authority, and are starting to work with the State of Minnesota to come up with a combined regulatory program.

It is the States that are really focused on this issue because it is impacting us dramatically. We agree that it's better to have Federal legislation, but if it extends too far in the future and isn't as stringent as the States believe are necessary to protect our vital resources and economic resources, we would ask that it be tightened up to mirror what the States have done.

Thank you very much for the opportunity to testify here today on behalf of these organizations.

Ms. JOHNSON. Thank you very much.

We'll begin our first round of questioning now.

Mr. Gauthier, you stated that the largest determining factor of water level fluctuation is nature and not human activities, and you also give us review of policy proposals.

Should we prioritize proposals that focus on natural fluctuations over human activity, or are these factors completely intertwined?

Mr. GAUTHIER. I'm certainly convinced that they are intrinsically interrelated. Solving global warming is a much bigger challenge than fixing historic dredging and channel accretion and erosion in the St. Clair River. That is something that is within the capacity of our engineering expertise, to explore options at this point in time.

I think the critical question that arises in this dilemma is whether or not scientific investigations should proceed first before engineering and policy analysis follow. The argument that is being made now is they should be done concurrently, that there are irreversible losses that are occurring in the system at large.

So one of the recommendations that we did put forward was to fund the Corps of Engineers to start engineering design analysis while the IJC study is under way of looking at the causative factors. This is one area where, if global warming is a reality and we see more protracted low lake levels, this is an area where there is an engineering solution to retain water in the upper part of the Great Lakes.

Ms. JOHNSON. Thank you very much.

Lieutenant Colonel, your testimony mentioned that the lakes are not usually at average level because the lakes fluctuate often and with both short-term and long-term fluctuations. How concerned should we be with the current low-water state?

Colonel LEADY. Ma'am, I think it is appropriate to be concerned, because Lake Superior is in a period of record at a—has been below average at its longest period, and Lake Michigan-Huron are about 3 years short of that. In the 1930s and early 1940s, it was about a 3-year longer period. But our concern should be put in perspective of the natural fluctuations.

Ms. JOHNSON. Okay. So this is not considered just another long-term fluctuation.

Colonel LEADY. I guess what I was trying to say, ma'am, is that it may be another long-term fluctuation. The issues that have been brought up certainly should be studied to investigate whether they are affecting this long term. This is a long-term fluctuation.

I guess the question is, will we reverse soon or in the near future and go back to more average or above average and continue the fluctuation cycle or not? That needs to be considered and is certainly appropriate for study. But again, putting it all in the context of, while it seems very low right now, this has happened before.

And one other point I would make is that, you know, our collective memory on the Great Lakes, especially the upper lakes, unless you're very, very old, is levels of higher than average lake levels. So when we go to lower than average lake levels, it's a significant change.

Ms. JOHNSON. Thank you.

Mr. Weakley, would dredging provide a long-term solution to the issue of lake levels, or would it be advantageous to study the causes of the low level more thoroughly?

Mr. WEAKLEY. Ma'am, I would say it's a combined effect. We saw hundreds of millions of dollars diverted away from the Great Lakes during a high-water period, and it masked the problem. So as the rest of the country was benefiting from that, we were having the problem masked. Now we're being significantly squeezed by the beginnings of low-water level and an increasing bottom.

The State of Wisconsin alone has a $14.1 million funding gap in the 2009 budget. It's about $120 million lakes-wide. We get about a third per ton of cargo moved than a river system, and we get one-sixth of the amount of construction in general money.

And one point I should have made during my testimony was the Harbor Maintenance Trust Fund is funded by the shippers. So it's money that we're paying to maintain the waterway, and we're not seeing the return on that investment.

Ms. JOHNSON. How have the lakers dealt with this historic highs and lows of the Great Lakes for the past 50, 100 years?

Mr. WEAKLEY. Well, in high-water times we benefit from being able to move more cargo. I wouldn't say we're hitting our marks on our bigger ships. There have been some operators going out of business. We have seen some consolidation within the industry. We have been able to stretch the season as much as we can. Right now there is no more ability to stretch the season.

In some periods they have built new vessels. Again, the cost of doing that, I don't see that happening. What we're doing now is hemorrhaging money and forcing cargo into trains and trucks. It takes 2,800 trucks to equal one of our ships, and it takes 700 rail cars to equal one of our ships. So you can imagine the amount of knocks and socks that are being produced and the fossil fuels that are being consumed.

Ms. JOHNSON. Thank you.

Mr. Imig, you mentioned dredging the Detroit Harbor West Channel. Would that solve the lake level problem in regards to Washington Island?

Mr. IMIG. Again, it's the chicken or the egg. Right now we're at low level. We have bigger ships that are going in and out, the ferries are bigger. Last winter we were, what I understand, very close to just about shutting down the operation because of the low water.

Yes, higher water levels will solve all our problems, but on the low side of the limit, we're at wit's end. And we need intervention because it is our lifeline and, without that, we have no other means of sustaining our Island.

Ms. JOHNSON. Thank you.

Mr. IMIG. I hope that answers your question.

Ms. JOHNSON. Thank you very much.

Mr. Petri?

Mr. PETRI. Thank you.

Thank you all for your testimony.

And, Colonel Leady, thank you and your colleagues at the Detroit office for the consideration that you've shown to this part of Wisconsin. I know we have to compete with and you have to weigh a

lot of competing demands. Especially when the water level is down, everyone wants you to dredge and do whatever they can to keep commerce going. And you've got to try to strike balances and operate with funds you have as efficiently as possible and as fairly as possible for everyone. We appreciate your working with us on that.

I wonder if you could expand a little bit on the St. Clair River dredging issue and put it in context, and I know there is a study going on, and how long it will be.

The charts and the discussion that you put forward indicate that the upper Lake Superior and Michigan are significantly below level, the lower lakes are about normal. And so that would raise the question of, can't something be done to slow the outflow at least in dry years from the upper lakes to balance out the whole system?

In this area, I know you work on that with Lake Winnebago, and for the paper industry and for the agricultural industry and the sports industry and everyone in the area, no one is ever completely satisfied, but they want the Corps of Engineers to keep on doing it because you have the experience.

And so could you talk about those issues?

Colonel LEADY. Yes, sir. Sir, there are two related issues on the St. Clair River, and I think because they're two related issues but separate, they cause some confusion, so I'll try to clarify those two.

First, there is the issue of historic dredging on the Great Lakes and how it has affected Lake Huron-Michigan. And the IJC has studied, and the Corps supported that, and other agencies, as Mr. Gauthier said, that had an effect on the lakes. The dredging was about seven inches that we dredged in the 1930s, deepened, I say technically. We dredge annually, but that's maintenance dredging. But we deepened the channel to 25 feet in the 1930s and 27 feet in the 1960s, deepened that same channel two more feet. That cumulative effect was calculated at the time to have lowered Lake Michigan-Huron by about seven inches. And then the other human activities, commercial mining, very unregulated around the turn of the century, turn of the 20th century, late 1900s, early 20th century, had a cumulative effect of about another seven inches. So that 14 inches is really not scientifically disputed. That's been calculated, been re-evaluated, and there is consideration for compensating for that. Both times it was considered and not done. So that's one issue.

The second issue is what the IJC is looking at now and what is referred to as the Baird Report, or the Georgan Bay Association study, is a related issue that is—because that dredging, lastly in the late 1960s, there is concern that the river bottom is continuing to erode now and more water is flowing out, you know, every day more flows out than the day before.

That is what's being looked at by the IJC right now, not the first issue, that's kind of subtle science. So the IJC in their upper lake study is looking at that issue. That study will be complete next summer. It's a very broad study being done by many, supported by the Corps and many other Federal agencies and Canadian federal agencies, Environment Canada, and we think that is the best vehicle to look at that second issue of is there an ongoing problem in the St. Clair River.

So that's a very important issue, and we think probably certainly the most appropriate, most academic, and largest board, the IJC, which is essentially in this case an umbrella for many Federal agencies on both sides of the border, is looking at that closely.

Mr. PETRI. So if they do conclude that that is contributing, it could be moderated, it would raise the level of Superior and Michigan by, what, seven inches you say?

Colonel LEADY. Again, two issues here. There is the compensation for past dredging and the permanent lowering of Lake Michigan-Huron, and then there would be separate solutions required if the study determines that there is an ongoing problem of erosion, essentially——

Mr. PETRI. Getting worse and worse.

Colonel LEADY. Getting worse and worse every year. Essentially, the St. Clair River is deepening or widening. That would be a separate issue, separate engineered solution probably necessary for it.

I would note at this time the preliminary findings of the board is that there is not an ongoing problem, but they're very preliminary findings and they will produce their final report next summer.

Ms. JOHNSON. Thank you very much.

Mr. Kagen?

Mr. KAGEN. Thank you, Madam Chairman. If I could just put up the third slide, just so we—and the next one? These are some of our new best friends who have gotten into the lakes.

I want to thank all of you for coming here today to enlighten Congress. And I'm going to ask you to continue to be engaged in this process, a process that shouldn't take as much time as some people are suggesting.

I think we can all agree on the phrase that Lieutenant Colonel just used, and my colleague Congressman Petri, that things are getting worse. So it's important for us to understand where we're at today with our new friends and begin to take every measure possible to remediate the problems. So I just want to ask a few questions of clarification.

Dr. Gauthier, did I hear you say that you will ascribe one foot lowering of Lake Michigan to the effects of dredging of the St. Clair River? Is that correct?

Mr. GAUTHIER. To be absolutely accurate in the statement, Lieutenant Colonel Leady did identify that the historic anthropogenic impact of dredging and sand mining over a 130-year period of time has permanently lowered Michigan and Huron by 14 to 17 inches. There is some question about the numbers, predominantly because of no records being kept in the 1910, 1920 era. That is not contested. That is part of the published literature that's been going on for the longest while. That's where the Great Lakes Commission has been requesting Congress to fund the Corps, to at least start the engineering design of compensation for that historic change.

And the important point that I need to elaborate further, the design could look at trying to restore 14 inches of water on Michigan and Huron, but if global warming does continue to cause more heat retention in the lakes, greater evaporation, less ice cover, even if structures are put in, there is no guarantee there will be restored water levels under that scenario. But nevertheless, some structural measure would ameliorate the effect in the long term.

Mr. KAGEN. And, Lieutenant Colonel, if we were going to take action to remediate the issue of the St. Clair River, allowing the plug to be pulled out to begin to drain at increasing rates into Lake Michigan and Lake Superior, how long would it take to place where submerged facilities to restrict the water from flowing out?

Colonel LEADY. Well, sir, two things would impact that. First, with all construction, funding and the rate of funding is always a large issue. But this is a very complex issue, and some real detailed and extensive studies would have to be done first.

And it is also a very, you know, it's a sociologic issue. We do regulate water on the Fox River here between Lake Winnebago and Green Bay, and what happens there is very similar to what happens everywhere the Corps regulates water: People who live upstream of the regulation have a very different opinion than the people that live downstream of the regulation. So the States and the community and the providences around Lake Erie and Lake Ontario would be very involved in this.

So the question of how to design it is a very difficult engineering question. But the question of should it be designed and, if so, how should it be——

Mr. KAGEN. I don't want you to change my question. I'm just asking how long would it take.

Colonel LEADY. Sir, I think it would be a multiyear process. From decision to go forward to actual construction operation would be a multiyear process, on the order of 6, 7 years.

Mr. KAGEN. Six or 7 years. So if you took money off the table as not an issue and you were keenly interested in restricting the bleeding of our lake levels, 6 to 7 years?

Colonel LEADY. Yes, sir.

Mr. KAGEN. And that's the speed of Government.

Colonel LEADY. Sir, and the speed of science to do that properly.

Mr. KAGEN. And, Dr. Gauthier, you would agree?

Mr. GAUTHIER. Unfortunately, yes.

Mr. KAGEN. And, Chuck, thank you very much for your impassioned presentation. And you had some very good suggestions, one of which I believe was that we might need to reorganize our different agencies to work more closely together. Is that what I heard from you?

Mr. LEDIN. I don't know if I was suggesting reorganizing agencies, but maybe looking programmatically at whether delivery could be achieved in a more effective way. Instead of having multiagency deliveries of the same program, maybe some consolidation of the delivery system could improve how the money moves from Washington to an actual in place project.

Mr. KAGEN. So more efficiencies could be gained by working more closely together.

Mr. LEDIN. Yes, I believe so.

Mr. KAGEN. Mr. Haen, thank you again for the good work you're doing at our port in Green Bay. Is there anything you would like to amplify upon?

Mr. HAEN. Only thing I didn't mention about Green Bay, and something, Congressman, you've worked hard for Green Bay last year and I know you will in the future, I just wanted to state maybe for the record where we are dredging-wise in Green Bay.

As Jim Weakley pointed out on the lakes, the shortfall, but just here in little old Port of Green Bay we've got a need of about $6 million, and the President's budget is showing about 4 million. So we have a $2 million gap, and if that gap isn't filled, we continue to silt up and limit our ability to do business.

Mr. KAGEN. So funding would assist you most?

Mr. HAEN. Yes.

Mr. KAGEN. Charlie Imig, thank you for the work you're doing on Washington Island. I have no further questions for you, but I do have a summary, I believe. I think, if I've heard you all correctly, there are five things that you're asking us to do.

First, the federal standards need to be created for handling of ballast water, and we need to pass the H.R. 2830, which is the Coast Guard Restoration Act. Is that correct? No disagreement amongst the panel?

Second thing would be to take a look at, remediate the St. Clair River. And from what I'm hearing now, it could take 6 to 7 years. I'm not sure if our economies along Lake Michigan would tolerate that.

Chuck?

Mr. LEDIN. I would just like to add that I don't think, from our DNR technical view right now, we're in no position to support doing anything in the St. Clair River at this time. We really think the study needs to be done.

And the other part that is critical is, even if we were able to put a weir in and back up some of the flow, we still may not be able to do anything in Lake Superior because that's not going to be affected by the Michigan-Huron. Flows out of Lake Superior right now are 40 percent or so of flow of Michigan-Huron, and if we continue to lose water in Lake Superior, nothing we do in the St. Clair River is going to impact how the whole system works.

So I think we need to know what's going on here. There is no question about that. We need the answer to that question, we need the study to be done. And then we need to put it in the context of the entire Upper Great Lakes Study to see how the pieces all fit together so we don't act with one solution that may not deliver the result we all hope it would achieve.

Mr. KAGEN. And, Mr. Weakley, you need full funding for dredging.

Mr. WEAKLEY. Absolutely. In the past 25 years, there have only been 6 years, fiscal year 2008 will be the 7th, that they have not contributed to the backlog. Currently 18 million cubic yards, three cubic yards for every man, woman and child in Wisconsin, needs to be dredged just to restore authorized depth. New York Harbor they're deepening to 55 feet. All we're asking is to maintain what was authorized 20, 30 years ago.

Mr. KAGEN. If I heard you correctly, the funding is there in the Harbor Maintenance Trust Fund?

Mr. WEAKLEY. Absolutely. The shippers pay .125 cents for each dollar of cargo shipped paid into the Trust Fund, $1.2 billion and growing, spending about $700 million.

Mr. KAGEN. Thank you.

Mr. Meyer, with regard to Clean Water Act, what specifically in the act, as you have read it, did you disagree with?

Mr. MEYER. Well, in H.R. 2830 and the Senate bill, there is a provision which preempts the Federal Clean Water Act. Basically, takes EPA's authority away, rests full authority with the Coast Guard. The Clean Water Act has provided a substantial benefit to try to get to the stage of regulating ballast water. So it's that part of the act, the fact that States would be removed from the equation, even though they have the most to lose by this. And thirdly, just the deadlines are too far out on H.R. 2830. They could be tightened up.

Mr. KAGEN. In my opinion, the aquatic invasive species issue is much like the medical problem of the infectious disease. You would like to prevent the transfer of an infection from one patient to the next or from one lake or one body of water to the next, and you like to do that as soon as possible.

Mr. MEYER. Correct.

Mr. KAGEN. Not after it's been spread throughout the community.

I thank you all for your testimony.

I yield back.

Ms. JOHNSON. Thank you very much.

Let me thank this distinguished panel and the other witnesses and all of the persons who came to express their interest by their presence. We appreciate you coming.

We appreciate and thank the staff who has supported us and, most especially, these two outstanding congressmen from your State with the leadership that both have offered.

I know, in some way, we will be responding.

Thank you.

[Whereupon, the Subcommittee was adjourned.]

OPENING STATEMENT OF REPRESENTATIVE MARK S. KIRK (IL-10) FOR THE U.S HOUSE OF REPRESENTATIVES TRANSPORTATION AND INFRASTRUCTURE SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT HEARING ON LAKE LEVELS IN THE GREAT LAKES APRIL 18, 2008

The Great Lakes are among the nation's most precious natural resources. As the world's largest freshwater system, the lakes provide food, recreation, and drinking water for nearly 40 million people. Yet the Great Lakes face numerous threats from sewage and industrial pollution to invasive species to decreasing water levels. These hazards threaten not only the ecosystem and water supply, but also the long term economic stability of the entire Midwest.

Reports detail that lake levels have been on the decline since the 1970's. According to the Army Corps of Engineers, the Great Lakes are now a combined 3.5 feet below their long-term average. Lake Michigan is ten inches below its January 2007 level and expected to remain 20-22 inches below its long-term average at least through this July.

Many factors are believed to contribute to the declining levels, including increasing air and water temperatures which reduce the ice cover of the lakes and result in faster evaporation during winter. With forecasts predicting above average temperatures through 2008 due to the La Niña effect, this trend is expected to continue for quite some time. In fact, researchers estimate that the lakes could drop up to eight feet this century.

While Congress can take action to help mitigate the effects of global warming, Great Lakes states must regulate water use. We run the risk that without water diversion safeguards, the drop in lake levels could continue. In 1998, the Canadian Nova Group tried to ship Lake Superior water in bulk to Asia. Last October, then presidential candidate Bill Richardson suggested that western states use Great Lakes water to meet unmet water demand. Clearly, the desire to seize Great Lakes water exists, and we must prevent the large-scale depletion of our resource.

Perhaps the most striking example of water mismanagement is the Aral Sea at the borders of Uzbekistan and Kazakhstan. In 50 years, what once was the world's fourth largest inland sea lost 75 percent of its water due to irresponsible irrigation and regional growth. This demonstrates how seemingly limitless supplies of water can vanish quickly.

To protect the Great Lakes, we need to ratify the Great Lakes-St. Lawrence River Basin Water Resources Compact. The Compact implements a host of water conservation and transparency measures that will limit water diversions and encourage responsible, sustainable water use. Only two states have ratified the measure so far – Illinois and Minnesota. Before it becomes law, all Great Lakes states must ratify the Compact. A state-by-state approach will not solve our

problem. We need a comprehensive, regional solution to prevent the selling off of our most important natural resource.

I want to thank the Chairman for holding this crucial hearing and all the witnesses for the work they are doing to study and prevent decreasing lake levels. We must do everything we can to protect this national treasure for future generations to enjoy.

Opening Statement by Congressman Bart Stupak
Subcommittee on Water Resources and Environment
"Lake Levels in the Great Lakes"
April 18, 2008

Thank you, Chairwoman Johnson for holding this hearing regarding the declining lake levels in the Great Lakes.

Since 1992, I have made it my mission to protect and promote Michigan's most precious resource, the Great Lakes.

Since taking office, I fought the Nova group which attempted to mass export Great Lakes water to China. I authored legislation that plugged loopholes that allowed the sale and diversion of our water in the 1986 Water Resources Development Act. Now, any water diversion or export of Great Lakes water outside of the basin would require the approval of all eight Great Lakes governors.

I led the fight in Congress to ban oil and gas directional (slant) drilling in the Great Lakes. During consideration of the Energy Policy Act of 2005, I was successful in including a provision to

permanently ban drilling for oil and gas in and under the Great Lakes.

In 2006, the EPA proposed to weaken regulations to allow for partially treated human waste to be dumped into our lakes, rivers, and streams during storm events. I stopped the EPA by authoring an amendment to the Fiscal Year 2006 Interior Appropriations Bill prohibiting this action.

Now we're confronted with the declining water levels in the Great Lakes. The negative impacts of the Great Lakes declining water levels can not be understated. 45 million people depend on the Great Lakes for drinking water, jobs, transportation, agriculture, and energy production. Up to 180 million tons of cargo is shipped annually on the Great Lakes adding over $4 billion to our nation's economy. Without the Great Lakes, our water borne steel highway, there would be no steel industry.

Many believe that human influences are solely to blame for the low water levels in the Great Lakes. While we do play a role, I

believe that in the overall Great Lakes ecosystem, our weather cycles play the most significant role.

In 2007, Northern Michigan experienced its 5th year of severe drought conditions. In addition, the 2006-2007 winter was relatively warm reducing the ice cover on the Lakes. The greatest loss of water in the Great Lakes occurs during the winter when the lakes do not freeze over and evaporation occurs.

Low water levels have directly impact Michigan's economy because boaters have a hard time accessing our harbors and rivers without risking damage to their vessels. Commercial shippers have faced significant financial hardships because they are forced to carry lighter loads.

Unfortunately, the agency tasked with providing assistance to our harbors, the U.S. Army Corps of Engineers, faces a significant backlog of maintenance dredging projects in the Great Lakes. Making this backlog even worse, the U.S. Army Corps has attempted to implement budget schemes, including a

tonnage-based formula that neglected our small harbors. In response, I authored a provision in the 2006 Water Resources Development Act (WRDA) preventing the U.S. Army Corps from using this formula. I look forward to working with this Committee and the Appropriations Committee to continue to address the need for adequate dredging in the Great Lakes.

Congress can also help reduce the impact of declining water levels by ensuring that the Great Lakes are protected from diversion, specifically by the bottled water industry.

The Great Lakes-St. Lawrence River Basin Water Resources Compact as it stands now would allow bottled water from the region to be classified as a "product" available for diversion without regulation. Once our Great Lakes water becomes a product or commodity, there will be significant international pressure to divert greater quantities.

Groundwater sources, which bottling companies seek to extract from, play a vital role in replenishing the Great Lakes.

Groundwater alone makes up approximately 35% of Lake Michigan.

The Nestle Company pumps 218 gallons per minute of groundwater headed for Lake Michigan. The City of Detroit has also entered into water contracts with Coke and Pepsi to bottle and ship substantial amounts of Great Lakes water as Aquafina and Dasani. Future water bottling facilities have already been proposed.

It is estimated that the lakes replenish themselves by less than 1% per year. Currently, we are consuming 3%-5% per year, resulting in an average net loss of as much as 4% per year. By not having a ban on extraction of groundwater sources for bottled water export, it won't be long before this practice causes irreparable harm.

In fact, North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT) state that no country can prohibit the export of water once it is designated as a commodity. The bottled water loophole in the Compact is a

significant diversion of groundwater, and would allow companies to make money at the expense of our treasured resource.

The Beverage Marketing Corp. estimated that the U.S. consumed 8.2 billion gallons of bottled water in 2006, 3 billion gallons more than 2001. With the net profit of the bottled water industry in the billions, the drive to extract more fresh water from the Great Lakes for commercial gain will increase. The problems associated with low water levels in the Great Lakes will only become worse.

Thank you again Chairwoman Johnson for holding this hearing on this critical issue. While we face several challenges in protecting and preserving our Great Lakes I look forward to working with my Great Lakes colleagues and the Members of this Committee to address low water levels in the Great Lakes.

Wisconsin State Senator
2nd Senate District

ROBERT L. COWLES

MEMBER:
Joint Committee on Audit
Commerce, Utilities and Rail

TO: House Subcommittee on Water Resources and Environment

FROM: State Senator Robert Cowles

DATE: April 18, 2008

RE: Field Hearing on Lake Levels in the Great Lakes

Chairwoman Johnson and Members of the House Subcommittee on Water Resources and Environment:

Thank you for holding a hearing on this important issue. The future health of the Great Lakes is tremendously important to the environment and economy of Wisconsin and the other Great Lakes states. Concerns over lake levels will grow as long as there is no Compact in place to protect the lakes from massive diversions to areas outside the Great Lakes Basin. Recently, the Milwaukee Journal Sentinel published an editorial that said that action must be taken to protect the Great Lakes Basin from harmful diversions by passing our state's version of the Great Lakes Water Compact. I could not agree more. For the last year, members of the State Legislature have been working together as a Legislative Council Study Committee to produce our state's version of the Compact. I was a member of that Study Committee.

Legislators, including myself, worked with all the stakeholders on this important issue to continue the work of the Study Committee to produce a version of the Compact that will best serve Wisconsin. The bottom line is that our Great Lakes are precious. They need to be protected for a variety of reasons, from recreational use to economic development. Our Great Lakes are also coveted by other states outside of the Great Lakes Basin that grow more populous and thirstier by the day.

Just last week, Governor Doyle and leaders of the Senate and Assembly announced that they had reached an agreement on Compact language that will protect the Great Lakes as well as economic development opportunities. Hopefully, Wisconsin's Legislature will enact the Compact within the next few weeks.

A proposal to build a coal slurry pipeline with Lake Superior water from Duluth, Minnesota to the West in the 1980's and a proposal to ship Great Lakes water to China in 1998 are examples of the lengths people will go to get their hands on the largest body of fresh water in the world. Diverting water outside the Great Lakes only compounds the problems we are starting to see with the low water levels in the lake.

Under current rules, it is extremely difficult to remove water from the Great Lakes. And that is how it should be. But the current laws protecting the Great Lakes are so fragile that one arbitrary act of Congress or one bad court decision could leave our lakes defenseless from unrestricted diversions to the southern or western United States or other thirsty corners of the world.

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It is very important for all of us in the Great Lakes Basin, stretching from Minnesota to Montreal, to ensure that our region controls the rules that will govern the use of Great Lakes water. The Great Lakes-St. Lawrence River Basin Water Resources Compact gives the Great Lakes states the power they need to protect the lakes.

The Compact uses strict guidelines to protect Great Lakes water. Water-strapped communities near the basin would be allowed to withdraw water from the Great Lakes only if they implement a way to return the water they use to the Great Lakes and have strong conservation plans. Transporting water far beyond the Great Lakes basin would be prohibited. Finally, the Compact promotes water conservation by all communities using Great Lakes water.

Adopting the Compact would lead to a more secure future for Wisconsin's tourism, development, and trade.

Great Lakes-related tourism generates millions of dollar ever year. Failure to adopt the Compact could mean the disruption of ecosystems and a loss of habitat, which would in turn mean a loss of fish and a loss of tourism dollars. In an increasingly thirsty world our abundant supply of fresh water will become ever more sought after and will be a magnet for economic growth and jobs.

Our economy and environment will suffer if we turn our backs on this historic opportunity to protect the Great Lakes. Wisconsin is poised do its part. After the remaining Great Lakes states enact the Compact, we will need you, our representatives in Congress, to ratify the Compact as soon as possible, to protect this valuable resource for generations to come.

Sincerely,

ROBERT L. COWLES

Testimony Presented by
Mr. Roger L. Gauthier, Program Manager and Hydrologist
Great Lakes Commission
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On Behalf of the
Great Lakes Commission

Field Hearing on *Lake Levels in the Great Lakes*
U.S. House Committee on Transportation and Infrastructure,
Subcommittee on Water Resources and Environment

April 18, 2008

Introduction

Madame Chairwoman Johnson, Congressman Kagen and members of the Subcommittee on Water Resources and Environment, I appreciate this opportunity to share the perspectives of the Great Lakes Commission on issues related to current low water levels on the upper Great Lakes and regional challenges related to prospective climate change. My name is Roger Gauthier and I am a Program Manager with the Great Lakes Commission and for the last two years have served as the Interim Executive Director of the Great Lakes Observing System (GLOS). I am also a retired hydrologist from the U.S. Army Corps of Engineers. In my current capacity, I oversee projects dealing with the collection, management and distribution of social, economic and environmental data for the Great Lakes – St. Lawrence River watershed.

The Great Lakes Commission is a public agency established by the Great Lakes Basin Compact in 1955 to help its members – the Great Lakes states and provinces – to speak with a unified voice and collectively fulfill their vision for a healthy, vibrant Great Lakes - St. Lawrence River region. To fulfill the mission of the Commission, a multi-jurisdictional approach is taken in the development of regional strategies to protect and maintain the ecological and economic health of the Great Lakes.

Water levels on the upper Great Lakes (Superior, Michigan and Huron), have been significantly lower than average over the last eight years. Water levels fell nearly four feet on lakes Michigan and Huron over a two-year period as a result of the record warm La Niña winter of 1999-2000. Water levels have remained in the lower third of each lake's historic range since then, with more incidences of severely low levels than the last major low water epoch, which occurred during the Dust Bowl era of the 1930s. The lakes have been retaining more heat energy over the last eight years than any period since records have been collected. This has caused below average ice cover, which in turn has increased evaporation rates from the lake surface, causing more water to be lost to the atmosphere.

Water levels on Lake Superior set a new record low in 2007 for the month of September. Similar new record lows on lakes Michigan and Huron were forecasted as distinct possibilities for this spring and summer. These forecasts have changed due to heavier than average snowfall across the region over the last 100 days. It is important to maintain a long-term perspective when considering fluctuations in Great Lakes water levels regardless of a seasonal shift of a few months or climatic variability over a few years. Short-term hydrologic changes need to be viewed in the context of longer term water level cycles and the potential of climate shifts caused by global warming.

Although the upper Great Lakes are currently undergoing protracted low water conditions adversely affecting the economic and environmental viability of the region, it is critically important to also remember that extreme high water level conditions persisted over the region for nearly 35 years starting in the early 1960s, causing a different set of economic and environmental losses. Adaptive approaches to water level change should focus on the resiliency of our coastal communities to withstand extreme high and low water level conditions alike.

Causative Factors

There are several factors that influence the water levels of the Great Lakes, including natural phenomena and human modifications to the hydrologic/hydraulic system. Natural phenomena are driven by movement of moisture entering the system as precipitation directly on the lake, runoff from surrounding land, direct and indirect groundwater recharge and inflow from the upstream lakes. Water leaves the system through evaporation from the land and water surface, transpiration from vegetation, consumptive uses (manufacturing, water supply, etc), diversions out of the basin, and outflows to downstream lakes, eventually out to the Atlantic Ocean.

Natural Factors

It needs to be made clear at the outset that the largest determinant factor in water level fluctuations is nature, not human activities. It has been said: "Man influences lake levels in a matter of inches and Mother Nature influences them in a matter of feet." By far the largest natural factor effecting change in water levels are longer-term climatic factors including temperatures, precipitation and evaporation.

Over most of the last eight years, spring and summer rainfall has been substantially below average for most of the upper Great Lakes and near average over the Erie and Ontario watersheds. Snowfall over the northern latitudes, measured by airborne surveys on an annual basis, has been particularly below average, during periods when peak accumulation is expected. Substantially above-average surface water temperatures, measured from satellite observations for the last eight years, have caused significantly increased evaporation from the lake surface. One manifestation of these conditions is frequent "lake effect" snowfalls on the leeward side of the lakes.

Water level fluctuations on the Great Lakes are: a) short-term (hourly or daily) affected by winds and barometric pressure; b) seasonal (low in fall/winter, high in spring/summer); and c) long-term (occurring over decades). Recent paleo-geologic evidence indicates that extreme high water levels on the Great Lakes are cyclical with high water periods occurring every 30-35 years and extreme highs every 150-160 years. This evidence indicates that the Great Lakes region is an excellent indicator of changes that occur in global climate patterns over thousands of years.

The Great Lakes have experienced extreme high and low water levels over the last 135 years since water levels were first measured. Lake Superior's historic water level range from extreme high to extreme low is nearly 4 feet, while the other lakes have historic ranges between extremes of 6 to 7 feet. Over the last 40-50 years, at the same time that a great deal of coastal community development has occurred across the system, these historic ranges were modified due to human activities.

Human Factors

Lake Superior outflows have been regulated since 1921 under increasingly more complex regulation plans. It should be stressed that levels on Lake Superior are controlled only to a minor extent; again the largest determinant being climate. Regulation has allowed a moderation of the levels on Lake

Superior, within limits that are dictated by nature, due primarily to the lakes' vast storage capacity. The regulation of Lake Superior outflows are authorized under the International Joint Commission's (IJC) 1914 Orders of Approval and supplemental orders of 1979. These Orders direct that the natural range of levels on Lake Superior be reduced from 3.9 feet to less than 3.0 feet, with compression eliminating the frequency of occurrences of extreme low water conditions. It is unknown what these changes have caused to nearshore processes and habitat characteristics across the lake.

Control of outflows from Lake Ontario is managed by the hydropower project in the St. Lawrence River near Cornwall, Ontario and Massena, New York. The IJC approved this project in 1952, with subsequent amendments, to provide dependable flow for hydropower, adequate navigation depths and protection for shoreline interests on Lake Ontario and downstream areas in Québec. Lake Ontario's natural range of 6.4 feet was reduced to less than 5 feet as a result of outflow regulation.

Existing diversions into, out of, and within the basin include: a) flow into Lake Superior through the Long Lac and Ogoki channels; b) flow out of Lake Michigan through the Chicago Diversion; and c) intrabasin flow between lakes Erie and Ontario through the Welland Canal. There are also some minor diversions that exist between lakes as a by-product of drinking water/wastewater systems. Flows within these diversions have been nearly constant over the last eight years without adversely affecting water levels on the upper lakes.

Channel Changes in the St. Clair – Detroit Rivers

The St. Clair River flows from the outlet of Lake Huron to a multi-channeled delta area at the upper end of Lake St. Clair, which in turn feeds into the Detroit River and subsequently into Lake Erie. Over the last few years, more evidence has been collected that changes at the head of the St. Clair River, acting as the outlet from the combined lakes Michigan and Huron, likely have caused major permanent changes in water levels on these lakes, and in turn on Lake Superior as a consequence of the current outflow regulation plan which "balances" levels between these lake systems.

There have been numerous alterations made to the St. Clair River – Lake St. Clair - Detroit River system since the mid-1800s, mainly to improve economic efficiencies of commercial navigation, but also for sand and gravel mining prior to 1930. These changes in the river affect its conveyance or capacity to carry water. Studies completed in the early 1960s for the IJC determined that all

dredging, sand mining and other structural modifications in the St. Clair River since the mid-1800s have caused a permanent lowering of water levels on lakes Michigan and Huron water levels of between 13 -18 inches. The uncertainty within these estimates reflects imprecise estimates for dredging that occurred between 1855 and 1906 and sand mining through 1930.

The last major dredging project was completed in 1962 to deepen selected reaches of the St. Clair River from a 25-foot to a 27-foot navigation depth. This dredging occurred in the Lake Huron approach to the St. Clair River and further downstream (not in the river mouth near the Blue Water Bridge, connecting Port Huron, Michigan to Sarnia, Ontario). Prior to this dredging, it was determined that lakes Michigan and Huron would be permanently lowered by 5 inches (included in the 13-18 inch estimate above) as a consequence of the artificial channel modifications unless some form of remediation structures were placed on the bottom of the St. Clair River mouth immediately downstream of the Blue Water Bridge. This remediation was not constructed due in large part to high water levels that occurred on the upper Great Lakes for the next 35 years. It was also concluded that downstream levels on lakes St. Clair, Erie and Ontario would reach a new equilibrium within a few years and that these lakes would not see any permanent impact from the dredging project.

Recent questions dealing with erosion in the upper St. Clair River center on the difference in water levels between lakes Michigan-Huron and Lake Erie becoming smaller over time. This difference between elevations is referred to as "head difference." The head difference is getting smaller since the mid-19th century, but there is considerable disagreement over why this is happening, which is the major emphasis of the current IJC International Upper Great Lakes Study (IUGLS). This study is expected to produce preliminary findings in spring 2009.

The causes of head difference are likely: 1) an increase in the size of the outlet; 2) decreased cumulative water supply to lakes Michigan, Huron and Superior; 3) increased cumulative supply to Lake Erie; 4) differential isostatic (post glacial) rebound upstream of Port Huron / Sarnia; 5) encroachment of the outlet of Lake Erie (construction into the Niagara River); and 6) isostatic rise of the Lake Erie outlet.

An analysis of the likely factors affecting the change in head difference was conducted in 2004 by W.F. Baird and Associates, a geocoastal engineering firm funded by the GBA Foundation, a Canadian charitable organization which funds environmental research and education. This initial

report concluded that lakes Michigan-Huron have permanently dropped another 9 inches (beyond the historic 13-18 inches drop) from 1971 through 2000 as a consequence of various factors, with river bed erosion being the predominant driver. The "Baird Report" has been the subject of much controversy, warranting more scientific investigation. To that end, we support the efforts being undertaken by the IUGLS study team to examine the role of physical changes in the St. Clair River as one factor that might be affecting water levels and flows throughout the system.

Hydrographic surveys of the upper two to three miles of the St. Clair River were conducted in 1971 and 2000 by NOAA using conventional single beam surveys. The U.S. Army Corps of Engineers (USACE) conducted additional bathymetric surveys in 2002, 2005 and 2007, using a multibeam survey system, which provides greater density of observations to detect subtle bottom characteristics. All surveys have inherent sampling errors, but multidate comparisons reduce cumulative errors. Comparison of the 1970 and 2000 NOAA surveys show that significant erosion of the river bottom (9-12 feet) has occurred immediately downstream of the Blue Water Bridge, with a cumulative increase in channel volume over time. The USACE surveys from 2002 through 2005 show that increases in channel volume were still occurring in the upper St. Clair River for this period.

Historic surveys conducted in 1859 show that depths at the mouth of the river were only 5-10 feet. The river near the Blue Water Bridge is now over 30 feet deep with significant sections that are over 60 feet deep. The historic surveys indicate that the river mouth has been naturally enlarging over the last 150 years as a consequence of extremely high flow velocities and erosive bed characteristics. This is an important insight as conventional wisdom had considered the outlet to be "stable." The outlet from Lake Huron has been enlarging by natural forces for over 4,000 years, an extremely short geologic period. The river is still evolving. Studies on the detailed stratigraphy (bottom composition) at the outlet have never been conducted, although seismic surveys of the river bed are planned to be conducted this summer under the IUGLS, which should provide invaluable insight on the complexity of the problem. More detailed geophysical surveys at the Lake Huron outlet are still critically needed.

Changes in water supplies to the lakes Michigan-Huron and Lake Erie watersheds could account for some of the decline in head differences between these lakes. The upper lakes (Michigan-Huron) could have been disproportionally drier over the last four decades than over the Lake Erie watershed. The magnitude of this factor is debatable, however, due to substantial uncertainties in the computation of water supplies to these lake basins.

Isostatic rebound is the continual imperceptible slow rise of the Earth's crust after the removal of the weight of the nearly two-mile high glaciers that left the region between 14,000 and 7,000 years ago. Isostatic rebound differs over time and space across the region, with the southernmost parts of the basin now encountering negligible rises and the northeastern portions of the Lake Superior watershed rising nearly 17-inches per century. Changes in the outlet from Lake Erie into the Niagara River also could affect the head difference between lakes Michigan-Huron and Erie. Prior IJC studies have identified that the head of the Niagara River has been "encroached" by the construction of structures (Peace Bridge, Railroad Bridge, etc) and infilling along the Canadian shoreline. Isostatic rebound at the Lake Erie outlet could also hold more water back on Lake Erie. Cumulatively these impacts were considered in the Baird report to be a minor fraction of the measured head difference.

Climate Change

There is growing evidence that regional climate variability is already altering the Great Lakes, most noticeably since 2000. Whether this climatic shift is a direct consequence of global warming is still debatable. Ice cover since 2000 has diminished conspicuously as a consequence of increases in heat retention within the lakes. According to a recent study from the University of Minnesota - Duluth, summer water temperatures in Lake Superior are warming faster than air temperatures across the region. In contrast to rising sea levels on ocean coasts, water levels along Great Lakes coasts are expect to decline below historic low levels, while climate change impacts will likely occur quicker over the lakes than on the ocean coasts. The majority of global climate models indicate that the Great Lakes region will be warmer and dryer due to global warming. Since the Great Lakes – St. Lawrence River drainage basin covers a vast portion of the mid-latitudes of the continent, changes in water storage can act as the "canary in the coal-mine" to detect larger and more global shifts in climate.

Changes in heat retention of the lakes are not adequately measured. Observations are limited to those collected in nearshore waters at municipal water intakes or through intermittent shipboard surveys. Regional-scale climate models, driven by systematic observations of heat retention, are of critical importance. This information would help the region identify and adapt to climate shifts affecting: public health (quality of drinking water supplies, swimmability of public bathing beaches); integrity of coastal wetlands; sustainability of the $4 billion per annum sport and commercial fishery; hydropower production; and recreational boating opportunities for a $16 billion per annum industry.

Ecological and Economic Impacts of Extreme Levels

The economic and environmental consequences of the current eight years of low water are vast and not well understood. Current funding to support this type of research is inadequate. A combination of biological, chemical and physical factors has degraded the ecologic balance of the Great Lakes system, with the current low water conditions amplifying some of these problems. Several leading regional scientists have reported that the lakes have reached a dangerous "tipping point," with massive irreconcilable losses expected in the near future if nutrient and contaminant loadings and invasive species introductions cannot be controlled. Recently fundamental shifts have occurred in cycling of nutrients in some of the lakes, including declines in phosphorus concentrations, plankton abundance and numbers of forage fish, all of which could be adversely affected by low levels.

The Great Lakes - St. Lawrence River system has long been the primary route of efficient transport of goods and raw materials into the heart of the North American Continent. Nearly a quarter of the U.S. top 150 commercial harbors are located within the system, serving a region that supports 40 percent of the nation's manufacturing industry and 25 percent of the national economy. Lower water levels increase the costs of shipping on the lakes requiring "light loading," potentially forcing a modal shift to rail or other means, increasing energy costs and reducing the economic competitiveness of the region. Improved short-term forecasts of conveyance in the interconnecting waterways are becoming more crucial under the current low lake level period.

Low levels have decreased hydropower production across the region which can reverberate throughout the U.S. and Canadian economies driving up energy costs and raising the specter of local "brown-outs." Lower levels also cause deterioration of wooden shore structures such as pilings and supporting structures now exposed to air, posing additional economic challenges for coastal communities. Regional climate change scenarios predict warmer winters and more extreme precipitation events, which can increase slope failure and bluff retreat, causing losses to residential riparian properties. The costs to remediate these impacts are currently unknown but could be staggering. These anticipated impacts make observations and modeling of changes in thermal structure, lake circulation and physical processes all the more critical.

Policy Responses

The Great Lakes Commission in its Legislative Priorities for FY 2009, released at Great Lakes Day on Capitol Hill in February 2008, called for several strategic investments from Congress to help adapt to current conditions on the Great Lakes. I would like to elaborate on some of these priorities which would help to protect the hydrologic integrity of the Great Lakes – St. Lawrence River system.

A fundamental mandate of the Great Lakes Commission is to foster informed use, management and protection of Great Lakes water resources. Foremost at the moment are concerns about water withdrawal, consumption, diversion, and export of our vulnerable water resources. The effective use, management and protection of Great Lakes basin water resources is a shared responsibility of jurisdictions at all levels of government, with states and provinces as primary stewards. The Commission supports full and open consultation and communication among all affected jurisdictions.

The Great Lakes Commission has consistently supported implementation of the provisions of the 1985 Great Lakes Charter and adoption of its successor, the Great Lakes-St. Lawrence River Basin Water Resources Compact. Once this Compact has been adopted by the eight Great Lakes states, we urge Congress to ratify the accord. The Compact is the best means available to assure that water quantity is managed for the long-term benefit of the region's economy and ecology. Regardless of the causes and consequences of current low water levels, the Compact will protect the resource from deleterious diversions outside the basin. It will usher in a new era of decision-making based on the best science available for large scale water withdrawal and consumptive uses within the basin. It will position the Great Lakes region as a leader in fresh water conservation and multi-jurisdictional policy and management to assure adequate supply for future generations.

The Commission has also pushed for comprehensive and integrated monitoring and analysis tools to assess cumulative effects of water uses and their impacts on regional ecosystem viability and economic sustainability. The Commission is committed to managing and maintaining the Great Lakes Regional Water Use Database – established under the 1985 Charter – and has offered its expertise and resources to serve the states and provinces to meet the evolving needs of the region in the area of water use, information management, science, conservation and efficiency.

The Great Lakes Commission has passed resolutions calling on Congress to fund investigations related to reducing economic and environmental damages occurring as a consequence of current low water level conditions on the upper Great Lakes. These resolutions specifically address the need for both U.S. and Canadian federal governments to fully investigate whether outflows from Lake Huron through the St. Clair River have increased as a direct consequence of man-made and natural channel enlargements, to initiate investigations of potential remedial measures to compensate for historic conveyance increases, and to complete comprehensive three-dimensional modeling of the interconnecting waterways between the lakes.

The Great Lakes Commission has also consistently championed maintenance of the Great Lakes water level gauging stations, managed by the National Oceanic and Atmospheric Administration (NOAA). This network is essential for supporting regional information needs on lake level changes. The Commission has also coordinated development of GLOS, the regional component of the U.S. Integrated Ocean Observing System, which will improve monitoring of Great Lakes conditions including climate change.

Further information on the policy considerations highlighted above can be found at http://www.glc.org/restore/ and at http://www.glc.org/about/resolutions/. In addition, we provide the following specific and general options for Congressional involvement to better understand and address the economic and ecological consequences of changes in the hydrologic and hydraulic regimes across the Great Lakes – St. Lawrence River system.

Specific options

1. Enact ocean observing authorizing legislation and fund regional initiatives and assure proportional funding to the Great Lakes

Background:

The U.S. House of Representatives passed the National Integrated Coastal and Ocean Observing Act (H.R. 2342) on March 31, 2008. The Act would create the U.S. Integrated Ocean Observing System (IOOS) that will monitor and forecast ocean, coastal and Great Lakes conditions, and provide that information in forms that are accessible and understandable by the people who depend on that

information for their livelihood, security and enjoyment. Companion legislation (S. 950) has been introduced in the Senate, which is similar to legislation passed in the 109th and 108th Congresses.

This important authorizing legislation has three purposes: 1) development of IOOS to ensure that societal goals dealing with economic development and ecological sustainability are addressed; 2) implementation of regional associations representing non-federal collaborators and end users (states, academic institutions, non-governmental organizations and trade organizations) to densify observations and generate products that meet user requirements; and 3) implementation of a data, information management and modeling system to develop an early warning system to more effectively predict and mitigate impacts of natural hazards, including climate change effects. These bills require that the system provide for long-term, continuous and quality controlled observations of the coasts, oceans and Great Lakes. The bills also establish NOAA as the lead federal agency for implementation and administration of IOOS and allows for certification and indemnification of regional association to extend functionalities beyond those already provided by federal agencies.

Funding for the IOOS program over the last three fiscal years has been modest for this national program ($30 million or less), with funding for regional associations only occurring last year at $18.3 million. The Great Lakes component of IOOS is represented by GLOS which has been chronically underfunded in this start-up endeavor. Congressional direction is needed to insure that geographic proportionality in funding occurs under the IOOS program and that the Great Lakes receives its proportional share of investment dollars.

The GLOS Regional Association has established a 10-year plan for improving monitoring systems across the region, with a high emphasis on improving climate predictions and adaptability, research on food web dynamics, protection of public water supplies and bathing beaches and improvements in safety and efficiency of commercial navigation and recreational boating. A key component of this plan is establishment of nearshore and offshore buoys to measure changes in heat storage of the lakes, as well as three-dimensional modeling for each of the interconnecting waterways.

- Promote passage of IOOS authorizing legislation (H.R. 2342 / S. 950) in conference with endorsement for long-term operations of regional associations including GLOS.

- Appropriate $95 million for the IOOS program in FY 2009, with at least $3.5 million directed toward implementation of GLOS regional observation/modeling components.

2. Fund development and application of three-dimensional hydrodynamic models for the interconnecting waterways, with initial emphasis on the St. Clair River

Background:

Stakeholders and modeling experts convened in 2005 at a meeting in Port Huron, Michigan arrived at a consensus that high resolution three-dimensional modeling is needed for the St. Clair and Detroit rivers and is applicable for the other interconnecting waterways (St. Marys, Niagara and St. Lawrence rivers). These models need to simulate and forecast plume tracking; (spill response and clean-up), riverbed movement (contaminated sediment transport/erosion studies), ice movement and corresponding flow dynamics and pathogen movement (adjacent to swimming beaches). The development of sediment transport / moving bed model functionality for the upper St. Clair River has been of particular concern. These tasks can be accomplished by providing consistent funding for GLOS for the next 4-5 years.

- Appropriate $95 million for the IOOS program in FY 2009, with at least $3.5 million directed toward implementation of GLOS regional observation/modeling components.

3. Initiate engineering studies to identify appropriate structural measures to retain water in the upper Great Lakes

Background:

Michigan Governor Granholm has requested that the USACE evaluate the potential effectiveness of structural measures previously proposed for the St. Clair River. The Great Lakes Commission has requested that the IJC, USACE and Environment Canada begin investigating mitigation measures to address permanent upstream lowering caused by historic dredging and other channel modifications prior to 1970. This permanent lowering of upstream levels has been acknowledged by both U.S. and Canadian governments. Preliminary design studies were completed in the early 1960s to install a series of submerged sills immediately downstream of the Blue Water Bridge. These measures were not implemented due to high water levels starting in 1965 which lasted for nearly 35 years.

The USACE has identified that it has the capacity to conduct engineering studies to design such mitigation structures but lacks appropriations to conduct this work. The USACE has stated that actual construction of mitigation works would require agreement by the federal governments of the U.S. and Canada, likely under the auspices of the IJC. The essential issue is that these engineering studies should be conducted concurrent with scientific and policy investigations already underway.

Design of underwater mitigation measures should include a series of options depending upon the degree of channel constriction needed and long-term flexibility required. Long-term flexibility is warranted to guarantee that these structures could be removed or disabled when future high water supply occur upstream. Design of such structures would require that three-dimensional flow models be constructed and validated for moving bed dynamics for the head of the St. Clair River addressed in an earlier recommendation. The decision to implement any of the engineering solutions should be made only after bi-national consultation with the affected states and provinces, likely under the auspices of the IJC.

- Appropriate $3.0 million in FY 2009 under Energy and Water appropriations to the USACE to identify engineering design options.

General options

Current water levels on lakes Michigan and Huron are eight inches lower than the "low crisis threshold level" identified in the 1993 Great Lakes Levels Reference Study Report to the IJC. This earlier study called for initiation of control measures to reduce St. Clair and Detroit River channel capacities through construction of underwater sills near the head of each river course. In fact, water levels on these lakes have been below the crisis threshold more than fifty percent of the time over the last eight years. The current IJC study does not include any investigations on implementing crisis response measures identified by the prior study team.

Construction of any structural measure to retain waters on the upper Great Lakes will require binational consensus on acceptable environmental consequences and socio-economic impacts of limited outflow control from Lake Huron, including potential consequences downstream on lakes St. Clair and Erie. These activities are within the mandate of the IJC. Congress should request that the

Administration consult with Canadian counterparts to assure that the IJC has the authority and resources to address economic, environmental and social consequences of implementing partial control of Lake Huron outflows as a crisis response measure.

In addition, research on the economic implications of low water conditions on the Great Lakes has been exceedingly limited. This is an essential first step in defining benefits that could be achieved or losses mitigated by adaptive management policies that could be applied across the region to a changing climate. Comprehensive economic impacts need to be ascertained for the following broad sectors:

- Hydropower production
- Maritime commerce
- Recreation (boating and beach use)
- Coastal infrastructure
- Fishery (sport and commercial)
- Coastal wetlands functions

Conclusion

Action on Great Lakes low water conditions is timely. It will take years to ascertain whether further human intervention is plausible and desired by the states and provinces. Given the costly and likely irreversible economic and environmental impacts that have already occurred, and that long term forecasts indicate that climate change will create favorable conditions for even lower levels over the long term, it is important to get started now. Federal responses and financial resources have been inadequate to date to respond to a rapidly changing climate affecting the region. We urge you to consider implementing the strategic federal legislation activities identified in this testimony. These investments will foster improvements in the knowledge of a rapidly changing Great Lakes region, which would support economic prosperity for the region and guarantee ecological sustainability for generations to come.

PORT AND SOLID WASTE DEPARTMENT

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CHARLES J. LARSCHEID
PORT AND SOLID WASTE DIRECTOR

April 18, 2008

Honorable James Oberstar, Chairman
U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington D.C. 20515

Honorable James Oberstar:

My name is Dean Haen, Port Manager for Brown County. Brown County oversees and administers the activities of the Port of Green Bay. I would like to thank Congressman Steve Kagen for bringing the opportunity to testify before the Subcommittee on Water Resources and Environment regarding Lake Levels in the Great Lakes to Green Bay today.

Water Levels

The Port of Green Bay brings in 225 to 250 ships each year carrying over two (2) million tons of cargo needed for manufacturing, farming and construction in Northeast Wisconsin. This cargo reaches south to Sheboygan, west to Wausau and north into the Upper Pennisula of Michigan. The cargo carried into Green Bay on the waterways of the Great Lakes is valued at over $300M.

In 2007, the Port of Green Bay had an economic impact of more than $76 million and supported 615 local jobs in Green Bay according to the 2007 Economic Impact Study conducted by the Bay-Lake Regional Planning Commission. The study also found that port activities produced an estimated $23 million in income, $2.5 million in state taxes, $2.1 million in local taxes and provided an estimated $36 million in gross state product.

Although declining slightly from 2006, the shipping industry continues to be the most cost effective method of transportation for commodities and generates employment opportunities for the region. Since 1999, the total economic output of the port has increased by more than $20 million and the number of port supported jobs has increased by 57 percent (260 jobs).

The numbers I have presented are significant and could be enhanced if lake levels were near normal. For the past 5-6 years, the port has been operating at water levels 12-24 inches below normal and this affects fuel and cost efficiencies. For every inch of water unavailable, a ship must leave 100 tons of cargo behind. This means that ships entering Green Bay today are leaving between 1,200 to 2,400 tons of cargo behind. This is 10-15% of their carrying capacity. Leaving cargo behind, means more trips into Green Bay, higher costs to users and consumers and puts businesses at risk of not receiving all of their raw materials before the shipping season closes for winter.

The Port of Green Bay is requesting that further research be conducted to determine if manmade withdraws or the deepening of the St. Clair River are contributing to sustained low water levels in the Great Lakes. If the research determines that manmade efforts have lowered

lake levels then corrective efforts must be made to reverse the effects or we would like the Green Bay harbor to be dredged deeper to increase its efficiencies.

Ballast Water

The Great Lakes ports are with in the the manufacturering hub of America and a significant percent of our population lives in the Great Lakes region. Our ports are and will continue to be essential, but we need Congress to solve the aquatic invasive species problem that is tainting our industry's perception and ability to grow.

Port and transportation related agencies, associations and industries opposes state regulation of interstate and international shipping and believes that state by state patch work of varying regulation of ballast water will lead to a chaotic regulatory environment that will cripple the shipping industry and fail to solve the problem.

The Port industry endorses a strong, uniform federal approach to the protection of the Great Lakes - and all U.S. waters - from invasive species via ballast water. We urges Congress to reauthorizing the National Invasive Species Act of 1996.

Thank you for your time. If you have any questions or comments, please contact me at *haen_dr@co.brown.wi.us* or by phone 920-492-4953 and by fax 920-492-4957.

Sincerely,

Dean Haen
Port Manager

WISCONSIN STATE SENATOR
DAVE HANSEN
SENATOR – 30TH DISTRICT
ASSISTANT MAJORITY LEADER

April 17, 2008

Testimony: Great Lakes Water Levels

U.S. House of Representatives Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment

Committee on Transportation and Infrastructure
U.S. House of Representatives
110th Congress
Majority (B-376 RHOB) - (202) 225-0060
Minority (B-375 RHOB) - (202) 225-4360
Eddie Bernice Johnson, Texas, Chairwoman

Thank you Madame Chair and members for convening this hearing today and for the invitation to testify.

I am State Senator Dave Hansen. I represent the 30th Senate District in Northeastern Wisconsin which encompasses the city of Green Bay north to the City of Marinette, Wisconsin. As a lifelong resident of Northeastern Wisconsin, I see the importance of the Great Lakes to the life, health and economic vitality of our area. The residents of the 30th Senate District rely heavily on Lake Michigan every day for our drinking water, for our economy and for our recreation.

As a member of the Great Lakes Commission I have been involved firsthand with the initiatives of that organization to restore, protect and sustain the Great Lakes.

Committees
Joint Committee on Finance, Senate Vice Chair
Education
Commerce, Utilities and Rail
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Senate Organization
Joint Committee on Legislative Organization

State Capitol
P.O. Box 7882
Madison, Wisconsin 53707-7882
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As part of this initiative, the Great Lakes Commission has called on Congress to strengthen national investment in the Great Lakes. We need help from the federal government to stop the influx of invasive species, to do more comprehensive study on lake levels, and to fix the problems that are causing our lake levels to drop.

I was happy to stand with the Governor last week as he announced an agreement on ratifying the Great Lakes Compact. Now that we have reached agreement on the compact, I am looking forward to standing with my legislative colleagues to ratify the compact and send it on to Congress for final approval. At that time, I would urge you to approve ratification of this historic agreement which will provide for more responsible use of and protect this vital resource.

But while approval of the Great Lakes Compact will provide a framework for future protection of the lakes, we all know that our Great Lakes are in trouble today. A new study says Lakes Michigan and Huron are losing 2.5 billion gallons per day. Our Great Lake levels are dropping nearly 2 inches per year. From 1999-2003 lake levels have dropped by over three feet. Last summer, Lake Superior reached its lowest level since 1926. Whatever the cause, it's clear that the falling lake levels in Lakes Michigan and Superior are affecting commerce in the Great Lakes, causing increased costs for dredging, affecting tourism, homeowners' properties and wildlife habitat.

What is causing this? Some have argued that a 40 year old dredging project on the St. Clair River has caused an increased water flow to Lake Erie. Some say that climate change is affecting rain and snow fall patterns and increasing evaporation or maybe it's a combination of factors. I will let the experts speak on this issue. However, it is clear that the Great Lakes need more attention and commitment to their preservation. As we all know, the Great Lakes holds 18% of the world's fresh surface water and 95% of all the fresh water in North America. I will do my part as a member of the Great Lakes Commission and as a State Senator, but I also urge the Committee and the federal government to do all it can to protect this valuable resource that defines and sustains the Great Lakes region.

Thank you.

Committee on Transportation and Infrastructure
U.S. House of Representatives
Subcommittee on Water Resources and Environment Field Hearing

"Lake Levels in the Great Lakes"

Friday, April 18, 2008

Green Bay, Wisconsin

Testimony of Charles M. Imig - 589 Silver Birch Lane, Washington Island, Wisconsin 54246 -(920) 427-4957 Clean Wisconsin Inc.

A special Thank You to Rep. Steve Kagen, who is exhibiting extraordinary commitment in listening to and acting on Door County's environmental water issues. Also a sincere Thank You to the honorable members of this field subcommittee for allowing me to appear today.

My name is Charles Imig and I have lived on Washington Island as a summer resident since 1943. Washington Island is approximately 4.5 miles by 5 miles in size and is located 5 miles off the tip of the Door County peninsula. It is the home of 680 year round residents. In the summer our population swells to several thousand, as summer residents return and families of tourists abound.

Yachtsmen from all around Lake Michigan make Washington Island a must-see destination. Tourism, the main industry in Door County, brings the county $453 million per year and Washington Island $19 million per year.

Our only commercial year-round access to the mainland is via a locally-owned ferry line service. All cars, trucks, passengers, freight, food, mail and emergency services must use this ferry service to access our Island. Last year, the Washington Island Ferry Line completed approximately 3,700 round trips to the mainland carrying approximately 225,000 passengers, 75,000 vehicles and countless tons of freight. This is no small operation.

The entire economy of Washington Island depends on the water.

Problems with our waterways mean problems for the Island's small business owners and their families. Lake Michigan water levels have hit record lows. A person can now walk to islands that were once only accessible by boat. One harbor, where sport fishermen stay at local resorts is closed even to small boat traffic because the channel is too shallow.

Throughout the winter, our ferry line has been dredging its Island and mainland ports and rebuilding its docks to accommodate the low water levels. This has been done at the small business owner's expense so that ferries can maintain a normal schedule. All these efforts do not solve the whole problem. Our main channel coming into the Island, which is a federal waterway, hasn't been dredged since 1939. The low water conditions and the shallow depth of this channel, plus larger deeper draft ferries making more trips than years ago, present a threat of interrupting our service if the waters continue to recede.

In addition, our local marinas have been forced to dredge and, even with those efforts, access to their docks is limited. Keep in mind, our peak tourist season is approximately 3 to 4 months long. The additional cost to dredge will hit the bottom line of the ledger sheet hard and we will all pay for it.

To compound our problems, Lake Michigan has been polluted with invasive species which arrived in untreated ballast waters in ocean freighters. Because of the low water level our Island and Door County beaches have become mud flats and are littered with dead zebra and quagga mussels and are infested with invasive plant species. You cannot walk barefoot on the beaches because the mussels are razor sharp when stepped on. Algae is now accumulating on beaches and rotting. The stench is so great that it is a nuisance to residents and tourists in the peak of our summer season. Local waterfowl are dying from botulism, further compounding our plight.

When yachtsmen can no longer access our harbors and tourists and summer residents no longer find the Island the precious treasure it once was, our Island economy will no longer support the people who make their living here.

Obviously our beautiful waters are in harm's way and the health of our Island and the whole Door County economy is in jeopardy.

WE NEED YOUR HELP!!!

WHAT CAN YOU DO????

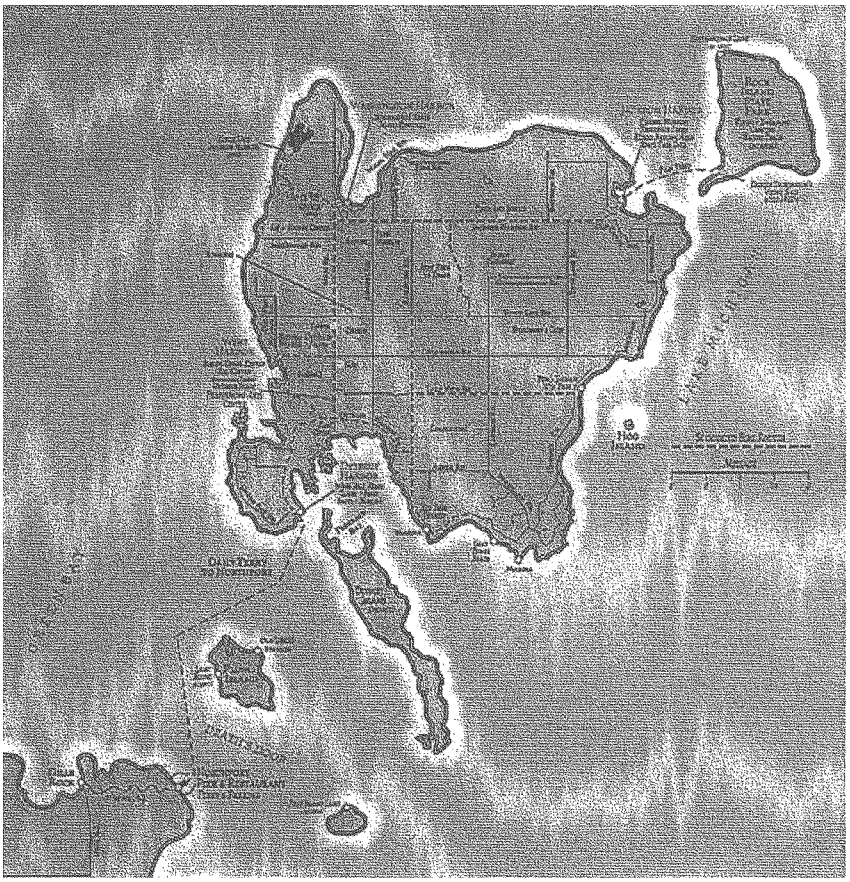
1 * To assure reliable Washington Island ferry service, you need to place the Detroit Harbor West Channel on the list of URGENT Army Corps of Engineer dredging projects.
2 * The most immediate solution is to act upon restricting water flow through the St. Clair River. Numerous studies have been conducted and solutions have been recommended in the past. Latest estimates indicate that the drain hole continues to erode and we are losing 2.9 billion gallons per day out of Lakes Michigan and Huron. The most logical solution is to install an interim, flexible control measure to bring Lakes Michigan and Huron out of crisis levels. The current International Joint Commission (IJC) study board should put their present work on hold, review the 1993 study in light of the current water conditions and get to it.
3 Congress needs to focus on reducing water diversions from Lakes Michigan and Huron. One such solution is for the United States government to immediately support and ratify the Great Lakes Compact once it reaches Washington D.C.
4 Enact and enforce strong legislation to control nonindigenous aquatic species coming into our waters in ocean ships with untreated ballast water.

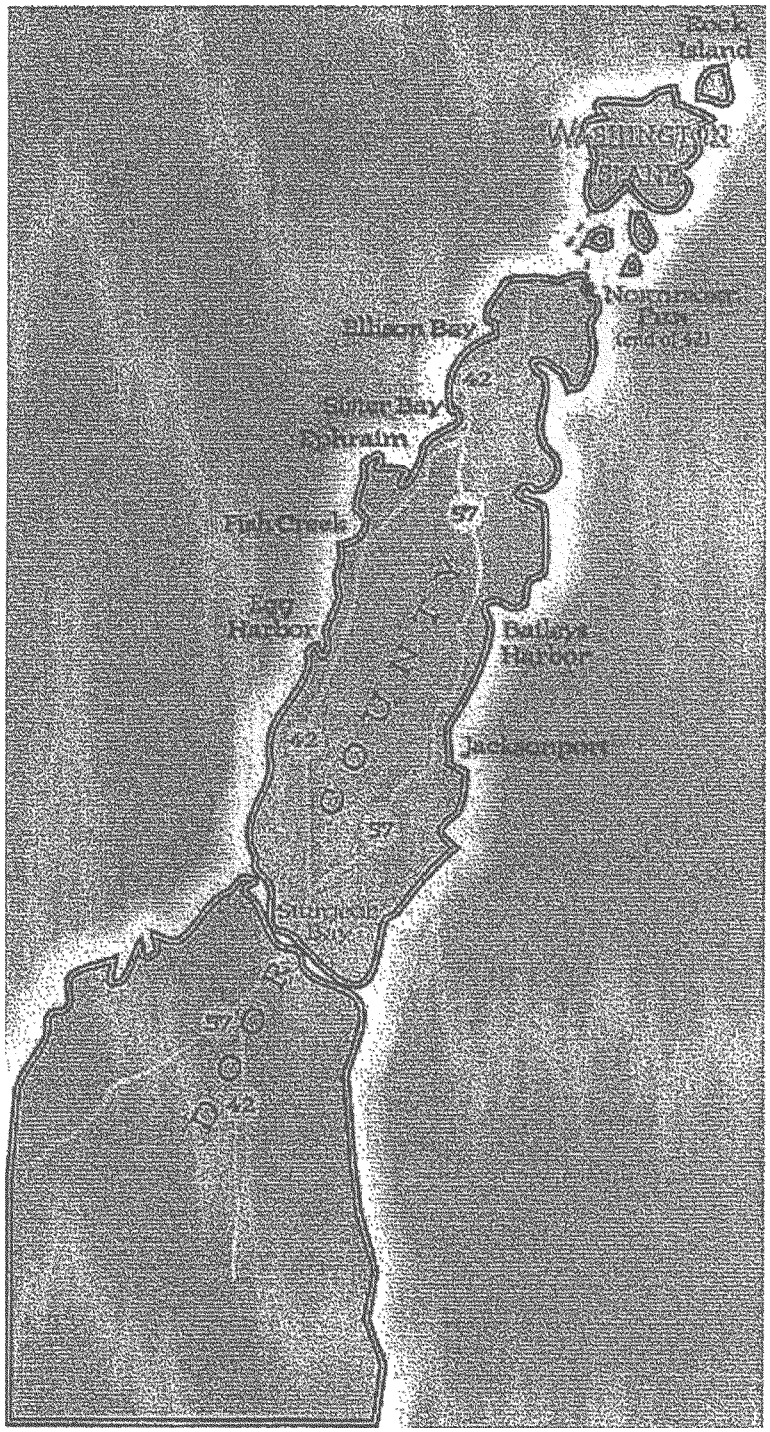
Successful resolution of these problems will take bi-partisan cooperation and dedication. If we don't act soon, these trends will become terrible legacies. Restoring our Great Lakes is a moral issue and needs the utmost priority. I beseech you to rise to the level of the solution for current and future generations.

PLEASE ACT NOW!!!!!

* attached support data

Washington Island is located just off the tip of the Door Peninsula at the very Northeast corner of Wisconsin. Just take Highway 57 North from Green Bay to Sturgeon Bay where it joins Highway 42. You can take either 42 or 57 to Sister Bay, then follow 42 to it's end at Northport Pier.




Rock Island
WASHINGTON ISLAND
Northwest Pt.
Ellison Bay
Sister Bay
Ephraim
Fish Creek
Egg Harbor
Baileys Harbor
Jacksonport
Sturgeon Bay
42
57

DEPARTMENT OF THE ARMY

COMPLETE STATEMENT OF

Lieutenant Colonel William J. Leady
Commander
U. S. Army Corps of Engineers, Detroit District

BEFORE THE

Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure

HOUSE OF REPRESENTATIVES

April 18, 2008

INTRODUCTION

Madam Chair and members of the Subcommittee, I am Lieutenant Colonel William J. Leady, Commander of the Detroit District of the U.S. Army Corps of Engineers. Thank you for the opportunity to testify before you today on lake levels on the Great Lakes.

In support of the nation, the U.S. Army Corps of Engineers provides technical support and expertise to monitor and forecast Great Lakes water levels. In addition, in support of the International Joint Commission (IJC), the Corps provides technical assistance in regulating the outflows of Lake Superior and Lake Ontario. Lake levels directly affect the health of the natural environment, the viability of commercial navigation and recreational boating, the stability of shoreline property, the availability of water for municipal water intakes, and many other features that affect our region's and our nation's quality of life. This testimony is meant to inform you about the causes behind the fluctuations in Great Lakes water levels and provide updated information on current conditions.

THE GREAT LAKES SYSTEM

The Great Lakes basin covers more than 94,000 square miles of water and more than twice as much land. It includes part or all of eight U.S. states and two Canadian provinces. The system begins at the Lake Superior headwaters and continues down to the Atlantic Ocean. The St. Marys River flows from Lake Superior to Lake Huron. Lakes Michigan and Huron are connected by the broad and deep Straits of Mackinac and are considered to be one lake hydraulically, with levels rising and falling together. The St. Clair and Detroit Rivers, with Lake St. Clair in between, connect Lake Huron with Lake Erie. The Niagara River then links Lake Erie with Lake Ontario, including the dramatic drop over Niagara Falls. The man-made Welland Canal also links Lakes Erie and Ontario, providing a shipping route around the falls. From Lake Ontario, water flows into the St. Lawrence River, which converges with the Ottawa River and flows on to the Atlantic Ocean.

The Great Lakes and St. Lawrence River are a dynamic system that is still evolving due to rebounding of the earth's crust, erosion and variations in climate. Ever since the last glaciers retreated more than 10,000 years ago, Great Lakes water levels and river flows have varied dramatically, as much as hundreds of feet.

Before I discuss current lake levels, I would like to briefly provide some background information on the main factors that affect lake levels. The Hydrologic Components figure (Figure 1) illustrates these components and their interactions. This figure was created using long term averages; it does not represent a specific time period.

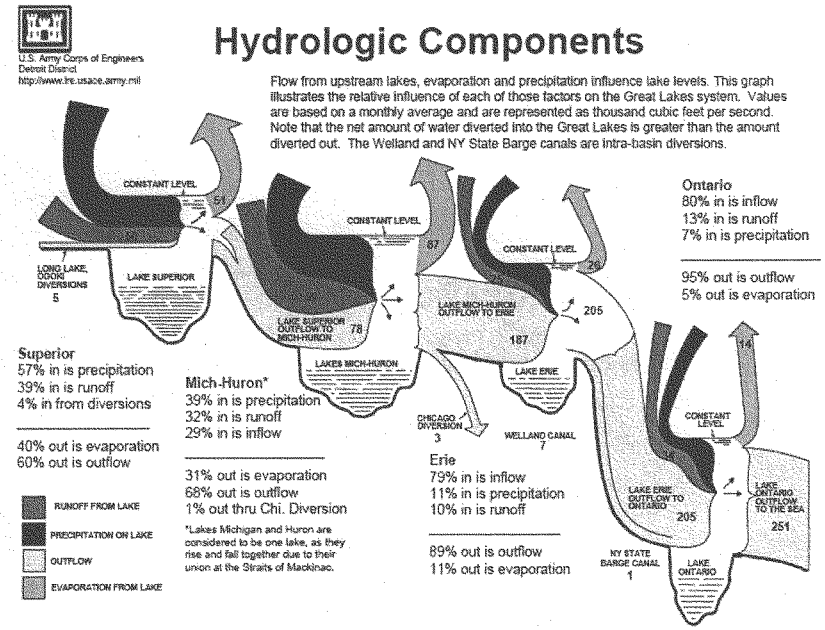


Figure 1: Hydrologic Components of the Great Lakes Basin

This figure illustrates four components: precipitation onto the lake (in red), runoff from rivers and steams that feed into the lakes (in orange), evaporation from the lakes' surface (in yellow), and outflows from the lakes (in blue). Man-made diversions are also shown. The relative importance of each of these factors shifts as water flows from the basin's headwater, Lake Superior, to the basin's outflow at the St. Lawrence River. For example, 57% of Lake Superior's inflow comes from precipitation directly onto the lake while precipitation directly onto Lake Ontario only accounts for 7% of it is inflow. Similarly, of the water that departs Lake Superior, 40% is lost to evaporation and 60% of it flows through the Saint Marys River into Lake Michigan-Huron. Of the water that departs Lake Ontario, only 5% is lost to evaporation and 95% of it flows into the St. Lawrence River. I should note that Lake Michigan and Lake Huron are, for many purposes, treated as a single lake since they are joined at the Straights of Mackinac and their levels rise and fall together.

There are five man-made diversions in the Great Lakes basin. The Long Lac and Ogoki diversions bring water into Lake Superior from the Hudson Bay watershed. The Lake Michigan Diversion at Chicago removes water from Lake Michigan for water supply, sewage disposal and commercial navigation. The Welland Canal provides a shipping route around Niagara Falls; because this diversion is internal it only affects a reach of the Niagara River, but not the Great Lakes as a whole. The New York State Barge Canal

diverts a small amount of water from the Niagara River and returns the water to Lake Ontario, also not affecting the system as a whole. In all, the net amount of water diverted into the Great Lakes basin exceeds that diverted out.

The difference between the amount of water coming into a lake and the amount going out is the determining factor in whether the water level will rise, fall, or remain stable. Moisture is carried into the Great Lakes basin by continental air masses originating in the northern Pacific Ocean, tropical systems originating in the Gulf of Mexico, or Arctic systems originating in the northern Polar regions. As these weather systems move through the Great Lakes, they deposit moisture in the form of rain, snow, hail or sleet. Water enters the system as precipitation on the lake, runoff from surrounding land, groundwater inflow and inflow from upstream lakes. Water leaves the system through evaporation for the land and water surfaces, groundwater outflow, consumptive use, diversions, and outflows to downstream lakes or rivers. Evaporation is a major factor when warm lake surfaces come in contact with dry air.

The water levels on the Great lakes fluctuate in three distinct cycles: short term, annually and longer-term. Water levels fluctuate on a short-term basis, usually due to winds and changes in barometric pressure, lasting from a couple hours to several days. The effects of wind and barometric pressure, for example a high pressure on one side of a lake and a low pressure on the other side, can raise or drop a lake level several feet in a few hours.

The lakes also fluctuate on a seasonal cycle. On all the Great Lakes, water levels decline to their lowest level in the winter months because more water leaves the lakes through evaporation than enters the lakes during that period. Evaporation is greatest in the fall and early winter. As the snow melts in the spring, runoff increases and lake levels rise. Generally, evaporation is least during spring and early summer. These factors contribute to more water entering the lakes than leaving, so water levels rise to their summer peak.

Long-term fluctuations occur over periods of consecutive years. Continuous wetter than average and/or colder than average years will cause levels to rise, while warmer than average and/or dryer than average years will cause levels to decline. Ice cover has a significant effect on lake levels because ice acts as a lid preventing evaporation, which is a major source of water outflow on the Great Lakes, especially the upper lakes. Cold winters, with significant and early ice cover, limit evaporation and result in higher water levels.

The IJC, with the Corps as one of its supporting agencies, does have some ability to influence relative lake levels.

Lake Superior outflows are controlled with compensating works near the twin cities of Sault Ste. Marie, Ontario and Michigan. Lake Superior outflows have been regulated since 1921 by the IJC's Lake Superior Board of Control in accordance with conditions specified by the IJC. The IJC is an international commission charged under the Boundary Waters Treaty with impartially approving certain uses and diversions of boundary waters and waters crossing the boundary. The objective of the Lake Superior

Outflow plan is to help maintain the lake levels on both lakes in relative balance compared to their long-term seasonal averages. Regulation of Lake Superior's outflow has a small effect on the relative water levels between the lakes, but to a far lesser extent than the effects of precipitation and evaporation.

Outflow from Lake Ontario is managed by the IJC and its International St. Lawrence River Board of Control. The IJC's criteria for regulating outflows recognize the need of three major interest groups: riparian property owners, hydropower, and commercial navigation. Outflows are regulated on a weekly basis under four key objectives: maintaining Lake Ontario's water level within a four-foot range during the navigation season; maintaining adequate depths in the International Section of the River for safe navigation; maintaining adequate flows for hydropower generation; and to protect the lower St. Lawrence River below the control works from flooding.

Crustal movement, the rebounding of the earth's crust from the removed weight of the glaciers, does not change the amount of water in a lake, but rather the intersection of the water surface and the shoreline. Rebound rates vary across the Great Lakes basin, with the earth's crust rising the most in the northern portion of the basin where the ice was thickest, heaviest, and last to retreat. For those areas in the northern part of the basin, crustal rebound causes a local situation where the land surface is rising at a rate that is noticeable over decades and causes the water level to appear to be lower than it was for the same water level decades earlier.

Now I'll turn to historical water levels on the Great Lakes and current conditions. The Corps began monitoring water levels on the Great Lakes in the 19th Century and, from 1918 to the present, we have monitored and recorded basin-wide water level data that allows for consistent, accurate, basin-wide comparisons.

The Great Lakes Water Levels figure (Figure 2) graphically shows these long-term fluctuations from 1918 to the present. On these graphs, the blue line for each lake represents the actual monthly average level and the red line represents the long-term (1918-present) average, based on a lake-wide average of several water level gages situated around each lake.

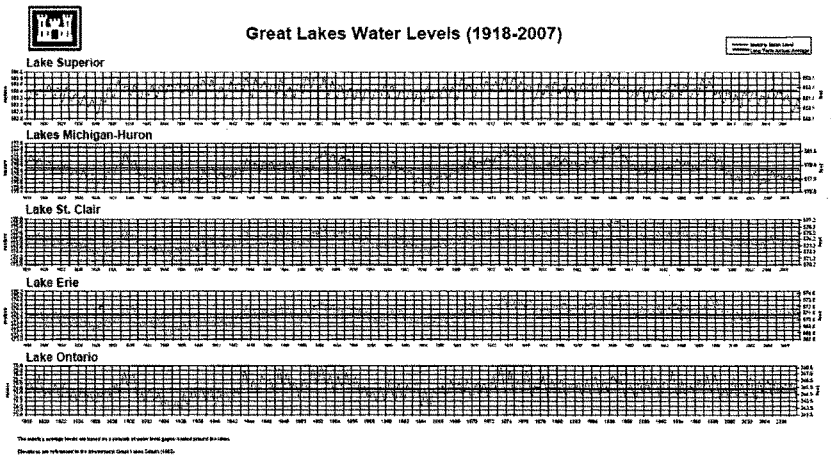


Figure 2: Great Lakes Water Levels 1918-2007

Several observations about the Great Lakes water levels become apparent when the information is presented in this format: First, the lakes are rarely at their average level. Also, even at this scale, the annual cycle with lake levels peaking in the late summer and dipping to their lowest in late winter is apparent.

The level of each lake is somewhat independent from each other. That is to say one lake may be in an extended above average period while at the same time another is in an extended below average period and a third lake is near average. For example, in the 1930s Lake Michigan-Huron, Lake Erie and Lake Ontario where all in an extended period of below average levels while Lake Superior was at slightly above average levels.

Lastly, from 1918 to the present there is not a definite or predictable pattern of level fluctuations on any of the lakes or for the system as a whole.

CURRENT CONDITIONS

For all the reasons I mentioned earlier, water levels on the Great Lakes have gone through periods of highs and lows over the past 90 years. Following a period of above average water levels during the 1970s through 1990s, the upper Great Lakes have experienced low water levels since the late 1990s. Over the past 10 years, increased water temperatures, reduced ice cover, reduced precipitation and snow pack, and increased evaporation have contributed to a decrease in water levels on the upper lakes. Lakes Superior and Michigan-Huron are currently significantly below average. In contrast, water levels on Lakes Erie and Ontario are currently above their long term averages.

But there is some good news this year. A very active 2007-2008 winter storm track has brought abundant snow to most of the Great Lakes basin. Some locations have seen two to three feet more snow than average. Temperatures have fluctuated this winter, leading to a number of snow melt runoff events. Also, ice cover began to form much earlier across the northern lakes, limiting evaporation. Soil moisture across much of the Great Lakes basin is above average. These conditions hold promise for increased water levels come spring and summer.

Lake Superior has been below its long-term average since 1998 and is currently in the longest period of below average water levels in the 1918-2007 period of record. Lake Superior set new record low monthly average water levels in August and September 2007. These new records were brought on by drought conditions across the Lake Superior basin over the previous 15 months. Precipitation in 2007 through August was three inches below average, adding to a six inch deficit from 2006. The winter of 2006-2007 had above average evaporation and below average snowfall. Forecasts made in early September showed a good chance for setting new record lows into 2008. Then in mid-September, the Lake Superior basin was inundated with heavy rain. From mid-September through October over ten inches of rain fell in the basin. The water level of Lake Superior responded by rising close to nine inches. Evaporation during the fall and winter of 2007/2008 was much less than that of 2006/2007. Snow pack across the Lake Superior basin is much greater this winter than last. Lake Superior is expected to remain below average, although levels will be 8 to 17 inches higher than last year.

Lake Michigan-Huron has been below average since January 1999 and is currently in its second longest period of below average water levels in the 1918-2007 period of record. The longest period of below average water levels was 1930-1943. The lake is currently below last year's levels. Lake Michigan-Huron is likely to remain 9 - 13 inches above its record lows and 18 -21 inches below its long-term average.

Lake St. Clair has fluctuated around average over the past two years. The March monthly average level was one inch below average and two inches above last year's level. The most probable forecast for the next six months shows the lake below average and near last year's levels, but well above its record lows.

Lake Erie has fluctuated around average over the past two years. The March monthly average level was eight inches above average, and two inches above last year's level. The most probable forecast for the next six months shows the lake will remain near or above average through May, then fall below average through September. Lake Erie will remain well above its record low levels.

Lake Ontario has fluctuated around average over the past two years, but ended 2007 below average. Since December 2007 the lake has risen significantly and the March monthly average level is now eight inches above average. The most probable forecast for the next six months shows the lake remaining above average through August and near

average in September. Lake Ontario will remain about three feet above its record low levels.

ST. CLAIR RIVER

Another issue that has received recent attention as a cause for lower water levels on Lakes Michigan-Huron is the flow in the St. Clair River. There have been many alterations made to the St. Clair River since the mid 1800s, including some for commercial navigation. Congress authorized the 25 foot navigation channel throughout the system in 1930. This authorization also noted the need for the construction of works to compensate for the enlargement of the lake outlets. These works would require the approval of the U. S. and Canadian Governments and the IJC. There are no known records detailing any agreements with the Canadian Government or the IJC regarding constructing any type of underwater structure that would compensate for the dredging. Dredging was completed in 1936 and model studies were done for submerged weirs in the 1930s. Submerged weirs would compensate for the decrease in water levels caused by the dredging. However, for a variety of reasons, no weirs were constructed.

It should also be noted that private interests mined a significant amount of sand and gravel from the upper St. Clair River. During the period 1908-1925, an estimated 3.5 million cubic yards were removed. Since this was done by private commercial interests, there are minimal records about exact locations and timing. There was no compensation done.

In 1956, Congress authorized the 27 foot navigation project, which included compensating works to assure the lakes would not be adversely affected. The compensating works would offset the lowering effects on Lakes Michigan and Huron of both the proposed improvement and previous dredging of the 25 foot channel. The dredging was completed in 1962. There were many hydraulic studies for weir design carried out through 1972. This was a period when water levels were rising (reaching record highs in 1973-74, which were then surpassed in 1985-86). There was no real interest at this point in placing submerged weirs in the St. Clair River which would have raised Lake Michigan-Huron water levels even higher, so construction was not initiated. Since these compensating works were not funded for five consecutive years, they were deauthorized in 1977.

Studies completed in the past by the IJC concluded that all dredging and mining in the St. Clair River since the mid-1800s has had a lowering impact on Lakes Michigan-Huron water levels of about 14 inches in total. The 25 foot project accounted for about two inches, while the 27 foot project accounted for about five inches of that total. The other seven inches are attributed to dredging prior to 1900 and commercial sand and gravel mining in the early 1900s. The IJC also concluded that the system reached a new equilibrium soon after each project.

Water levels remained above average during the period 1969 through 1999. As levels dropped below average in 2000 for the first time in nearly 30 years, lower water levels

and compensation for past dredging became an issue again. In January 2005, the Georgian Bay Association (GBA) released a report prepared by a consultant to address causes of lower water levels on Lakes Michigan-Huron. This report alleges that Lakes Michigan-Huron are being permanently and continually lowered by an increase in St. Clair River flows. GBA primarily attributes this to dredging of the navigation channels and a theory that severe and ongoing erosion of the river bottom was triggered by this dredging. The GBA and others are calling for action to be taken to compensate for this perceived erosion and subsequent alleged water loss.

In order to answer the many questions about changes in the St. Clair River over time and their impact on the rest of the system, the IJC has included these issues in their International Upper Great Lakes Study. This study will re-evaluate the regulation of Lake Superior and will investigate issues involving the St. Clair River and potential changes to water levels, whether from new regulation plans or physical changes in the St. Clair River. The Corps believes that this IJC study is the appropriate vehicle to investigate St. Clair River issues raised by the GBA report, and we are actively supporting this study.

SUMMARY

To close, I would like to thank you once again, Madam Chair, for allowing the Corps of Engineers the opportunity to appear before this subcommittee to discuss the Corps role in monitoring and forecasting lake levels in the Great Lakes. Current evidence suggests that the lake level regime is primarily due to the natural fluctuations of the hydrologic cycle; however the Corps awaits the IJC study conclusions on the St. Clair River to assess other factors.

I would be happy to answer any questions you and other Members of the Subcommittee may have.

Statement of
Mr. James H.I. Weakley
President
Lake Carriers' Association
Suite 915 • 614 West Superior Avenue • Cleveland, Ohio 44113

Before the
U.S. House of Representatives Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment

Hearing on
LAKE LEVELS IN THE GREAT LAKES
University of Wisconsin — Green Bay Phoenix Room
April 18, 2008 – 9:00 a.m.

SUMMARY

Water levels are critical to the efficiency of Great Lakes shipping. Vessels lose between 50 to 270 tons of cargo for each inch they must reduce their draft. As a result of falling water levels and lack of adequate dredging, the largest iron ore cargo carried in 2007 was more than 7,000 tons less than the record cargo moved in 1997, a period of high water. Those 7,000 tons of iron ore could have produced nearly 6,000 automobiles.

Water levels are cyclical and determined by precipitation and evaporation, natural forces no one can control. However, the effects of low Lake levels could be offset by adequate dredging of ports and waterways. Decades of inadequate funding for dredging have left a backlog of 18 million cubic yards of sediment. The U.S. Army Corps of Engineers estimates removing the backlog will cost more than $230 million.

Money is available to restore the Great Lakes navigation system. The Harbor Maintenance Trust Fund, **which is funded by a tax on deep-draft navigation,** has a surplus of more than $4.1 billion. The $230 million needed to restore the Lakes represents only 6 percent of the surplus. Congress must provide the Corps enough money to maintain the system and establish a line item for Great Lakes Navigation Restoration and fund it with at least $25 million a year until the backlog is removed.

The benefits of restoring the Great Lakes navigation are many fold. The efficient delivery of iron ore will keep our steel industry competitive with imports. Efficient delivery of coal will keep electricity affordable in the Great Lakes region. Efficient delivery of limestone and cement will help us to rebuild more of our bridges and highways. Increased use of waterborne commerce will also ease congestion on our highways and railbeds and reduce greenhouse gas emissions.

FULL TESTIMONY

Thank you Madam Chairperson and honored members of the Subcommittee. Lake Carriers' Association deeply appreciates your interest in Lake levels. This is a topic of critical importance to our industry.

Lake Carriers' Association represents 15 American corporations operating 63 U.S.-Flag vessels on the Great Lakes. These U.S.-owned, -built, and -crewed vessels move the raw materials that drive the U.S. economy: iron ore for steel production; coal for power generation; limestone and cement for construction; and other raw materials that are so vital to employment and our standard of living. When high water levels offset the now decades of inadequate dredging of Great Lakes ports and waterways, our members can annually move more than 115 million tons of cargo.

Statement of Mr. James H.I. Weakley, President
Lake Carriers' Association
Suite 915 • 614 West Superior Avenue • Cleveland, Ohio 44113

Before the U.S. House of Representatives Committee on Transportation and Infrastructure / Subcommittee on Water Resources and Environment

Hearing on
LAKE LEVELS IN THE GREAT LAKES
University of Wisconsin — Green Bay Phoenix Room
April 18, 2008 – 9:00 a.m.

It is no exaggeration to say that water levels make or break our industry. Depending on the size of the vessel, our members carry anywhere from 50 to 270 tons of cargo for each inch of loaded draft. Again, depending on the vessel, loaded drafts range from about 19 feet to more than 28 feet.

In the late 1990s, Mother Nature was very generous in terms of precipitation and Lake levels rose to near record highs. As a result, a number of cargo records were established in 1997. The benchmark for the iron ore trade through the Locks at Sault Ste. Marie, Michigan – 72,300 tons – dates from 1997, as does the top coal cargo – 70,903 tons. The largest U.S.-Flag salt and cement cargos also date from 1997.

However, starting in the late 1990s, water levels on Lakes plunged. In fact, Lake Superior reached a new record low last fall. It's little surprise then that the top cargos carried in 2007 paled in comparison to a decade ago. The largest iron ore cargo was 65,252 tons. The coal trade peaked at 64,450 tons. Since the vessel mix serving salt has changed, that comparison would be misleading, but the top cement cargo was only 15,682 tons. In 1997, the same vessel carried 17,740 tons in one trip.

My members earn their living carrying cargo, so less cargo means less revenue and less funds for modernizing vessels or building new hulls. However, there is a much greater impact from falling water levels and lack of adequate dredging. Let's consider those two iron ore cargos. The difference between 1997 and 2007 is 7,048 tons. Seven thousand tons of iron ore represents about a day's production at a Minnesota or Michigan iron ore mine. Seven thousand tons of iron ore will make about 4,700 tons of steel at a steel mill in Indiana, Ohio, Michigan, or other steel-producing States. Depending on the size of the mill, that's a half day's production at a complex that can employ thousands of men and women.

In turn, 4,700 tons of steel will make nearly 6,000 automobiles. Your typical American auto plant turns out 600 cars a day, so the cargo we lost from one vessel trip to the dredging crisis and low water represented almost two week production for the end user of that iron ore.

Water levels are cyclical. For example, we had a period of very low water levels in the early 1960s. In fact, water levels were so low that there were plans to put compensating works in the St. Clair River to keep the water level on Lakes Huron and Michigan up. Those plans were shelved when water levels rose.

Variances in water levels primarily reflect precipitation and evaporation, and no one can control the forces of nature.

There is, however, something we can do to cope with the cyclical nature of Great Lakes water levels. And that is to dredge Great Lakes ports and waterways to their project dimensions. It is one thing to have to reduce draft because we are experiencing a drought. It is quite another to have to lighten a load because the U.S. Army Corps of Engineers does not receive enough funds to maintain the Great Lakes navigation system.

Funding for dredging has been inadequate for decades. So much so that the U.S. Army Corps of Engineers estimates the backlog of sediment that must be removed from ports and waterways totals 18 million cubic yards. To give that some local perspective, that's more than 3 cubic yards for every resident of Wisconsin.

What will it cost to restore the Great Lakes navigation system to project dimensions? Again, according to the Corps, more than $230 million.

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$230 million is a significant amount of money. However, as a steel company executive whose operation is suffering from the dredging crisis recently noted, $230 million is less than was spent to reconfigure one freeway intersection south of Chicago.

Thanks to the efforts of the Great Lakes delegation, in FY08 the Corps will have nearly $140 million to dredge the Lakes. That is an increase of more than $40 million over the Administration's proposed budget and will allow the Corps to reduce the backlog by about 1 million cubic yards.

Unfortunately, the proposed budget for FY09 slashes nearly $50 million from this year's funding level. The $90 million allotted the Corps for the Lakes in FY09 may not even allow the Corps to maintain the status quo, let alone remove any more backlog.

No law can make it rain more. No law can cover the Lakes with ice in the winter to reduce evaporation. But Congress does have the power to increase the Lakes dredging appropriation. Not only do we need to provide the Corps enough money to maintain the system each year, we need to establish a line item for Great Lakes Navigation Restoration and fund it with at least $25 million a year until the backlog is removed.

Money is available to restore the Great Lakes navigation system. The Harbor Maintenance Trust Fund, which is funded by a tax on deep-draft navigation, has a surplus of more than $4.1 billion. The $230 million needed to restore the Lakes represents only 6 percent of the surplus.

What adds insult to injury is that the surplus in the Harbor Maintenance Trust Fund is growing. The Fund took in about $1.2 billion in 2007, but spent only $750 million on maintenance dredging, which is more or less typical. So much for "User Pay, User Say." At a minimum, the Fund should spend as much as it takes in. To accomplish this, we must have legislation that mandates that the Harbor Maintenance Trust Fund is used for its intended purpose. The days of using the surplus to paper balance the budget must end. It's time to put the TRUST back in the Trust Fund.

The benefits of restoring the Great Lakes navigation system are many. The efficient delivery of iron ore will keep our steel industry and its 100,000-plus employees competitive with imports. Efficient delivery of coal will keep electricity affordable in the Great Lakes region. Efficient delivery of limestone and cement will help us to rebuild more of our bridges and highways.

Speaking of our bridges and highways, the more we use Great Lakes shipping, the more we ease the congestion on our highways. It would take 2,800 trucks to deliver as much cargo – 70,000 tons – as does a 1,000-foot-long Laker in one trip. Even the railroads can't compare to us. It would take seven 100-car unit trains to equal the hauling power of one 1,000-footer.

America has a wonderful asset in Great Lakes shipping. The U.S.-Flag Lakes fleet leads the world in terms of self-unloading vessels. Since these vessels fly the U.S. Flag, they are built and operated to the world's highest safety standards. Yet year after year we have forfeited cargo because of inadequate dredging. This was never wise, but the economic realities of today and tomorrow demand we utilize Great Lakes shipping to its fullest extent. The Great Lakes region cannot remain our industrial heartland if vessels continue to light load.

Thank you for the opportunity to address this hearing. I will do my best to answer any questions you might have.

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DAVID A. PATERSON
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STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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ALEXANDER B. GRANNIS
COMMISSIONER

MAY 27 2008

Honorable Eddie Bernice Johnson
Chairwoman
Subcommittee on Water Resources and Environment
United States House of Representatives
Room B-376 Rayburn House Office Building
Washington, D.C. 20515

Via Facsimile: (202) 225-4627

Dear Chairwoman Johnson:

I would like to add the comments of the Department of Environmental Conservation to the record of the Subcommittee's April 18, 2008 hearing on Lake Levels in the Great Lakes. New York's experience with the International Joint Commission's regulation on water levels on Lake Ontario and the St. Lawrence River may be of assistance to the Subcommittee in its discussion of water levels.

For the past several years, DEC and the Department of State have made every effort to work with the IJC to develop a new protocol for the water levels of Lake Ontario and the St. Lawrence River. These waters, which form the State's boundary with our Canadian neighbors, are vital environmental and economic resources for New York residents and businesses.

The IJC decided to regulate water levels on Lake Ontario and the St. Lawrence River in 1952, implementing a regulatory protocol pursuant to an Order issued in 1956. The underlying intent of this Order was to support decisions by the governments of New York State and the Province of Ontario to construct hydroelectric facilities which would utilize the flows of the St. Lawrence River. By regulating water flows in Lake Ontario and the St. Lawrence River, the IJC hoped to protect the interests specified by the U.S.-Canadian Boundary Waters Treaty of 1909 – domestic use of water, navigation and hydropower generation.

The protocol for water-level management which the IJC developed and has implemented for the past 50 years has been disastrous for the ecology of Lake Ontario, severely damaging more than half of all the wetlands (33,000 acres) bordering the Lake. Despite the repeated pleas of New York State and others, on March 28, 2008 the IJC released a plan, known as "Plan 2007," which will provide little to no improvement. This information is reflected in the Subcommittee's Summary of Subject Matter, which clearly shows the significantly diminished fluctuations in Lake Ontario's water levels over the past 50 years.

There is a well-developed alternative protocol, known as Plan B+, which would substantially restore the wetlands and fish habitat and benefit the hydroelectric power sector and the recreational boating community – while not harming other interests such as navigation and domestic water use. Recently New York Governor David Paterson and I asked the IJC, at a minimum, to present this alternative for public comment and consideration (with other draft protocols if necessary), allowing an airing of the choices, but our request fell on deaf ears.

The Subcommittee should be aware that the IJC spent five years and $20 million – $10 million of which was supplied by the U. S. Congress – to studying options for better regulation of water levels on Lake Ontario and the St. Lawrence River. Despite the clear public support for Plan B+, the IJC has chosen to lock it away in a bureaucratic closet, presenting instead a protocol which essentially continues the environmentally damaging protocol of the last 50 years. Making matters worse, the IJC has said publicly that New York must implement environmental mitigation programs if we are ever to see Plan B+ implemented. Although we are amenable to developing such a plan, the IJC refuses to meet with New York State officials to discuss associated policy matters. The IJC worked with New York throughout the process of developing a plan for Lake Ontario and the St. Lawrence River, but has now thrown all of that work away. The upper Great Lakes states can expect the IJC to act in a summary fashion in crafting recommendations for the new Lake Superior-St. Mary's River regulatory plan and in response to the Lake Huron-St. Clair River outflow concerns.

New York is not alone in its concern with the manner in which the IJC has acted with respect to the Lake Ontario-St. Lawrence River water level protocols. Plan B+ was developed by the U. S. Army Corps of Engineers in conjunction with the Study Board that oversaw the five year - $20 million Study. This Plan has garnered support from the National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency, as well as the Province of Ontario.

This issue is an example of the IJC's abuse of its authority under the Treaty. The IJC's lack of respect for the only State which is affected by its current and proposed protocols to regulate water levels on Lake Ontario and the St. Lawrence River greatly disturbs New Yorkers. Based upon our experience, we can only believe that the IJC will behave in a similar fashion in dealing with the upper Great Lakes States.

I hope that this information is helpful to the Subcommittee. I would be happy to discuss this issue with you further.

Sincerely,

Alexander B. Grannis

STATEMENT FOR THE RECORD
LEON M. CARL
CENTER DIRECTOR
U.S. GEOLOGICAL SURVEY
U.S. DEPARTMENT OF THE INTERIOR
BEFORE THE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIROMENT
U.S. HOUSE OF REPRESENTATIVES
APRIL 18, 2008

Madam Chairman and Members of the Subcommittee, thank you for the opportunity to provide this statement for the record on water levels in the Great Lakes. I am the Center Director of the U.S. Geological Survey (USGS) Great Lakes Science Center (GLSC) in Ann Arbor, Michigan.

Scientists at the USGS have conducted research on water levels in the Great Lakes for over 20 years. Our scientists have played a major role in the environment portion of the International Joint Commission studies of potential lake-level regulation following the high water levels in 1986, as well as the recently completed studies of Lake Ontario regulation plans. USGS scientists have also conducted research on the effects of climate change on Great Lakes wetlands by studying the effects of past climate variability. Scientific understanding of pre-historical lake-level history and behavior in the Great Lakes is based largely on these studies.

Water levels in the Great Lakes vary naturally on time scales that range from hours to thousands of years. Seasonal changes are driven by differences in basin water supply during the year associated with snow melt, precipitation, and evaporation. Annual-to-millennial changes are driven by subtle-to-major climatic changes affecting both precipitation, and resulting streamflow, and evaporation. Observed water levels in the Great Lakes are also affected by very short-term changes resulting from storm surges and other fluctuations caused by wind, changes in barometric pressure or seismic disturbances (or seiches) and by very long-term changes caused by the rebound of the earth's crust which had been depressed under the massive weight of ice sheets during the last glacial period.

USGS research quantifies the amount and timing of the natural variability in Great Lakes water levels going back nearly 5,000 years. For example, the reconstructed water-level history of Lake Michigan-Huron over the past 4,700 years shows three major high phases. The first phase occurring from 2,300 to 3,300 years ago, the second from 1,100 to 2,000 years ago, and the most recent from present to 800 years ago (Figure 1). Within this 4,700 year record is an apparent periodic rise and fall fluctuation lasting about 160 (±40) years in duration and a shorter fluctuation of 32 (±6) years that is superimposed on the 160-year fluctuation. Independent investigations of climate variability in the Great Lakes Basin over the long-term period of record confirm that these changes in lake level are a response to climate change, with higher lake levels during cool periods and lower lake levels during warm periods. Recorded lake-level history from 1860 to the present (Figure 2) is consistent with the longer-term pattern and appears to represent one 160-year quasi-periodic fluctuation. The current low water levels in the upper lakes that began in 1999 fall within the 30- to 32-year fluctuation which has been observed during the mid-1960s, mid-1930s, late 1890s, and late 1860s. Please note that the water level of

Lake Superior and Lake Ontario has been regulated since about 1914 for Lake Superior and since about 1960 for Lake Ontario (Figure 2). The range of Lake Superior water-level fluctuations has not been altered greatly by regulation. However, fluctuations in Lake Ontario have been reduced from 6.6 feet before regulation to 4.3 feet over the past three decades since regulation has been implemented.

Natural variability of lake levels has been linked to the diversity and viability of nearshore wetlands in Lake Ontario. Periodic high lake levels kill trees, shrubs, and canopy-dominating emergent plants in nearshore wetlands, and low water levels following the high levels result in seed germination and growth of a multitude of species (Figures 3 and 4). Occasional low water levels are also needed to restrict the growth of plants that require very wet conditions, such as cattails, in wetlands higher up the shoreline that are typically colonized by wetland plants and grasses. The diversity of wetland plant communities and the habitats they provide for fish and wildlife in Great Lakes wetlands are dependent on water-level fluctuations. In Lake Ontario the effects of regulation have eliminated or significantly reduced the natural pattern of high and low lake levels. As a result, extensive cattail stands have become established in nearly all wetlands in Lake Ontario, mostly at the expense of wetland rushes and grasses, substantially reducing the diversity of shoreline habitat (Figure 5).

In addition to USGS research on Great Lakes water levels, the USGS has also examined trends in tributary runoff into the Great Lakes. These trends are based on measurements of streamflow at USGS streamgages throughout the Great Lakes region. Runoff is a significant component of the Great Lakes water balance, especially in Lake Superior which has no inflow from an upstream Great Lake. Clearly, decreases in runoff result in decreases in lake level. Recent trends show decreased runoff in the Lake Superior watershed. This has contributed to lower lake levels in Lake Superior as well as the downstream Lakes Huron and Michigan.

Examination of very long-term trends in lake levels and recent trends in streamflow indicate that current low water levels in Lakes Michigan, Huron, and Superior are greatly influenced by natural variability in climate. Furthermore, this natural variability is critical to the health and viability of natural ecosystems, such as nearshore wetlands.

The USGS report on historical lake-level change, as well as analysis of trends in tributary runoff to the Great Lakes, was funded by Congress as part of a national pilot study of water availability in the Great Lakes. The Great Lakes pilot study includes analysis of historic trends in streamflow and preciptation, estimates of consumptive water use, rates of ground water recharge, and estimates of the amount of potable water available in the Great Lakes Basin. Reports produced through this pilot effort can be viewed on the pilot study website at: *http://water.usgs.gov/wateravailability/greatlakes/index.html*. The USGS is requesting a net increase of $8.2 million along with an internal redirection to provide $9.5 million to conduct a water census and upgrade the Nation's stream gage network as part of the Department's Water for America initiative in 2009. Future studies of this kind are being planned by the USGS as part of this larger initiative.

Thank you for the opportunity to submit this statement for the record.

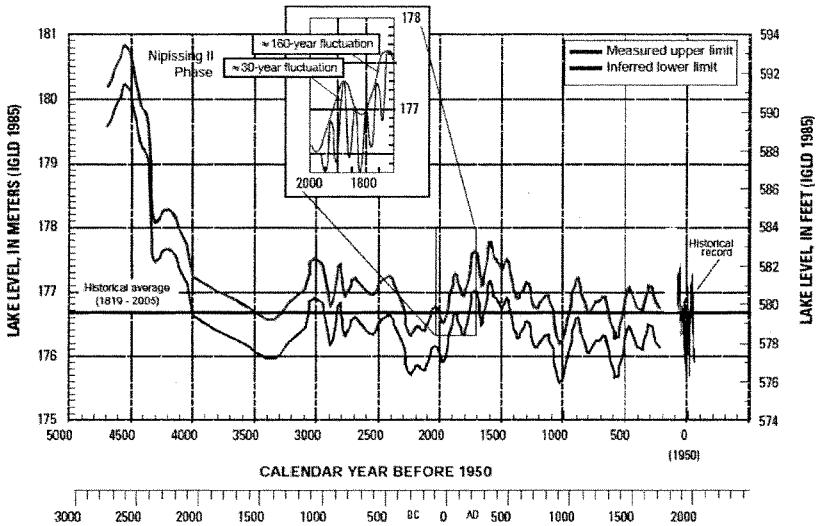

Figure 1. Graph of paleo lake level and historical lake level for Lake Michigan-Huron. Top line shows seasonal high lake levels as determined from sedimentological data; bottom line shows inferred seasonal low lake levels using the range of the historical record as a guide.

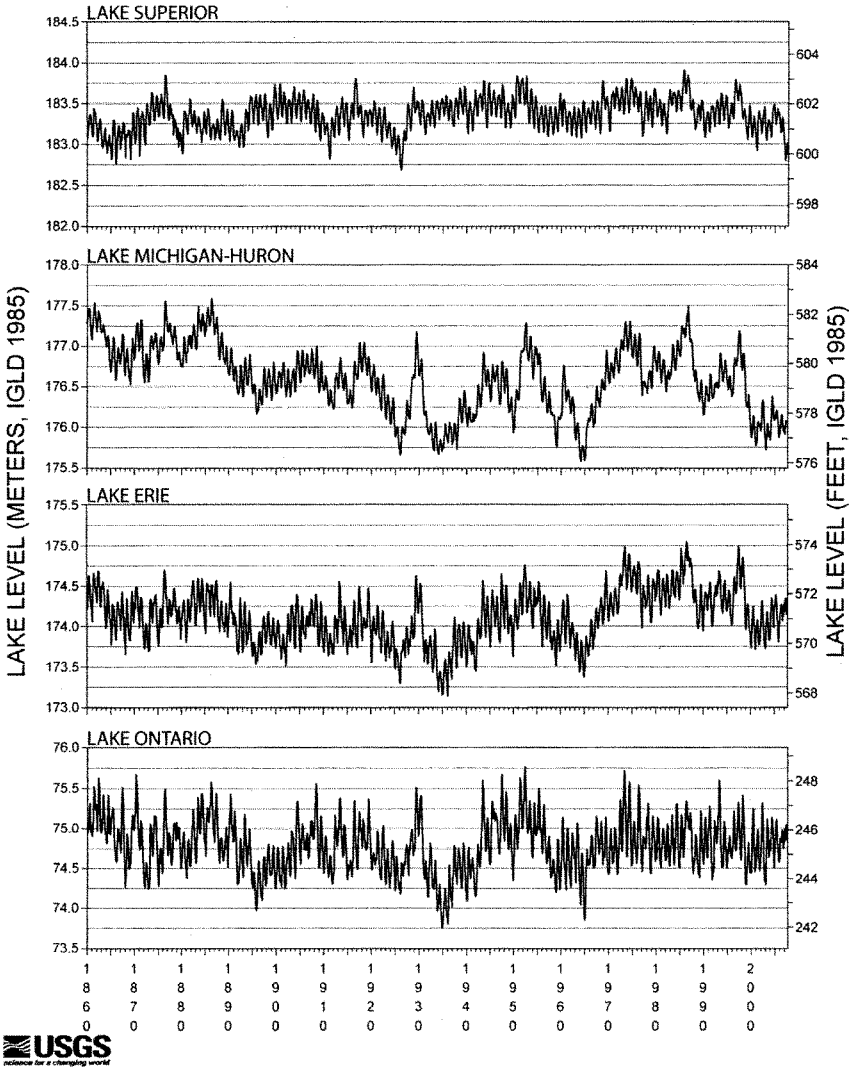

Figure 2. Historical lake levels for the Great Lakes, 1860-2007.

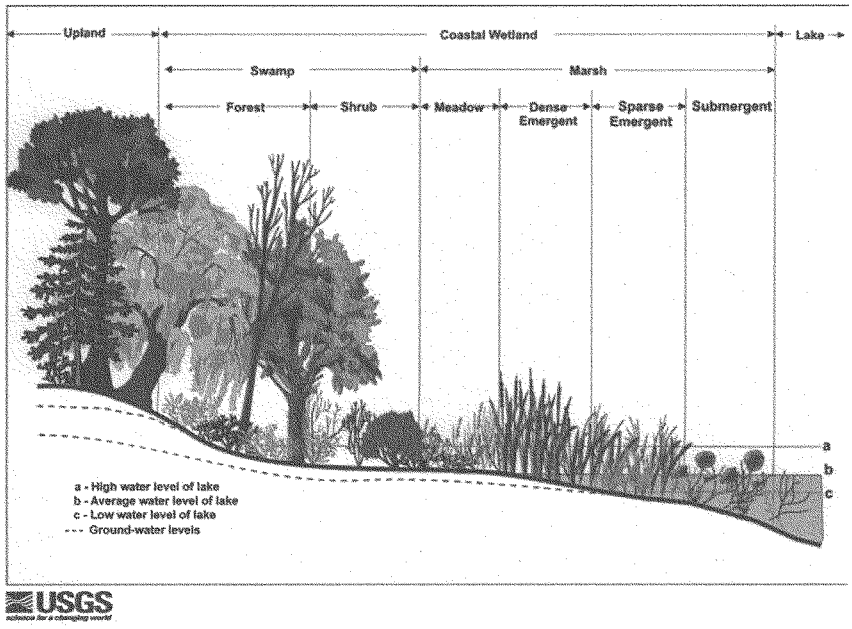

Figure 3. Profile of a typical coastal marsh from lake to upland showing changes in plant communities related to lake-level history.

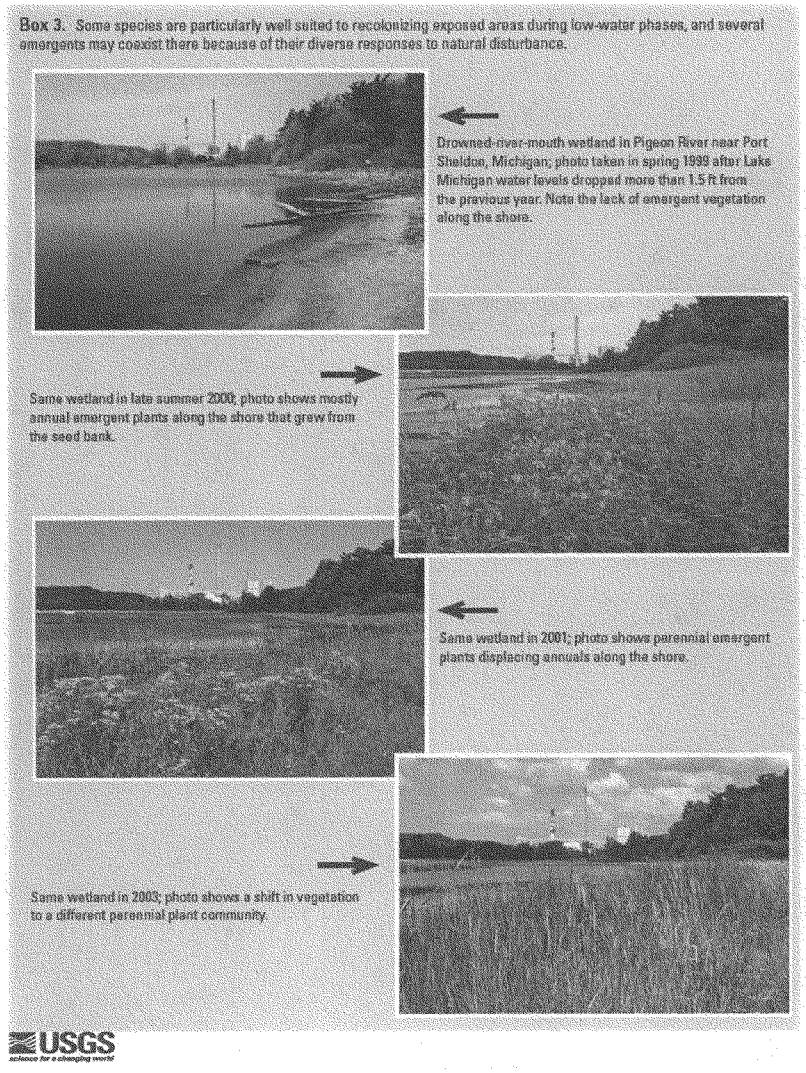

Figure 4. Natural revegetation of a drowned-river-mouth wetland of Lake Michigan following a drop in water levels of more than 1.5 feet from the high of 1997 to the current low that began in 1999.

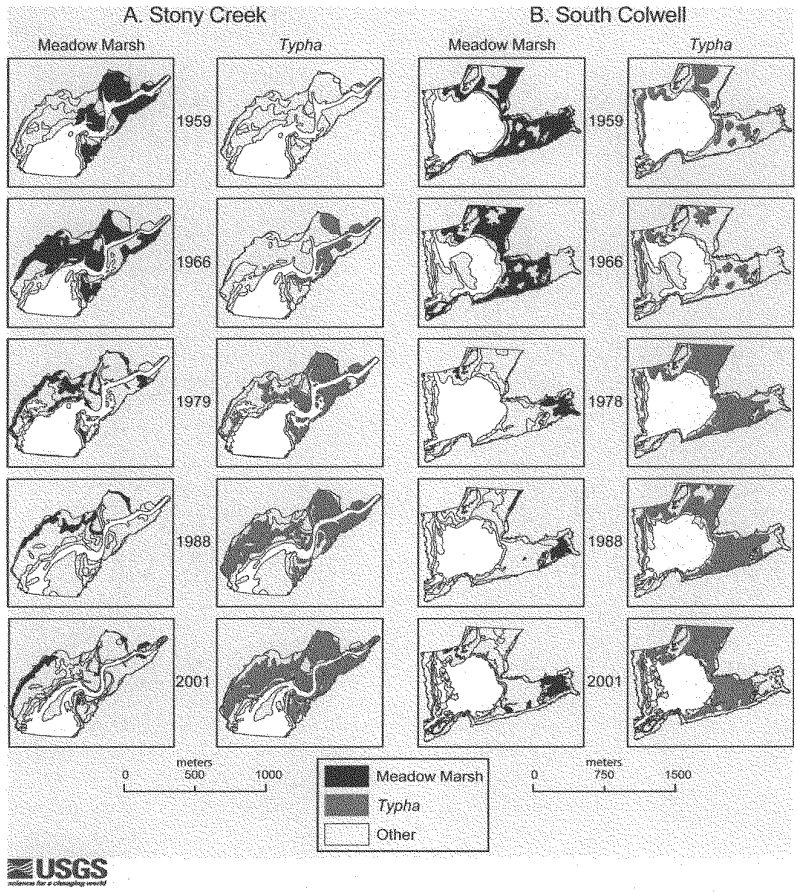

Figure 5. GIS maps of sedge/grass-dominated meadow marsh and cattail (*Typha*) vegetation types at Lake Ontario drowned-river-mouth wetland Stony Creek (A) and barrier beach wetland South Colwell Pond (B) derived from photointerpretation of aerial photographs taken in 1959 before regulation and in succeeding decades following regulation.