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WATER RESOURCES DEVELOPMENT ACT: LEGISLATIVE AND POLICY PROPOSALS TO BENEFIT THE ECONOMY, CREATE JOBS, PROTECT PUBLIC SAFETY AND MAINTAIN AMERICA'S WATER RESOURCES INFRASTRUCTURE

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

NOVEMBER 17, 2010

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ONE HUNDRED ELEVENTH CONGRESS
SECOND SESSION

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WEDNESDAY, NOVEMBER 17, 2010

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The full Committee met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Office Building, Hon. Barbara Boxer (Chairman of the full Committee) presiding.

Present: Senators Boxer, Inhofe, Cardin, Vitter, and Merkley.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. Good morning, everybody. I wanted to start this exactly on the nose—hello, Senator Inhofe—because we have a couple of votes starting at 11. So we want to get through this. I think we can, because we only have one distinguished panel with us, very important panel.

Today's hearing will examine proposals for maintaining our ports, keeping our waterways open for commerce, protecting our citizens from storms and floods, and restoring our most precious ecosystems. This is the second hearing held by the EPW Committee as we continue to develop the next Water Resources Development Act. The projects included in WRDA are vitally important to keeping our communities safe and our economy moving forward.

Prior to 2007 WRDA had not been passed in 7 years. But we built overwhelming bipartisan support, Senator Inhofe and I, in the Senate to enact the Water Resources Development Act of 2007 over President Bush's veto. That bill allowed many critical projects across the country to proceed. And if we are going to grow America, we have to make sure we keep up with the infrastructure. That is the bottom line.

I look forward to working with Senator Inhofe again and colleagues on both sides of this aisle to develop the next Water Resources Development Act. The projects, the policies, the programs authorized in WRDA are essential components of creating jobs and keeping our economy growing. For example, today we will hear about proposals to increase investment in our Nation's ports and

inland waterway navigation channels. Ensuring our port and inland waterway infrastructure is adequately maintained is critical to the Nation's economic success. According to the Army Corps of Engineers in 2008 U.S. ports handled over $1.6 trillion in foreign commerce, and U.S. ports and waterways moved nearly 2.5 billion tons of cargo.

Maintaining our ports is especially important in my home State. The Port of Los Angeles, Port of Long Beach, Port of Oakland are among the top 10 ports in the Nation by the amount of container cargo shipped. These and many other important California ports support economic activity representing hundreds of thousands of jobs and tens of billions of dollars across this entire Nation because those goods are transported to the port and then they go from the port across the entire Nation.

Past WRDA bills have authorized projects to build and maintain ports across the country. Now we must ensure we invest in these projects so our ports are properly maintained and continue to support the billions of dollars of commerce and thousands of jobs that depend on them all across the country. A bipartisan group of Senators has introduced legislation to ensure that revenues collected for harbor maintenance activities are invested in our ports. I support these efforts, and I believe increasing investment in harbor maintenance should be a focus of our next WRDA bill.

Our witnesses today will also discuss steps we can take to improve the safety of the Nation's thousands of miles of levees. How critical is that? As we write the next WRDA bill, improving the Nation's levees will be one of our top priorities. In California, many communities such as Sacramento face considerable flood risk and they rely on the levees for protection. We know what happens when levees fail. We have seen it, we will never forget it, and we want to avoid that.

WRDA is needed to allow critical enhancements to the levees surrounding Sacramento's Natomas Basin to move forward. In WRDA 2007 we established a national Committee on Levee Safety. We directed that committee to develop recommendations for a national levee safety program. The Committee's recommendations called for comprehensive and consistent national leadership on levee safety, strong levee safety programs in all of our States, and alignment of existing Federal programs. These are important goals that the next WRDA bill can help to achieve.

Investment in the Nation's WRDA resources, creating jobs and providing benefits to America's families and businesses every day, is crucial. Moving forward on WRDA would provide the opportunity to advance important projects and programs, create jobs, and promote our long-term prosperity, not to mention our competitiveness as a Nation in a global work marketplace.

So I would like to call on Senator Inhofe now.

OPENING STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Thank you, Madam Chairman. It surprises a lot of people when they hear me say it is good to be back with you, but it is. It upsets people no end when they find out that the person who is ranked as the most conservative member of the U.S.

Senate really likes the most liberal member of the U.S. Senate, and we have a lot of things in common.

I used to say that while I am ranked as the most conservative, there are some areas where I am a big spender. One is national defense, one is infrastructure, and one is unfunded mandates. Well, infrastructure and unfunded mandates are a product of this, and we are in agreement on that.

So we are anxious together, I think every member of this Committee, the Republicans and the Democrats working together, to have another WRDA bill. As the Chairman mentioned, when we had our 2007 bill it had been just years since we had had one before, and we need to get it done this year. I don't think we will be able to do it this month or this year, but I think we will when we come back into session. That is my personal feeling.

A lot of people are not aware of the fact, we are going to be dealing, of course, with some of the harbor things, the inland waterways, that Oklahoma, my State of Oklahoma, is probably the most inland port in America. People are not aware of that. They think of Maryland and other States as having all these ports, or California. But the McClellan-Kerr waterway system is kind of interesting because it was started by my father-in-law with Governor Bob Kerr. I was there at the breaking of all this, and when President Johnson came in, I was there at that time. A lot of people have said, well, that is a boondoggle. Well, maybe they called it that, but it is sure working today. We have just thousands of people working out there.

One of the things I think should be changed is, when we have this harbor fund, this trust fund, they have taken a portion of that and put it to debt reduction. To me, this is kind of a moral issue. I said the same thing back in 1998, when President Clinton took out of the Highway Trust Fund about, I can't remember the exact amount, $8 billion or $9 billion. It took us 10 years to get that back, but we did. And that overcame a crisis that we are facing. So I think it is exactly the same thing, what we are facing here.

So on the issues that are coming up, I am very anxious to get started with this thing. We will be working hand in hand, and hopefully it will get done.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA

Thank you, Madam Chairman, for holding this hearing, and thank you to all the witnesses for joining us this morning. We've been trying to hold this hearing for several months now, and I'm happy it's finally happening.

The Chairman and I have worked together to develop a Water Resources Development Act (WRDA) of 2010, but it looks like we are not going to have enough time to finish it this Congress. I hope to continue working in a bipartisan fashion to ensure we pass a WRDA next year.

At our first WRDA hearing in May we heard from witnesses who spoke of the short- and long-term economic benefits of investments in our water resources infrastructure. Today's hearing will focus on legislative and policy recommendations for the next WRDA, including levee safety, investment in our inland waterways system, and maintenance of our ports and harbors.

As anyone who has heard me speak before about infrastructure well knows, I strongly support Federal investment in public infrastructure. In fact I believe it is one of two areas where the Federal Government should spend money, the other being national defense, of course. We have significant water resources needs across the country, but we aren't dedicating the funds necessary to address them.

Let me be clear, though, that I am not advocating for simply increasing overall spending. Instead, I support making infrastructure spending a greater percentage of overall spending. I look forward to discussing how we can do that with the witnesses here today.

WRDA 2007 included establishment of a committee on levee safety, to be composed of Federal, State, local, tribal, and private sector experts and charged with making recommendations on how best to structure a national levee safety program. In January 2009 that committee made public a report with a number of recommendations that I believe deserve further discussion. It is important that we get a program started soon, but also important to make sure we don't rush through the numerous and complex issues involved and that a national levee safety program does not set unrealistic expectations for levels of Federal funding.

Moving to the topic of the inland waterways system, I know I've used this example before, but it bears repeating: the McClellan-Kerr Arkansas River Navigation System is very important to the national economy and to the economy of my home State. Currently the Tulsa Port of Catoosa alone is the location of more than 60 companies employing nearly 3,000 employees. We must figure out a way to continue investing in this important aspect of our economy.

The Inland Waterways Users Board, working with the Corps of Engineers, undertook a thorough review of the current process used for investing in our system. The Board developed a comprehensive set of recommendations aimed at not just increasing our investments but also at making any level of investment more efficient and effective. Many of these recommendations may be appropriate for inclusion in the next WRDA.

Maintenance of our ports and harbors is unfortunately another underfunded activity. I can understand the frustration on this issue since a specific tax is collected to be used to fund these activities. Instead, approximately half of yearly revenues are spent as intended while the rest is counted as offsetting the deficit. That is not fair or honest, especially when so much maintenance is left unfunded.

I do have a concern with the legislation introduced to address this issue, however, and that is that it likely would lead to decreased funding for other activities of the Corps that are already underfunded as well. If we can find a way to address the needs of our ports without negatively impacting our other water resources needs, I would be very supportive.

Before I finish, I want to acknowledge all the work done so far. I know that a lot of people have put a great deal of time and effort into studying these three issues and developing recommendations. I want to say thank you to everyone involved. We still have some work to do, but I look forward to continuing to work together with my colleagues, the witnesses, and their colleagues to address these issues during development of the next Water Resources Development Act.

Senator BOXER. Well, I think it is going to get done. And one of the reasons will be, certainly, the support of our colleagues. One of them is here, Senator Cardin.

OPENING STATEMENT OF HON. BENJAMIN L. CARDIN, U.S. SENATOR FROM THE STATE OF MARYLAND

Senator CARDIN. Let me thank our Chairman and our Ranking Member because I do believe the Water Resources Development Act is one of the most important bills that we can get done. I hope we can get this done early next year, because I think it is very important to get the predictability on water infrastructure projects. We will be talking today about levees and dams. We also will be talking about the Harbor Maintenance Trust Fund and Inland Waterway Trust Fund. I think some of the issues that my Chairman and Ranking Member have raised are very important for us to deal with.

Let me just point out, I think this bill is critically important for jobs in our community. It is about jobs, it is about creating more opportunities for Americans to work. In my own State of Maryland, I am going to be talking a great deal about the dredging projects and the impact it has on Maryland's economy. I can talk about the Chesapeake Bay, and I can also talk about the ports that are lo-

cated in Maryland. The Chesapeake Bay has a considerable amount of erosion and sediment that adds to the needs for the dredging funding to be predictable and to deal with dredging our waterways.

The Port of Baltimore has 126 miles of shipping channel. That is a real challenge. The Port of Baltimore is one of our most busy ports in our Nation. It ranks first in handling trucks, roll-on, roll-off cargo such as automobiles, trucking trailers, and freight cars. It ranks first in gypsum, sugar, and iron ore. It is the country's second largest automobile exporter and nationally ranked 12th in total value of foreign cargo handled. So dredging of our shipping lanes is critically important to the economic strength of our entire region and our Nation in regards to the Port of Baltimore.

But what you may not be aware of is that we have other ports that are equally important to our regional economy. The Port of Salisbury, critically important for the energy of the DelMarVa peninsula, critically important for the farming interests in the DelMarVa peninsula.

Then in regard to levees, Madam Chair, let me just point out, we have six federally funded levees that are in Maryland that are critically important for flood control. In western Maryland they are particularly vulnerable. And the safety of our levees is important. I want to make sure that we have adequately funded maintenance and repair of our levees, which I think today is—all surveys show that we are not doing enough in order to do that.

In the interest of time, Madam Chair, I am going to ask that my entire statement be made a part of the record so we have maximum opportunity to hear from our witnesses.

[The prepared statement of Senator Cardin follows:]

STATEMENT OF HON. BENJAMIN L. CARDIN,
U.S. SENATOR FROM THE STATE OF MARYLAND

Madam Chairman, thank you for holding this hearing today. The Water Resource Development Act is one of the most important public works laws that we consider. I am happy to have the opportunity today to address some of the critical economic issues associated with our water resources infrastructure.

Today's witnesses will discuss some of the specific funding mechanisms used to support our water resources infrastructure. We'll hear about levees and locks and dams. We'll hear about the Harbor Maintenance Trust Fund and the Inland Waterways Trust Fund.

While the specific points our witnesses will be making will vary, there will be a common theme throughout today's hearing, and that is jobs. The economic importance of a robust water resources infrastructure for America is vital to creating and maintaining jobs all across this country.

Maryland has a geography and topography which makes the Chesapeake Bay particularly susceptible to the adverse effects of erosion. This erosion contributes to 5 millions of cubic yards of sediment deposited annually into the bay, adversely affecting water quality, destroying valuable wetlands and habitat, and clogging navigation channels.

Every year the Corps clears tons of eroded sediment from the Federal navigation channels that lead into and out of the Port of Baltimore. Keeping this port open and the channels dredged is essential not just for Maryland, but for the Nation.

The Port of Baltimore is an enormous economic engine for Maryland with national significance. There are 126 miles of shipping channels leading to the Port of Baltimore. In 2008 approximately 47.5 million tons of cargo, including 33 million tons of foreign cargo valued at $45.3 billion, and approximately 14.5 million tons of domestic waterborne cargo moved through the Port of Baltimore.

Among the 360 U.S. ports, Baltimore is ranked No. 1 for handling:

- Trucks
- Roll on/roll off cargo (i.e. automobiles, trucking trailers, and freight cars),

- Imported forest products,
- Gypsum, sugar, and iron ore, and
- it is the country's second largest automobile exporter and
- is nationally ranked 12th in total value of foreign cargo handled.

The Maryland Port Administration estimates that the Port generates 50,700 jobs in Maryland with $3.7 billion in wages and salaries. Additionally, there are approximately 68,300 related and indirect jobs associated with Port activities.

At the local level, Maryland puts the Bay's dredge material to good use on coastal habitat, beach, and island restoration projects.

The Port of Baltimore is one of America's greatest ports, supporting an incredible array of jobs. But it is not the only port in a State that has more miles of shoreline than the entire west coast of America.

Salisbury is a relatively small city and an unexpected place for Maryland's second busiest port. Located 30 miles inland from the Chesapeake Bay, the port of Salisbury is vital to the entire DelMarVa peninsula. Fuel oil, diesel, and other petroleum products are delivered daily in some of the hundreds of barges that are the backbone of the port.

Farmers need the port to move corn and soybeans to market. Shale, sand, and aggregates move up and down the Wicomico River, supporting thousands of jobs in the construction industry.

Maryland is home to scores of other ports, many of them tiny operations that support our independent watermen—the men and women who make their living crabbing or oystering the Chesapeake's waters.

Before I close, I want to mention one other issue.

There are six major federally constructed levee systems in Maryland consisting of miles of earthen levees and structural floodwalls. In the past the Potomac River presented a potential flood threat to the residents of Cumberland, in western Maryland. But the Cumberland Flood Control Project has done an outstanding job of lessening the threat of future flooding. This levee system protects 400 businesses and 178 households. And it saves all of them the extra expense of purchasing Federal flood insurance.

As the economic recovery continues to struggle to take hold, the last thing these businesses and families need is to be hit with a big increase in insurance premiums.

This morning we will be hearing about some funding issues and the continuing challenges that we face in making the necessary investments in our water infrastructure. I want to underscore that each of these issues relates back to our No. 1 priority: creating and sustaining jobs.

I look forward to hearing from today's witnesses and working with my colleagues on the latest reauthorization of WRDA.

Senator BOXER. Thank you so much.

I am pleased to call on Senator Vitter.

OPENING STATEMENT OF HON. DAVID VITTER, U.S. SENATOR FROM THE STATE OF LOUISIANA

Senator VITTER. Thank you, Madam Chair. And thanks to all the witnesses for being here. I certainly agree, this is an important discussion and an important topic and goal for the Nation, certainly including my State of Louisiana, which is full of vital waterways for commerce.

I, too, want to focus on some of the key issues starting with the Harbor Maintenance Trust Fund. We have faced this perennial problem that while trust fund revenue is healthy and the trust fund balance in theory is growing, Administration after Administration—whether it is Republican or Democrat—basically won't touch much of that money as really a game to mask the budget deficit and artificially lower the budget deficit by not using that money for the purposes that it is dedicated to.

So I am a leading co-author and a very strong advocate of 3213 to change that in a way generally similar to the reforms Congress has brought in the past to other trust funds, like the Transportation Trust Fund.

Also, as we all know, there is a very important proposal put together by industry, working hand in glove with the Corps of Engineers on the Inland Waterways Trust Fund, so that we actually move forward and complete these projects, and they don't languish forever with costs rising year by year. That is a very serious proposal. I am just digesting it now, but I hope we all look very hard at that.

There are numerous dredging issues around the country that aren't adequately dealt with. Perhaps the most serious in my neck of the woods is Mississippi River dredging. A huge part of our Nation's commerce is dependent on that. And yet constantly we are slowing down traffic, we are actually slowing down or short-waiting commerce because of inadequate dredging in the Southwest Pass and other key parts of the lower Mississippi River. That is all related to this discussion.

And then certainly to pick up on something Senator Cardin mentioned, levee safety. Nobody has learned more about levee safety than folks in Louisiana for obvious reasons. But it is a national issue. And the National Levee Safety Program, 5 years after Hurricane Katrina, after the National Committee on Levee Safety published its report in 2009, 20 recommendations, none of that has been implemented yet. So I think that is an important national concern that we also need to address.

So I look forward to moving forward on all of these and other important fronts.

Thank you, Madam Chair.

Senator BOXER. Thank you so very much, Senator.

We are now going to get through this in an hour. We have four very important witnesses. Mr. Matt Woodruff is the Director, Government Affairs, at Kirby Corporation, on behalf of the Inland Waterways Users Board. Mr. Jim Weakley, President of the Lake Carriers' Association.

Mr. Steve Verigin, he is Vice President, GEI Consultants, Inc., and member, National Committee on Levee Safety. I wanted to mention, based in Sacramento. So I wanted to personally welcome you here. He also serves as a member of the National Committee on Levee Safety. And he will be testifying today about the committee's recommendations. He has three decades of experience in the management of water resources and previously served as the Deputy Director of the California Department of Water Resources. So water is his middle name.

And we have Mr. Lawrence Roth, who is also based in Sacramento, Senior Vice President of ARCADIS U.S., Inc., testifying in behalf of the American Society of Civil Engineers, where he previously served as the Executive Vice President for nearly a decade. Mr. Roth has had an extensive career as a professional engineer working on a variety of water resources issues.

So our panel is just terrific, and we are going to listen to you and ask you some questions. We will start with Mr. Woodruff, Director, Government Affairs, Kirby Corporation, on behalf of the Inland Waters Users Board.

Welcome, sir.

STATEMENT OF MATT WOODRUFF, DIRECTOR, GOVERNMENT AFFAIRS, KIRBY CORPORATION

Mr. WOODRUFF. Thank you.

Inland Waterway Users are not asking for a list of new project authorizations in WRDA. What we want is a new process that will help us build our projects quicker and more economically. At a time when everyone is focused on the economy and jobs, inland waterways are a great value for our Nation, essential to our continued competitiveness.

As mentioned, I am a member of the Inland Waterway Users Board and was a part of the group of Users Board members who worked for about a year and a half with the Corps of Engineers to develop a comprehensive strategy to recapitalize our inland waterway system. This Committee knows that our waterways safely and efficiently move vast quantities of the building blocks upon which this Nation's economy is built: grain, steel, coal, petroleum, chemicals, fertilizers. They allow our farmers and our factories in the heartland to reach markets across the world.

On November 3rd President Obama told the Nation, "The most important contest we face is not the contest between Democrats and Republicans. In this century, the most important competition we face is between America and our economic competitors around the world." Our inland waterways help America face that international competition and win.

If we want to double exports we have to have a way to get those exports to market. The waterways have the capacity to do that that cannot be matched by our other modes of transportation.

What is at stake if we turn our back on the waterways? If we are prepared to turn off the lights in portions of America, stop feeding the world, cripple our manufacturing base and deprive consumers of essential goods and services, then we can stop worrying about the waterways. We can move America's cargo without the waterways, but not until we incur billions in the costs that it would take to provide highway and rail infrastructure to do the job. Not just billions of dollars, but we could also measure that cost in lives lost in highway and rail accidents, added energy consumption, additional pollutants in our atmosphere, congestion delays, and lost competitiveness. The waterways make sense for America.

Many people focus just on the transportation benefits of the waterway system, but they sell our system short when they do so. Our system provides stable pools of water for industrial, municipal, and agricultural use. It provides recreational opportunities and enhances property values along the waterfronts. Our Nation reaps billions in benefits each year from the non-transportation uses of our inland waterways.

A moment ago I mentioned a comprehensive strategy to recapitalize our inland waterway system that was developed by a joint Corps-industry team. The report has been out for some 6 months now, and we have heard some questions and concerns about the plan. So I would like to devote my remaining time today to tell you some of the things that the plan is and some of what it is not.

It is comprehensive. It is prioritized, and it is long-term. But it is not all or nothing or take it or leave it. It doesn't usurp the pre-

rogatives of Congress, nor does it bind Congress to multi-year commitments.

It is a 20-year plan. It looks forward based on what we know today, but it doesn't lock us onto a particular path for 20 years. We recognize that there will be changes over time, so we established an objective framework that will allow the most critical projects to come to the top of the list. We envision reconvening the Corps-industry team on a regular basis to review and update the plan as needed. And every year, Congress will have the opportunity to exercise its authority to review the recommendations and choose the path forward.

It does call for a reliable funding stream that will keep construction moving forward efficiently.

We do strongly urge that we first finish what we started, then move down the list and only build as many projects at a time as we can afford to efficiently fund. In general, once we start a project we need to finish it. Otherwise we waste money. However, Congress will always have the prerogative to make adjustments when the circumstances warrant.

We recommended a series of process changes to help ensure that the projects are completed on time and on budget. The Corps is moving ahead with many of these improvements, so we will see some benefits in the coming years.

But to get the full benefit of the efficiencies that are possible, we need Congress and the Administration to support a comprehensive set of changes such as we have described in our report. Over 200 organizations have endorsed the plan. It will give us 25 finished projects in the next 20 years instead of 6 under the status quo. We hope this Committee will help us make a comprehensive capital development plan a reality.

[The prepared statement of Mr. Woodruff follows:]

Statement of Matt Woodruff

On behalf of

Kirby Corporation

and

Inland Waterways Users Board

Before the

Committee on Environment and Public Works

United States Senate

November 17, 2010

Chairwoman Boxer, Ranking Member Inhofe, Members of the Committee, thank you for providing me with this opportunity to testify concerning a new Water Resources Development Act. We are encouraged by the Committee's efforts to begin to develop this legislation. Your initial WRDA hearing earlier this year helped emphasize how very important Water Resources Development Acts, or WRDA's as many of us have come to refer to them, are to jobs, the economy, and the environment of the nation, a reality that is even more important today as we struggle to emerge from the worst economic downturn since the Great Depression.

I am Matt Woodruff, Director-Government Affairs of Kirby Corporation (Kirby). Kirby Corporation is the premier inland tank barge operator in the United States, offering safe, dependable, cost-efficient and environmentally sound transportation services of bulk liquid products throughout the Mississippi River System and the Gulf Intracoastal Waterway. Kirby currently operates 217 active inland towboats and 850 active tank barges having a cargo capacity of approximately 16.4 million barrels. Headquartered in Houston, Texas, Kirby and its marine transportation and diesel engine services subsidiaries employ approximately 2,625 employees, all of whom are in the United States.

In addition to my position with Kirby, I am also honored to serve as a member of the Inland Waterways Users Board (Users Board or IWUB), as General Counsel and Executive Committee member of the Board of Directors of Waterways Council Inc (Waterways Council or WCI), and as a member of the Board of Directors of the American Waterways Operators (AWO). The Inland Waterways Users Board is the federal advisory committee established 24 years ago by Congress in the Water Resources Development Act of 1986. Waterways Council is the national

public policy organization advocating in support of a modern and well-maintained national system of ports and inland waterways. The American Waterways Operators is the national trade association for the U.S. tugboat, towboat and barge industry.

Madam Chair, I mentioned that I am a member of the Inland Waterways Users Board (IWUB or Users Board). The Inland Waterways Users Board is a federal advisory committee established by Congress in Section 203 of the Water Resources Development Act of 1986 (Public Law 99-662, November 17, 1986), one of this Committee's many significant legislative achievements. Reflecting the concept of "Users Pay, Users Say", Congress created the Users Board to give commercial users a strong voice in the investment decisions those users are supporting with their diesel fuel tax payments. At full strength, the Users Board is comprised of eleven voting members, who are appointed to staggered two-year terms by the Secretary of the Army and are selected to represent the various regions of the country as well as a spectrum of commercial users and shippers of the inland marine transportation system. The Board currently has one vacancy. As envisioned in Section 302, the Secretaries of Army, Agriculture, Transportation, and Commerce each appoint a non-voting representative to act as an observer of the Users Board. The principal responsibility of the Users Board is to make recommendations regarding construction and rehabilitation priorities and spending levels on the commercial navigational features and components of the inland waterways and inland harbors of the United States.

On behalf of Kirby Corporation and the Inland Waterways Users Board, I am pleased to appear before the Committee this morning to testify in strong support of the recommendations developed by the Inland Marine Transportation System (IMTS) Capital Investment Strategy Team (CIST or CIS Team). These recommendations have been approved unanimously by the Users Board. They also have the broad and growing support of the waterways industry as evidenced by their unanimous endorsement by the boards of directors of Waterways Council Inc., the American Waterways Operators (AWO), and National Waterways Conference (NWC) and by similar expressions of support from more than 200 other associations and companies throughout the nation. (See Attachment A).

As I'll discuss in more detail in my testimony, the joint industry/Corps of Engineers CIS Team has produced a comprehensive, consensus-based set of proposals to address the capital investments that should be made over the next 20 years in order to preserve and enhance the performance of our nation's inland waterway transportation system. A copy of the Executive Summary of the report that accompanies and explains the CIS Team's recommendations is provided with this written statement as Attachment B. In sum, those recommendations present a proposed plan to:

- Identify ways to improve the Corps project delivery system,
- Implement a capital investment strategy that balances reliability and affordability
- Prioritize specific capital investments needed over the next 20 years, and
- Define a revenue and cost sharing approach that can be met with reasonable certainty and efficiency.

The need for a long-term capital investment plan for the inland waterways has been apparent for a number of years, and the Users Board has attempted to highlight this issue in its annual reports.

The nature of our inland waterway system challenge, however, has changed somewhat over the past 10 years or so. Ten years ago, the inland waterway industry and the nation were faced with the same kind of problem that all of the transportation trust funds had been experiencing: a growing surplus in the Inland Waterways Trust Fund as year after year more revenues were collected from the commercial users of the system than were withdrawn from the Trust Fund to make needed capital investments in the system. Those delays in expenditures resulted in preventable and greatly increased costs of projects. If the Trust Fund dollars had been spent properly in a timely fashion, we would have avoided much of the adverse impact from the dramatic rise in material prices like steel and concrete that occurred in intervening years.

Fortunately, with the help of this Committee and others, the surplus has been invested in modernization projects. Today the Trust Fund is operating as originally intended when it was created, with virtually all of its resources being spent quickly to modernize the system. As of the end of the just-completed 2010 fiscal year, which ended only a few weeks ago, the balance in the IWTF stood at $58.5 million, with $20.3 million of that amount already obligated by the Corps for ongoing project construction work.

The inland waterway modernization challenge going forward is the need to create and implement an improved program for the future. We have an aging system that needs recapitalization. We have a project funding and delivery system that is too inefficient, resulting in much wasted time and money. While we now have invested the surplus in the Inland Waterways Trust Fund, that has resulted in too few finished projects. And all of this comes in the face of an unprecedented economic crisis that is severely stressing our waterway industry and the nation.

Work has been underway for some time to address this situation. A little more than three years ago, leaders of industry and the Corps gathered at Corps headquarters to discuss the going-forward challenge. The Corps committed to undertake an internal review of then-current inland waterway construction project performance to help identify and understand opportunities to improve project delivery results. During the summer, 2008 meeting of the Inland Waterways Users Board, after presentation by and discussion with Corps leaders of the report that chronicled the results of that review (titled "Inland Navigation Construction, Selected Case Studies"), the Corps acknowledged shortcomings and the need for improvements and, to their credit, recommended that the Board should be more directly involved with Corps personnel in the development of an improved project delivery model. That led to formation of the industry/Corps CIS Team.

For roughly a year and a half, approximately 50 key Corps and industry representatives worked diligently to develop together a comprehensive solution to the future-oriented challenges facing our inland waterways infrastructure, a solution that improves the project delivery system, dimensions the most critical physical needs of the inland waterway system, figures out what it will cost to address those needs, and addresses how to pay for it and how to allocate funding responsibility. Included among industry's representatives were the presidents of seven major inland waterway companies and senior representatives from a number of other companies. On the Corps side were senior leaders and technical experts from virtually every level of the Corps hierarchy: headquarters, divisions, districts and technical support centers. A series of multi-day

face-to-face meetings was held throughout the country. Between those meetings, countless additional hours were spent in further discussions, phone conferences, and preparatory sessions.

I would also respectfully suggest that the CIS Team effort has the potential to stand as a model of what we believe President Obama meant when, shortly after his inauguration, the President wrote in a January 21, 2009, Memorandum for Heads of Executive Departments and Agencies:

> *"Government should be participatory. Public engagement enhances the Government's effectiveness and improves the quality of its decisions. Knowledge is widely dispersed in society, and public officials benefit from having access to that dispersed knowledge. Executive departments and agencies should offer Americans increased opportunities to participate in policymaking and to provide their Government with the benefits of their collective expertise and information....Government should be collaborative. Collaborative activity engages Americans in the work of their Government...."*

Thus far, the work of the CIS Team reflects those concepts. This effort has required an enormous commitment from all involved but, speaking for myself and also reflecting the views of the entire Inland Waterways Users Board, it was a most important endeavor and thus far a completely worthwhile commitment. At the end of the day, the CIS Team was able to meet the challenge it was given to develop the consensus recommendations I am now honored to testify in support of today.

The CIS Team proposes a $7.6 billion 20-year inland waterway Capital Investment Program. The Program would entail an average annual investment level of $380 million, comprised of two sub-component average annual program levels: $320 million for "construction" projects and $60 million for major rehabilitation projects. On average, of the $380 million total, $110 million would be contributed by the Inland Waterways Trust Fund and $270 million would come from general revenues.

The CIS Team's proposal would preserve the existing 50% industry/50% federal cost-sharing formula for new lock construction and major rehabilitation projects costing $100 million or more.

The plan would adjust the current model to provide 100% federal funding for dam construction and major rehabilitation projects and for smaller lock rehabilitation projects. The proposed funding for dams was made in recognition of the enormous value derived by other beneficiaries from the dams and the pools created by those dams. As the report points out, "such large and varied segments of the U.S. population benefit from the presence of dams on the (inland waterway) system that it is most appropriate for general revenues to fully fund dam construction and major rehabilitation costs". Categories of those non-navigation beneficiaries of the dams include municipal water supply, hydropower, recreation, industrial water supply, national defense and security, flood damage prevention, agricultural water supply, environmental restoration, local and regional economic development, property value enhancement, and international competitiveness.

The proposal also includes a project-by-project cost-sharing cap to provide some protection to industry from unreasonable cost escalation and project delays and to place additional emphasis on the need to produce more reliable project cost estimates in the underlying decision document and manage projects within the identified cost estimates and schedules. The cap would be set at the Feasibility or Rehabilitation Evaluation Report base cost, including contingencies reflected in the relevant decision document, escalated to the new construction start date based on the IMTS capital investment program schedule.

After reviewing alternative options for generating additional revenues for the IWTF, the CIS Team proposes a 30% to 45% increase---between 6 and 9 cents per gallon ---in the current diesel fuel tax (i.e., to a level between 26 and 29 cents per gallon). The Team reached this conclusion based on its sense that the current diesel tax revenue-raising system is fair and equitable and is a "workable, understood, acceptable, and auditable system for collecting the waterways industry's share of the IMTS capitalization costs". While the industry representatives of the CIS Team clearly would have preferred to avoid this increase, it is a measure of the seriousness and spirit of compromise that they brought to the CIS Team effort that they were willing to agree in an unprecedented way to this increase as part of the total comprehensive package.

Under the Team's proposal, project construction funding would be provided to complete a prioritized list of specific projects. The projects were prioritized through use of a ranking system that was based on two broad categories: structural and operational risk and reliability and economic return. Project-by-project information was used that sought to assess the project's current condition, the likelihood of diminished project performance, the consequence of diminished performance, and how the proposed investment would improve the project's and the system's performance. Prioritization occurred in three categories---authorized and under construction, authorized but not yet under construction, and other potential projects most of which were completely unstudied. In making its recommendations, the Team emphasized completing work that was already underway or was un-started but had already been approved by Congress.

To address the opportunity to improve internal Corps project delivery performance, the CIS Team makes a number of recommendations. Some of these recommendations are already in the process of being implemented. Others will require additional review within the Corps before they can be implemented. At least one project delivery recommendation, relating to the use of continuing contracts in the construction of inland waterways system modernization projects, may require Congressional action before it can be implemented. The project delivery improvement recommendations cover items such as:

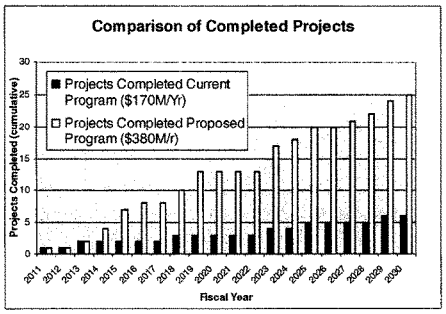
- Highly-reliable risk-based cost estimates,
- Independent external peer reviews,
- Certification requirements for project managers,
- Development of an IMTS Capital Investment Program regulation,
- Increased participation by the Inland Waterways Users Board,
- Use of Military Construction Program efficiency approaches,
- Acquisition strategy advances,
- Virtual design and review centers of expertise, and
- Standardization of designs.

The Team's report covers each of these and others in more detail. At our most recent Users Board meeting, the Corps reported on their progress in achieving each of these goals. Going forward, we expect the Corps to provide objective assessments at each Users Board meeting of their progress in attaining each of the goals that are within their power to achieve.

A fundamental assumption of the Team's recommendations, in fact the Team's underlying premise, is that the federal government will provide the funds envisioned in the plan in an efficient manner. Inefficient funding will significantly impair the ability to implement this program. This point cannot be over-emphasized. It is critically important.

Madam Chair, the Corps has conservatively estimated that the CIS Team's proposed plan is expected to avoid cost growth of between $600 million and $2.1 billion over the defined 20-year program. Other economic benefits include avoiding far more than $2.8 billion in additional national economic development benefits foregone. The $2.8 billion figure was calculated looking only at projects currently under construction and does not include, as it should in order to more completely reflect the entire plan, the value of beginning other projects under the proposed program much earlier than otherwise would be possible. And, of course, the plan would also deliver the additional non-economic environmental, societal, safety and energy benefits that accrue to the nation because of the inland waterway system's use.

Under the proposed CIS Team plan, significant modernization of the inland waterway system will occur. Without the plan, necessary achievable progress completing lock and dam and channel improvement projects will languish, dangerously threatening our nation's well being. The following chart, taken from the Team's report, starkly illustrates that reality.



The CIS Team concludes its report with these words: "While unlikely that any set of recommended improvements could completely eliminate cost increases and schedule delays, these recommended improvements---in combination with the development of the capital investment strategy and with the underlying premise that the funding will be provided in an efficient manner---will achieve the goal of an improved capital projects business model". Kirby Corporation and the Inland Waterways Users Board believe that statement to be true and urges the Committee to include in its next Water Resources Development Act the provisions that are

necessary to fully implement this comprehensive inland waterway system modernization plan. We also believe that, when the Committee acts in this fashion, it will be following the incredible, almost-prayerful insight of our first President, George Washington, who wrote 217 years ago:

> *"Prompted by these observations, I could not help taking a more contemplative and extensive view of the vast inland navigation of these United States, from maps and the information of others; and could not but be struck with the immense diffusion and importance of it, and with the goodness of that Providence, which has dealt her favors to us so profuse a hand. Would to God we may have wisdom enough to improve them."*

That concludes my statement. Thank you again for the opportunity to testify this morning. I'd be pleased to respond to any questions that Members of the Committee have.

ATTACHMENT A

WATERWAYS COUNCIL, INC.

The American Waterways Operators

NATIONAL WATERWAYS CONFERENCE, INC.

Support the Inland Waterways Capital Development Plan
Invest in America's Inland Waterways Transportation System

Benefits to America

America's inland waterways are a precious resource, and the envy of the world because of the natural "water highway" the waterways system provides for commerce. Modern lock and dam infrastructure is critical to U.S. competitiveness in the world market, to environmental protection, to energy efficiency, to the sustainment of well-paying American jobs and to congestion relief. Inland waterways transportation is a key component of the intermodal transportation network, and is essential to our nation's economy, environment, and quality of life.

A Consensus Plan to Improve Inland Waterways Navigation Infrastructure

Industry and the U.S. Army Corps of Engineers have worked together over the past year to develop a comprehensive, consensus package of recommendations to improve the continued vitality of this critical system. The recommendations, unanimously endorsed by the congressionally established Inland Waterways Users Board on December 15, 2009, will:

- **Prioritize the completion of navigation projects across the entire system,**
- **Improve the Corps of Engineers' project management and processes to deliver projects on time and on budget, and**
- **Recommend an affordable funding mechanism to meet the system's needs.**

The recommendations represent a new approach to meet the longstanding need for efficient delivery and timely completion of critical projects and sustainable funding for the Inland Waterways Trust Fund. The nation's transportation system and taxpayers would benefit from the completion of essential navigation infrastructure and the containment of cost overruns. The final report detailing these recommendations was approved by the Inland Waterways Users Board meeting on April 13, 2010.

Support the Inland Waterways Capital Development Plan
Invest in America's Inland Waterways Transportation System

Recommended Reforms
The proposal would:

- Preserve the existing 50% industry/50% federal cost-sharing formula for new lock construction and major lock rehabilitation projects costing $100 million or more.
- Adjust the current model to provide 100% federal funding for dam construction and major rehabilitation and smaller lock rehabilitation projects, recognizing the value derived by other beneficiaries from dams and the pools created by dams.
- Include a cost share cap on new lock construction projects to incentivize keeping projects on budget and prevent industry taxpayers from bearing the burden of paying for unreasonable cost overruns. This will strengthen the ability of the Inland Waterways Trust Fund to fund more priority projects in the pipeline.

The proposed new funding parameters will necessitate a 30% to 45% increase (between 6 and 9 cents per gallon) in the existing fuel tax of 20-cents-per-gallon that is paid by the barge and towing industry, the only users of the system who currently are taxed. At the same time, the recommended reforms to the Corps of Engineers' project management and delivery process would ensure that these additional resources are spent wisely.

Endorsements
On January 12, 2010, the Board of Directors of Waterways Council, Inc., the national public policy organization advocating a modern and well-maintained national system of ports and inland waterways, voted unanimously to support the recommendations of this industry-Corps joint effort.

On January 22, 2010, the Board of Directors of The American Waterways Operators, the national trade association for the American tugboat, towboat and barge industry, voted to authorize AWO to advocate before the Administration and Congress in favor of the recommended plan.

On February 24, 2010, the Board of Directors of the National Waterways Conference, Inc., the national organization advocating for the enactment of common-sense policies recognizing the widespread public benefits of our nation's water resources infrastructure, voted unanimously to support the plan.

The more than 200 organizations on the following page join us in supporting this important effort:

Supporters of the Inland Waterways Capital Development Plan

National Organizations

The American Waterways Operators
National Waterways Conference, Inc.
Waterways Council, Inc.
American Agri-Women
American Land Conservancy
American Soybean Association
Dredging Contractors of America
Inland Rivers Ports & Terminals, Inc.
International Liquid Terminals Association
The International Propeller Club of the United States
National Association of Manufacturers
National Audubon Society
National Corn Growers Association
National Council of Farmer Cooperatives
National Grain and Feed Association
National Mining Association
North American Equipment Dealers Association
Steel Manufacturers Association
Transportation Research Board/Marine Board
U.S. Chamber of Commerce

State, Regional, and Local Organizations

Alabama State Port Authority
Association of Tennessee Valley Governments
Bond County (Ill.) Farm Bureau
Boone County (Ill.) Farm Bureau
Bureau County (Ill.) Farm Bureau
Calhoun County (Ill.) Farm Bureau
California Marine Affairs & Navigation Conf. (CMANC)
Carpenters' Dist. Council of Greater St. Louis and Vicinity
Carroll County (Ill.) Farm Bureau
Chemical Industry Council of Illinois
City of Pittsfield, Ill.
Clark County (Ill.) Farm Bureau
Coalition of Alabama Waterway Associations, Inc.
Cook County (Ill.) Farm Bureau
Coosa-Alabama River Improvement Association, Inc.
DeWitt County (Ill.) Farm Bureau
DeWitt (Mo.) Drainage and Levee District
Ducks Unlimited, St. Louis Mid-County Chapter
DuPage County (Ill.) Farm Bureau
Effingham County (Ill.) Farm Bureau
Farm Resource Center
Grain & Feed Association of Illinois
Great River Economic Development Foundation
Greene County (Ill.) Farm Bureau
Gulf Intracoastal Canal Association
Hancock County (Ill.) Farm Bureau
Huntington District Waterways Association
Illinois AgriWomen
Illinois Association of Drainage Districts
Illinois Biotechnology Industry Organization
Illinois Corn Growers Association
Illinois Farm Bureau
Illinois Fertilizer & Chemical Association
Illinois Grape Growers & Vintners Association
Illinois Seed Trade Association
Illinois Soc. of Prof. Farm Managers and Rural Appraisers
Illinois Soybean Association
Indiana Corn Growers Association
Indiana Soybean Alliance
International Union of Operating Engineers Local 513
Iowa Corn Growers Association
Jasper County (Ill.) Farm Bureau
Jersey County (Ill.) Business Association
Jersey County (Ill.) Farm Bureau
Kane County (Ill.) Farm Bureau
Kendall County (Ill.) Farm Bureau
Kentuckians for Better Transportation
Kentucky Chamber of Commerce
Kentucky Corn Growers
Kingdom of Callaway (Mo.) Chamber of Commerce
Knox County (Ill.) Farm Bureau
LaSalle County (Ill.) Farm Bureau
Lee County (Ill.) Farm Bureau
Little Rock Port Authority
Louisiana Assn. of Waterway Operators and Shipyards
Macon County (Ill.) Farm Bureau
Marshall-Putnam (Ill.) Farm Bureau
Mason County (Ill.) Farm Bureau
McDonough County (Ill.) Farm Bureau
McLean County (Ill.) Farm Bureau
Menard County (Ill.) Farm Bureau
Mercer County (Ill.) Farm Bureau
MidCentral Illinois Regional Council of Carpenters
Minnesota Chapter of ASFMRA
Minnesota Corn Growers Association
Minnesota Grain and Feed Association
Mississippi Water Resources Association
Missouri Corn Growers Association
Missouri Levee & Drainage District Association
Mo-Ark Association
Montgomery County (Ill.) Farm Bureau
Ogle County (Ill.) Farm Bureau
Ohio Corn Growers Association
Pacific Northwest Waterways Association (PNWA)
Paducah Area Chamber of Commerce
Peoria County (Ill.) Farm Bureau
Perry County (Ill.) Farm Bureau
Pike and Scott County (Ill.) Farm Bureaus
Port of Cincinnati, LLC
Port of Houston Authority
Board of Commissioners of the Port of New Orleans
Port of Pittsburgh Commission
Port of Portland (Oregon)
Port of Vancouver, Wash.
Red River Valley Association
Rock Island County (Ill.) Farm Bureau

Supporters of the Inland Waterways Capital Development Plan

State, Regional, and Local Organizations

Rosedale-Bolivar County (Miss.) Port Commission
Sangamon County (Ill.) Farm Bureau
Shelby County (Ill.) Farm Bureau
Stark County Farm (Ill.) Bureau
Stephenson County (Ill.) Farm Bureau
Tennessee Cumberland Waterways Council
Tennessee River Valley Association
Tennessee-Tombigbee Waterway Development Auth.
Tennessee-Tombigbee Waterway Development Council
Texas Agri Women
Texas Waterways Operators Association
Tri-State Development Summit
Tri Rivers Waterway Development Assoc.
Tulsa Port of Catoosa
Upper Mississippi Waterway Association
Upper Mississippi, Illinois & Missouri Rivers Assn.
Warrior-Tombigbee Waterway Association
Washington County (Ill.) Farm Bureau
Waterways Association of Pittsburgh
Whiteside County (Ill.) Farm Bureau
Will County (Ill.) Farm Bureau

Companies

Advantus Strategies, LLC
AEP River Operations
Ag-Land FS, Inc.
Agriservices Of Brunswick, LLC
Alter Barge Line, Inc.
American Commercial Lines
American Inland Ports,LLC
American River Transportation Company
Amherst Madison, Inc.
Artco Fleeting Service
B&G Towing LLC/Acme Marine LLC
Bayou Fleet Inc.
Bludworth Marine LLC
Blue Danube Incorporated
Bob Brackmann Farms
Brennan Marine, Inc
Brunswick River Terminal, Inc.
Buffalo Marine Service, Inc.
Bunge North America
C&C Marina Maintenance Company
Campbell Transportation Company
Canal Barge Company, Inc.
Cargill, Inc.
CF Industries Holdings, Inc.
CGB Enterprises, Inc.
Channel Shipyard Companies
CHS Inc.
Cincinnati Bulk Terminals, LLC
CITGO Petroleum Corporation
Clarkson Grain Company Inc.
Colusa Elevator Co.
CONSOL Energy
Crounse Corporation
Deloach Marine
E.ON U.S.
Farm Credit Services of Illinois
FirstEnergy Solutions
Grain Processing Corporation
GROWMARK
Hartsburg Grain Company
Hodel Farms Inc.
Holcim (US) Inc.
Ingram Barge Company
Inland Marine Service
The Integra Group, Inc.
J.A.M. Marine Services, LLC
Kirby Corporation
K-Sea Transportation Partners LP
Lafayette Workboat Rentals, LLC
LeBeouf Bros. Towing, LLC
Magnolia Marine Transport Co.
Marathon Petroleum Company LLC
MARMAC, LLC d/b/a McDonough Marine Service
Marquette Transportation Company, LLC
Martin Marine
McNational Inc.
Mulzer Crushed Stone
Natures Way Marine, LLC
New Orleans Shipyard
Northern Partners Cooperative
Nucor Steel Tuscaloosa, Inc.
Osterholt Farms
Parker Towing Company
PowerSouth Energy Cooperative
Rentech Energy Midwest
Sause Bros., Inc.
Servco FS Cooperative
Smurfit Stone Container Corporation
T & T Marine Salvage, Inc.
Thomson, Rhodes & Cowie P.C.
Tidewater Barge Lines, Inc.
TradeWinds Towing LLC
Trinity Marine Products, Inc.
Turn Services, LLC
Twomey Company
United Ocean Services
Upper River Services LLC
Valero Energy
Volunteer Barge & Transport Inc.
Vulcan Materials Company
The Waterways Journal, Inc.
Yager Materials, LLC

Supporters of the Inland Waterways Capital Development Plan

Alabama

Alabama State Port Authority
Coalition of Alabama Waterway Associations, Inc.
Coosa-Alabama River Improvement Association, Inc.
Natures Way Marine, LLC
Nucor Steel Tuscaloosa, Inc.
Parker Towing Company
PowerSouth Energy Cooperative
Tennessee Cumberland Waterways Council
Tennessee River Valley Association
Tri Rivers Waterway Development Assoc.
Vulcan Materials Company
Warrior-Tombigbee Waterway Association

Arkansas

Little Rock Port Authority

California

American Land Conservancy
California Marine Affairs & Navigation Conf.

District of Columbia

Dredging Contractors of America
International Liquid Terminals Association
National Association of Manufacturers
National Council of Farmer Cooperatives
National Grain and Feed Association
National Mining Association
Steel Manufacturers Association
Transportation Research Board/Marine Board
U.S. Chamber of Commerce

Florida

TradeWinds Towing LLC
United Ocean Services

Illinois

Ag-Land FS, Inc.
American Inland Ports,LLC
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Illinois Biotechnology Industry Organization
Illinois Corn Growers Association
Illinois Farm Bureau
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Illinois Grape Growers & Vintners Association
Illinois Seed Trade Association
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Illinois Soybean Association
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Jasper County (Ill.) Farm Bureau
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Mason County (Ill.) Farm Bureau
McDonough County (Ill.) Farm Bureau
McLean County (Ill.) Farm Bureau
Menard County (Ill.) Farm Bureau
Mercer County (Ill.) Farm Bureau
MidCentral Illinois Regional Council of Carpenters
Montgomery County (Ill.) Farm Bureau
Northern Partners Cooperative
Ogle County (Ill.) Farm Bureau
Peoria County (Ill.) Farm Bureau
Perry County (Ill.) Farm Bureau
Pike and Scott County (Ill.) Farm Bureaus
Rentech Energy Midwest
Rock Island County (Ill.) Farm Bureau
Sangamon County (Ill.) Farm Bureau
Shelby County (Ill.) Farm Bureau
Stark County Farm (Ill.) Bureau
Stephenson County (Ill.) Farm Bureau
Tri-State Development Summit
Twomey Company
Upper Mississippi, Illinois & Missouri Rivers Assn.
Washington County (Ill.) Farm Bureau
White County (Ill.) Farm Bureau
Whiteside County (Ill.) Farm Bureau
Will County (Ill.) Farm Bureau

Supporters of the Inland Waterways Capital Development Plan

Indiana

American Commercial Lines
Indiana Corn Growers Association
Indiana Soybean Alliance
Mulzer Crushed Stone
Osterholt Farms

Iowa

Alter Barge Line, Inc.
Grain Processing Corporation
Iowa Corn Growers Association

Kansas

American Agri-Women

Kentucky

Crounse Corporation
E.ON U.S.
Huntington District Waterways Association
Inland Marine Service
Kentucky Chamber of Commerce
Kentucky Corn Growers
Marathon Petroleum Company LLC
Marquette Transportation Company, LLC
Paducah Area Chamber of Commerce
Yager Materials, LLC

Louisiana

B&G Towing LLC/Acme Marine LLC
Bayou Fleet Inc.
Board of Commissioners, Port of New Orleans
CGB Enterprises, Inc.
Canal Barge Company, Inc.
Channel Shipyard Companies
Deloach Marine
Inland Rivers Ports & Terminals, Inc.
Lafayette Workboat Rentals, LLC
LeBeouf Bros. Towing, LLC
Louisiana Assn. of Waterway Operators and Shipyards
New Orleans Shipyard
Red River Valley Association
Turn Services, LLC

Massachusetts

Holcim (US) Inc.

Minnesota

Cargill, Inc.
CHS Inc.
Minnesota Chapter of ASFMRA
Minnesota Corn Growers Association
Minnesota Grain and Feed Association
Upper River Services LLC
Upper Mississippi Waterway Association

Missouri

AEP River Operations
Agriservices Of Brunswick, LLC
American Soybean Association
Brunswick River Terminal, Inc.
Bunge North America
Carpenters' Dist. Council of Greater St. Louis and Vicinity
DeWitt (Mo.) Drainage and Levee District
Ducks Unlimited, St. Louis Mid-County Chapter
The Integra Group, Inc.
International Union of Operating Engineers Local 513
Kingdom of Callaway (Mo.) Chamber of Commerce
Missouri Corn Growers Association
Missouri Levee & Drainage District Association
Mo-Ark Association
National Audubon Society
National Corn Growers Association
North American Equipment Dealers Association
Smurfit Stone Container Corporation
The Waterways Journal, Inc.

Mississippi

Magnolia Marine Transport Co.
Mississippi Water Resources Association
Rosedale-Bolivar County (Miss.) Port Commission
Tennessee-Tombigbee Waterway Development Auth.
Tennessee-Tombigbee Waterway Development Council

New Jersey

Donjon Marine Co., Inc.
K-Sea Transportation Partners LP

Ohio

Cincinnati Bulk Terminals, LLC
FirstEnergy Solutions
McNational Inc.
Ohio Corn Growers Association

Oklahoma

Tulsa Port of Catoosa

Supporters of the Inland Waterways Capital Development Plan

Oregon

Pacific Northwest Waterways Association (PNWA)
Port of Portland (Oregon)
Sause Bros., Inc.

Pennsylvania

Blue Danube Incorporated
C&C Marina Maintenance Company
Campbell Transportation Company
CONSOL Energy
Port of Pittsburgh Commission
Thomson, Rhodes & Cowie P.C.
Waterways Association of Pittsburgh

Tennessee

Association of Tennessee Valley Governments
Ingram Barge Company
Volunteer Barge & Transport Inc.

Texas

Bludworth Marine LLC
Buffalo Marine Service, Inc.
CITGO Petroleum Corporation
Gulf Intracoastal Canal Association
J.A.M. Marine Services, LLC
Kirby Corporation
MARMAC, LLC d/b/a McDonough Marine Service
Martin Marine
Port of Houston Authority
T & T Marine Salvage, Inc.
Texas Agri Women
Texas Waterways Operators Association
Trinity Marine Products, Inc.
Valero Energy

Virginia

Advantus Strategies, LLC
The American Waterways Operators
The International Propeller Club of the United States
National Waterways Conference, Inc.
Waterways Council, Inc.

Washington

Port of Vancouver, Wash.
Tidewater Barge Lines, Inc.

Wisconsin

Brennan Marine, Inc
Servco FS Cooperative
Wisconsin Farm Bureau Federation

West Virginia

Amherst Madison, Inc.

ATTACHMENT B

Inland Marine Transportation Systems (IMTS) Capital Projects Business Model

Final Report

Revision 1

April 13, 2010

Prepared by:
IMTS Capital Investment Strategy Team

The views and recommendations contained within this report reflect those of the Inland Marine Transportation System Capital Investment Strategy Team and not necessarily those of the Inland Waterways Users Board, the U.S. Army Corps of Engineers, or the Administration.

Revision 1 includes minor formatting and grammatical changes, and acknowledges the Inland Waterways Users Board approval, adoption and subsequent forwarding of the report to the Assistant Secretary of the Army for Civil Works for consideration by the Administration.

Contents

Contributors

This report was prepared at the request of the Inland Waterways Users Board and represents a collaborative effort between navigation industry representatives and U.S. Army Corps of Engineers inland navigation experts. The views, opinions, and findings contained in this report are those of the Inland Marine Transportation System Capital Investment Strategy Team (IMTS CIS Team, or Team). The report should not be construed as an official Agency position, policy, or decision, unless so designated by other official documentation.

On 13 April 2010, the Inland Waterways Users Board unanimously approved and adopted this report.and transmitted the report to the Assistant Secretary of the Army for Civil Works (ASA(CW)), requesting that the Administration adopt and implement those recommendations of the report within the purview of the Administration. The Board further transmitted the report to the Congress, recommending that Congress implement those recommendations requiring legislative action.

Stephen Little
Chairman
Inland Waterways Users Board

Jeanine Hoey
Program Manager
U.S. Army Corps of Engineers

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John E. Hite	U.S. Army Corps of Engineers
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Gerald Jenkins	Ursa Farmer Cooperative
Steve Jones	U.S. Army Corps of Engineers
Michael Kidby	U.S. Army Corps of Engineers
Jerry Knapper	Ingram Barge Company
Mark Knoy	AEP River Operations LLC
Gary Loew	U.S. Army Corps of Engineers
Cornel Martin	Waterways Council Inc.
Daniel Martin	Ingram Barge Company
Jeffrey McKee	U.S. Army Corps of Engineers
Deane Orr	Consol Energy
Michael Park	U.S. Army Corps of Engineers
Timothy Parker	Parker Towing
John Pigott	Tidewater Barge Lines
Mark Pointon	U.S. Army Corps of Engineers
Glenn Proffitt	U.S. Army Corps of Engineers
Michael Ryan	American Commercial Lines
Jose E. Sanchez	U.S. Army Corps of Engineers
Mary Anne Schmid	U.S. Army Corps of Engineers
Ty Thomas	Ian Inc.
Major General Bo Temple	U.S. Army Corps of Engineers
James Walker	U.S. Army Corps of Engineers
Wesley Walker	U.S. Army Corps of Engineers
Royce Wilken	American River Transportation Company
Matthew Woodruff	Kirby Corporation

Executive Summary – IMTS Capital Projects Business Model

The U.S. Army Corps of Engineers (Corps) has played a major role in the nation's marine transportation system and inland water management since the country's founding and, through its navigation mission, retains a pivotal role in managing inland waterways into the future. The Corps Navigation mission is to provide a safe, reliable, efficient, effective, and environmentally sustainable waterborne transportation system for the movement of commerce, national security needs, and recreation. In fulfilling the navigation mission, the current project delivery model, that was effective in the past, is no longer appropriate for successful inland waterways management. Fundamentally, local district and regional division efforts that previously focused on addressing regional needs and improving infrastructure problems neither provide optimal solutions for managing a nationwide portfolio of assets nor the investments needed to maintain those assets. As investigated in the *Inland Navigation Construction Selected Case Studies* report and specifically recognized by the Inland Marine Transportation System (IMTS) Capital Investment Strategy Team (IMTS CIS Team or the Team), in recent years there has been an undesirable trend of lock and dam construction projects exceeding, by unacceptable amounts, their originally authorized cost and schedule expectations.

After many years of a growing balance in the Inland Waterways Trust Fund (IWTF or Trust Fund), which funds half of navigation construction and major rehabilitation projects, the Trust Fund balance began to decline in fiscal year (FY) 2003 as the Administration and Congress dedicated increased amounts of Trust Fund resources to address modernization of the inland waterway system. This trend continued through FY 2009, resulting in a decline of the Trust Fund balance to the point that expenditures must be limited to the amount of annual fuel tax revenues collected for that particular year. The increased costs and constrained IWTF have resulted in a backlog of authorized projects that have not yet begun construction. This backlog, in turn, exacerbates the declining reliability of the IMTS.

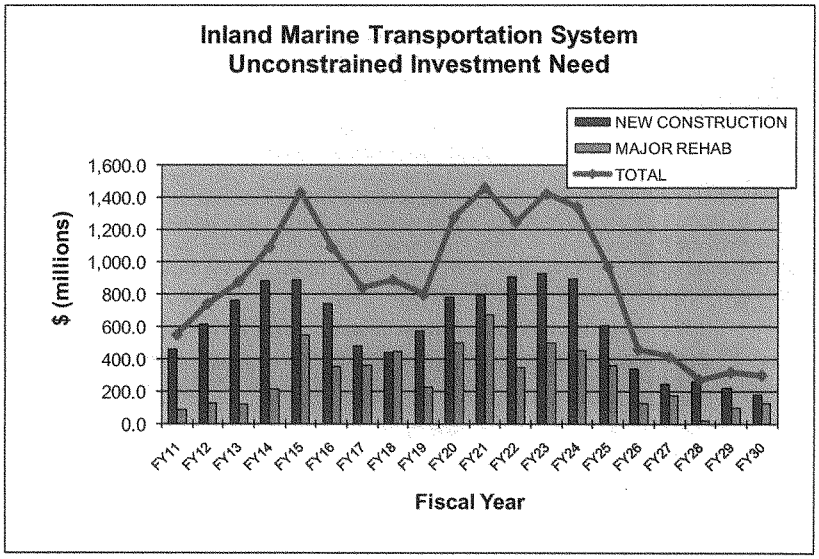
Given current average annual revenues of $85 million, the substantial backlog of authorized projects, and the declining reliability of the IMTS, the Corps is collaborating with the Inland Waterways Users Board (IWUB or the Board) to identify ways to improve the capital projects business model in tandem with developing an investment strategy designed to improve and ensure the long-term viability of the IMTS. The goals of the IMTS CIS Team are the following:

1. Identify ways to improve the project delivery system (i.e., more reliable cost estimates and construction schedules, better contracting practices, improved project management) to ensure that future system improvements can be completed on time and within budget.
2. Develop a list of long-term capital needs for the inland navigation system, including an objective methodology for prioritizing those needs.
3. Develop a capital investment strategy that balances reliability with affordability.
4. Develop and recommend a strategy to help ensure that funding requirements can be met with reasonable certainty and efficiency.

Unconstrained Project List

To aid the IMTS CIS Team in identifying future needs/demands on the IWTF and help in establishing a funding strategy, the Corps developed an "unconstrained" list of projects. Currently, the Corps has identified over 100 projects in the inland and intracoastal waterways system that require, or could conceivably require, capital investments in the next 20 years. For analytical purposes, this list was developed without regard to funds that would be available to perform the work. Each district identified new construction or major rehabilitation projects that were (1) under construction (Phase 1 projects) or (2) that were authorized but not yet under construction (Phase 2 projects). In addition, districts identified potential future projects over the 20-year time horizon, a few of which are already under study, assuming the availability of completely unconstrained funding (Phase 3 projects).

Over the 20-year period from fiscal year (FY) 2011 to FY 2030, the districts' unconstrained financial requirements to address the infrastructure needs of the IMTS is reflected in Figure ES-1 and totals nearly $18.0 billion, or an annual average of nearly $900 million. Of the $18.0 billion identified for expenditure, nearly $12.1 billion (67 percent) would be for new construction and $5.9 billion (33 percent) would address major rehabilitation projects.



Note: Fully funded estimates assume a 3 percent escalation of costs per year.

Figure ES-1. Unconstrained Investment Need of IMTS, FY 2011 to FY 2030

Prioritization Criteria and Prioritized List

Inland waterways system users, policy makers in the U.S. Congress and within the Administration, and others share a desire to better understand both the value of existing IMTS assets and the return on investments made to the system. Reflecting this desire, the IMTS CIS Team worked together to develop and apply logical metrics to help guide system modernization investments. After discussing numerous

approaches, the Team concluded that the most useful representation of system value and return on investment should include assessments on an asset-by-asset basis using the following:

1. The asset's current condition
2. The likelihood of diminished asset performance
3. The consequence of diminished performance in terms of repair costs, outages, and economic losses
4. How the proposed investment would improve performance or reduce the asset's likelihood of diminished performance
5. For new assets, whether the project could be expected to improve system performance.

The criteria the IMTS CIS Team selected for ranking projects fell into two broad categories: (1) structural and operational risk and reliability and (2) economic return. Structural and operational risk and reliability metrics were represented either by a Dam Safety Action Classification (DSAC) rating or a Condition Index (CI) rating.[1] Economic consequence metrics included Net Benefits, Benefit-Cost Ratio (BCR), and Remaining Benefit Remaining Cost Ratio (RBRCR) (for Phase 1 and Phase 2 projects only), and Economic Impact (for all projects, however this is the only category of economic criteria used for Phase 3 projects). The risk and reliability criteria were depicted as numeric grades of 1 through 5 for DSAC ratings (with 1 being the worst/failed condition), and as letter grades of A through F for CI ratings (with F being the worst/failed condition). Those risk and reliability criteria metrics were then converted to numeric scores, with a maximum weight of 40 for Phase 1 and Phase 2 projects or 60 for Phase 3 projects. The rationale for a higher weight for risk and reliability for Phase 3 projects was necessitated by the limited economic analyses data performed on Phase 3 projects and recognition that infrastructure in a failed or failing condition could require earlier attention. The economic criteria were depicted as dollars for net benefits, as ratios for BCRs and RBRCRs, and as numeric grades of 1 through 100 for economic impact. These metrics were normalized to the highest value observed for that metric in the project list, with a maximum weight of 60 or 40 depending on the project phase. Table ES-1 and Table ES-2 display the criteria used to prioritize the unconstrained project list.

Table ES-1. IMTS Investment Strategy Criteria Weighting

Criteria	Phases 1 and 2	Phase 3
Risk and Reliability	40	60
Condition Index for Locks (rated A through F)		
DSAC for Dams (rated 5 through 1)		
Economic Return	60	40
Net Benefits	15	
BCR	5	
RBRCR	25	
Economic Impact	15	40
Totals	100	100

[1] The team is assessing the relative importance of channels on a case-by-case basis. Metrics compatible with those used for locks and dams were not available at the time this report was prepared.

Table ES-2. IMTS Investment Strategy Condition Weights

Risk and Reliability DSAC | Condition Index Rating	Phase 1 and 2	Phase 3
1 | F	40	60
2 | D	25	45
3 | C	10	30
4 | B	5	10
5 | A	0	0

IMTS Capital Investment Program

The IMTS CIS Team evaluated what should be reasonably addressed and completed in the next 20 years to maintain a reliable IMTS. It became apparent from this examination that two separate program component levels were required to ensure that both new construction as well as major rehabilitation projects are being prioritized and funded effectively. It was recognized that worthwhile projects already under construction should be completed as efficiently as possible. The Team recommended that new construction projects should be allocated an annual funding level of about $320 million. Figure ES-2 shows the proposed timing associated with those new construction projects that are recommended in the plan.

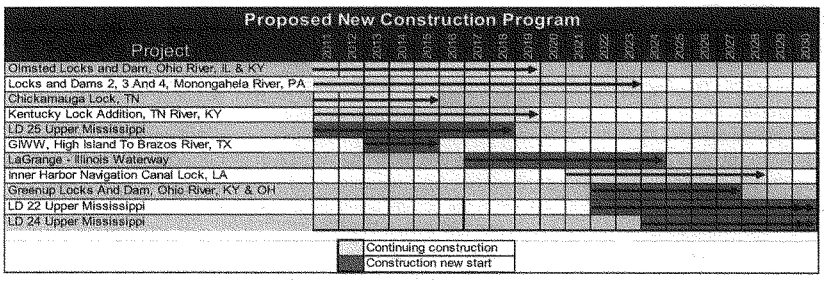
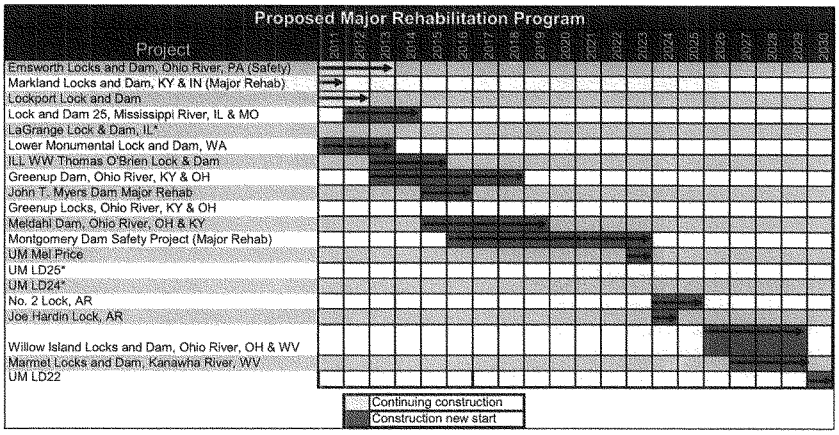


Figure ES-2. Proposed New Construction Projects Timeline

To ensure that existing infrastructure is being continually maintained and rehabilitated in a timely and appropriate manner, the IMTS CIS Team also looked at separately funding major rehabilitation projects. The Team recommends using the average amount spent on major rehabilitation projects in the last three years, which amounts to approximately $60 million per year. Figure ES-3 shows the proposed timing associated with major rehabilitation projects. Because there is a large bottleneck of new construction early in the capital investment strategy, the funding allocations between new construction and major rehabilitation would be skewed to new construction in the immediate near term. The target total for the 20-year capital investment strategy for new construction and major rehabilitation on average is $380 million per year.



* Note – Lagrange, Greenup, UM LD 25 and UMLD24 do not show scheduled rehabilitation projects due to new construction projects at these facilities. Their priority remains as a placeholder until the new construction work begins and criteria is re-evaluated for these projects.

Figure ES-3. Major Rehabilitation Projects Timeline

The proposed 20-year capital investment strategy generally addresses the highest priority new construction and major rehabilitation projects as determined by the criteria weighting and decision principles implemented. With a $380 million average annual investment level, this investment strategy addresses at least 27 of the candidate projects that have been identified by Corps districts and highlights how those projects would be prioritized based on the recommended investment level. Figure ES-4 compares cumulative project completions at the current investment level of about $170 million per year ($85 million from general appropriations and $85 million from the IWTF) with project completions at the recommended investment level of $380 million per year. The recommended investment plan addresses five DSAC 1 and three DSAC 2 dams, as well as one lock facility that was rated F and six that were rated D through the operational condition assessment process.

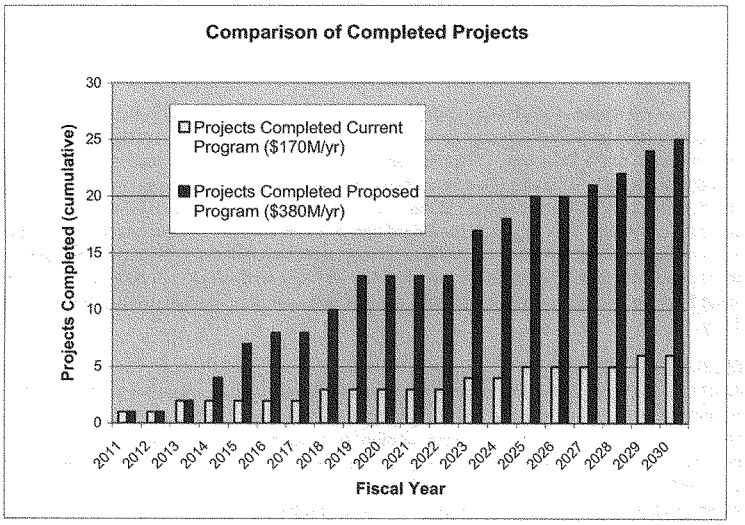


Figure ES-4. Comparison of Completed Projects

Funding Model

Cost-Share Recommendations

With the recommended $380 million annual funding-level program, IWTF revenues are proposed to be increased beyond what is anticipated under current law to address the needs of the IMTS. The IMTS CIS Team members understand the implications of an increase in revenues and have strived to develop cost-sharing recommendations that are fair and equitable.

The IMTS CIS Team reviewed and evaluated more than a dozen options for funding the IMTS capital investment program. These options included maintaining the current cost-sharing arrangement of 50 percent federal and 50 percent IWTF for all capital investments; varying that percentage; excluding some projects/features, such as dam or major rehabilitation projects; setting different thresholds for the cost-sharing of major rehabilitation projects; and capping the IWTF share for some projects with significant cost increases, such as Olmsted Locks and Dam and Lower Monongahela Locks & Dams 2, 3, and 4 (Lower Mon).

After a high-level review and evaluation of the options presented, the IMTS CIS Team recommends the following cost-sharing program:

- All *lock* construction projects should be cost-shared 50 percent from general appropriations and 50 percent from the IWTF and all major rehabilitation *lock* projects costing at least $100 million should be cost-shared at 50 percent from general appropriations and 50 percent from the IWTF.
- Construction and major rehabilitation *dam* projects and major rehabilitation *lock* projects below $100 million should be entirely funded from general appropriations.

- With the program recommendation of $380 million per year and the proposed program shown in Figure ES-2 and Figure ES-3, the average IWTF requirement over the next 20 years is $110 million per year, with the federal cost-sharing requirement averaging $270 million per year. In the future, these average amounts may vary depending on the mix of projects in the program.

Another feature the Team recommends is establishment of a project-by-project cost-sharing cap to protect industry from unreasonable cost escalation and project delays. The IMTS CIS Team recommends that the cap be set at the Feasibility or Rehabilitation Evaluation Report base cost using risk-based cost and schedule estimates. This risk-based cost estimate will include contingencies reflected in the relevant decision document and will be escalated to the new construction start date, plus whatever additional amount, if any, that both the Corps and the Board agree is appropriate. This cap places additional emphasis on the need to produce more reliable project cost estimates in the underlying decision document and to manage projects within the identified and agreed upon project budgets and schedules, protecting both the waterways industry and the general taxpayer from preventable project cost escalation and delay.

Revenue Recommendations

The IMTS CIS Team also reviewed alternative options for generating revenues for the IWTF. These options included the current revenue plan consisting of a waterways fuel tax, a user fee, bonding, and other revenue sources, such as state funding or other beneficiaries of the IMTS. The Team acknowledged that the current revenue-raising system is a workable, understood, acceptable, and auditable system for collecting the waterways industry's share of the IMTS capitalization costs and that the additional revenues required in the Teams' consensus recommendations should best be raised through an increase in the current fuel tax. The recommended program would require a 30–45 percent increase in the current fuel tax (a $0.06–$0.09 per gallon increase). The 30 percent increase is based on an assumption that, under current law, anticipated future revenues would equal the average $85 million annual amount generated over the past five years, while the 45 percent increase is based on FY 2009 actual revenues of $76 million.

Process Improvements

Given the challenges with the current project delivery model, as highlighted with a few recent projects, and the need to improve the process so that the IMTS remains viable for the foreseeable future, change is essential. In addition to insufficient funding identified in *The Inland Navigation Construction, Selected Case Studies Report,* other factors identified in the report also have contributed significantly to the cost increases and schedule delays affecting recent Corps capital projects. Because many of these issues could be controlled with an improved project delivery process, the IMTS CIS Team, in combination with its development of the capital investment strategy, examined the Corps' current project delivery process and developed a number of recommended process improvements. Together with the underlying premise that the necessary project funding will be provided in an efficient manner, the team believes that these improvements will achieve the goal of an improved capital projects business model. Some of these recommendations are already in the process of being implemented and just need to be measured and monitored. Other recommendations can immediately be put into practice, while still others will take additional study or authority to implement. The following recommendations have been organized into those three categories:

Already Implemented Process Improvement Recommendations

1. **Encourage project management certification.** A project management certification program was recently developed and implemented. Senior leaders within the Corps should emphasize the benefits of and encourage certification. The Corps should ensure that only certified project managers are assigned to critical IWTF projects.

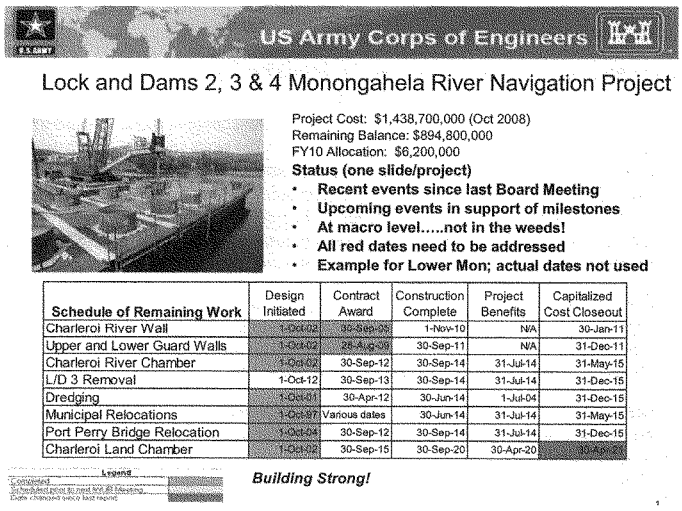
2. **Develop highly reliable risk-based cost estimates for IMTS projects meeting certain thresholds.** Risk-based cost estimates are now required for all projects over $40M and meeting certain thresholds. Only a few of existing projects incorporate updated risk-based cost estimates. As a first step, the IMTS CIS Team will recommend a list of existing projects to be reevaluated using risk-based cost estimating techniques by the summer 2010 Board meeting. In the future, all IMTS projects being proposed for congressional authorization would have a risk-based cost estimate having at least an 80 percent confidence level performed prior to completion of the project's feasibility report.

3. **Require independent external peer reviews for IMTS projects meeting certain criteria.** Independent external peer reviews are a new requirement for large or controversial capital projects. The IMTS CIS Team will follow the new regulation, which was implemented in December 2009, for external peer reviews. No additional specific action is required at this time.

Immediately Implementable Process Improvement Recommendations

1. **Appoint a Board representative to each IMTS project.** The Board Chairman should assign a representative from the Board to each active project by the summer 2010 IWUB meeting. Those representatives will be forwarded to the project managers for inclusion as Project Delivery Team (PDT) members.

2. **Provide project status communication to the Board.** The following template, shown in Figure ES-5, should be used for briefing project status beginning at the summer 2010 Board meeting.


US Army Corps of Engineers

Lock and Dams 2, 3 & 4 Monongahela River Navigation Project

Project Cost: $1,438,700,000 (Oct 2008)
Remaining Balance: $894,800,000
FY10 Allocation: $6,200,000

Status (one slide/project)

- **Recent events since last Board Meeting**
- **Upcoming events in support of milestones**
- **At macro level.....not in the weeds!**
- **All red dates need to be addressed**
- **Example for Lower Mon; actual dates not used**

Schedule of Remaining Work	Design Initiated	Contract Award	Construction Complete	Project Benefits	Capitalized Cost Closeout
Charleroi River Wall	1-Oct-02	30-Sep-05	1-Nov-10	N/A	30-Jan-11
Upper and Lower Guard Walls	1-Oct-02	28-Aug-09	30-Sep-11	N/A	31-Dec-11
Charleroi River Chamber	1-Oct-02	30-Sep-12	30-Sep-14	31-Jul-14	31-May-15
L/D 3 Removal	1-Oct-12	30-Sep-13	30-Sep-14	31-Jul-14	31-Dec-15
Dredging	1-Oct-01	30-Apr-12	30-Jun-14	1-Jul-04	31-Dec-15
Municipal Relocations	1-Oct-97	Various dates	30-Jun-14	31-Jul-14	31-May-15
Port Perry Bridge Relocation	1-Oct-04	30-Sep-12	30-Sep-14	31-Jul-14	31-Dec-15
Charleroi Land Chamber	1-Oct-02	30-Sep-15	30-Sep-20	30-Apr-20	30-Apr-21

Legend

Building Strong!

Figure ES-5. Proposed Project Status Briefing Template

3. **Include the Board chairman and representative as signatories for all project management plans (PMPs).** Project management plans for new projects should be developed during the planning

phase. Existing PMPs should be updated to include the Board representative and Chairman as signatories over the next year. All plans should be signed by the spring 2011 Board meeting.

4. **Apply lessons learned to managing new projects.** The Navigation Community of Practice (COP) should set up a system to capture lessons learned specifically for IMTS projects and ensure that they are reviewed prior to initiating new work.

5. **Evaluate use of early contractor involvement as a contract vehicle for an IMTS project.** The Corps should identify one or more pilot projects where early contractor involvement would improve the outcome.

6. **Implement applicable principles from the Military Construction (MILCON) Model.** Adopting several principles of the MILCON model would result in a culture change; these principles should be reinforced at all levels throughout the Corps Civil Works program hierarchy. Principles include that cost estimates cannot be exceeded, schedules must be met, and a multiyear funding stream must have a commitment from the U.S. Congress. Contracts should be structured with awardable options that can be eliminated if costs are exceeded, but still provide a functioning facility. Project managers and project staff members should follow guidance requiring that budgets and schedules be met and abandon the presumption that additional funding will always be available. The culture should reflect that the construction program cannot afford what would be "nice" for the projects, but can address only what is necessary.

7. **Establish procedures for recommending new construction starts.** Through the new IMTS capital projects business model, the Corps should establish the procedures for recommending new construction starts.

Process Improvement Recommendations Requiring Additional Study or Authority

1. **Revisit use of the continuing contracts clause.** Use of an appropriately structured continuing contracts clause or fully funding contracts often is essential to move forward with the larger civil works IMTS project being proposed. The Corps must work with the U.S. Congress to develop a continuing contracts clause that adequately protects the prerogatives of both the legislative and executive branches while not causing unnecessary project delay and cost escalation. One approach for consideration is to fully fund all contracts up to $50 million (current Corps regulations require all contracts $20 million or less to be fully funded), while allowing contracts greater than $50 million to have the option of using an agreed-upon continuing contracts clause.

2. **Draft and ultimately obtain approval for a capital projects business model regulation.** The process improvements and funding strategies recommended in this report should be incorporated into a regulation to direct future IMTS project prioritization and funding. A smaller subset of this Team should develop the regulation with a draft prepared by September 30, 2010.

3. **Create Design/Review Center(s) of Expertise.** Implementation of this recommendation would require organizational changes affecting a number of non-navigation-related considerations that would in turn have to be evaluated. This recommendation is offered to Corps senior leadership for study and evaluation.

4. **Develop a portfolio of standardized designs.** A team from Corps Engineering and Operations should be identified to consider a pilot project for design of a lock component that could be used throughout the IMTS. In addition, for new projects, it may be helpful to begin requiring a design concepts meeting that involves senior design and technical personnel who are not otherwise involved in the project to brainstorm ideas, solutions, and experiences on past projects.

Benefits

The capital investment strategy and process improvements described above are expected to result in measurable benefits to the IMTS. Cost growth that has become typical with IMTS projects will be reduced. Using the *Selected Case Study Report* as a basis, cost growth on IMTS projects under the in-place business model can be as high as 60 percent of the initial cost. Of that amount, about 30 percent is attributable to inefficient funding and 70 percent to other factors, such as differing site conditions or design changes. Another benefit to the capital investment strategy is avoiding additional benefits foregone on construction projects by completing current ongoing projects efficiently and on time. Additionally, it is important to monitor and measure project performance as the capital investment strategy is implemented to document the benefits of the program with this improved process. The Team estimates the benefits of the recommended program to be the following:

- The avoided cost growth due to inefficient funding over the 20-year capital investment program is conservatively estimated to be between $350 million and $1,180 million.
- Benefits foregone to date at only two of the larger construction projects, Olmsted and Lower Mon, are calculated to be $5.2 billion.
- With the 20-year capital investment program, more than $2.8 billion in additional benefits foregone would be avoided when looking only at the projects that are currently under construction and the schedule for completing these projects under the current program.

Future Improvements

The Team recognizes that as the process matures, changes will be needed to continue to provide the best program and a reliable IMTS. Additional studies and data are recommended to advance the current recommended process, including, but not limited to, the following:

- Developing criteria for channels that are comparable to those developed for lock and dam projects. These criteria would eliminate the need to evaluate channel projects to determine their priority without an established process for comparison.
- Changing the rating scale for the Relative Risk Marix Rankings for Operations and Maintenance budget work packages (currently ranked 25 to 1 and 5 to 1, with 25 and 5 beign the worse condition) to parallel the DSAC scale (1 through 5, with 1 beign the worse condition) for consistency.
- Identifying and quantifying other IMTS beneficiaries to develop a fuller understanding of the IMTS and its importance to the nation's waterways.
- Developing and standardizing additional economic data for proposed projects to improve the information used to prioritize projects.
- Developing reliability data for all projects to use the full capability of the Impact Algorithm.
- Automating the prioritization process to more efficiently manage the program and enable analysis of different factors/constraints.

The inland waterways project delivery process has faced increased criticism over funding priorities, the timing of capital projects funding, escalating costs and construction schedules, and project delivery issues. The IMTS CIS Team's review and analysis resulted in the recommended capital investment strategy and process improvements. While unlikely that any set of recommended improvements could completely eliminate cost increases and schedule delays, these recommended improvements—in combination with the development of the capital investment strategy and with the underlying premise that the funding will be provided in an efficient manner—will achieve the goal of an improved capital projects business model.

This report was prepared at the request of the Inland Waterways Users Board and represents a collaborative effort between industry representatives and U.S. Army Corps of Engineers inland navigation experts. The views, opinions, and findings contained in this report are those of the Inland Marine Transportation System Capital Investment Strategy Team and should not be construed as an official agency or board position, policy, or decision, unless so designated by other official documentation.

Environment and Public Works Committee Hearing
November 17,2010
Follow-Up Questions for Written Submission

Questions for Woodruff

Questions from:

Senator Thomas R. Carper

1. What are some innovative financing and project delivery tools that you have seen work in your organizations that could help reduce the backlog of projects, lower project costs, and deliver projects more efficiently and effectively?

Much of what needs to be done to reduce backlogs, lower costs and deliver our projects on time and on budget can hardly be described as innovative. The government simply needs to employ common sense practices that businesses and families have employed across America for years. These things include:

- **Honestly assessing the cost of a project before it is started.** This includes ensuring that adequate determinations are made of site conditions and the scope of the work needed. The Capital Development Plan calls for at least an 80% confidence level in the cost estimate when a project is brought forward for authorization. That means that 80% of the time, the project can be completed at or below the authorized cost.
- **Providing an adequate funding stream.** Much of the cost escalation in these projects stems from inadequate or ill-timed funding. Uncertain annual appropriations, often delayed by continuing resolutions, sometimes results in stopping and starting projects and added cost. There are a variety of ways to overcome this. For many projects, appropriating the full cost of construction at the outset is the answer. This is what is done with most Military Construction projects undertaken by the Corps. The New Orleans flood control projects being completed now by the Corps are an example of how even a massive project can be fully funded and finished on budget. Some lock and dam projects are large, multi-year endeavors and it would be difficult to appropriate the entire cost at one time, but these are the projects that would benefit the most from a stable funding stream. In the private sector and other parts of the public sector, financing is used to smooth out the cash flow demands. Bonding is an example of how this is often done on other large projects. While that adds financing cost to the project, this cost is offset by avoiding construction price inflation that results from delays and allows the economic benefits of the projects to be realized much sooner.
- **Standardize and centralize lock and dam design where possible.** Historically, each Corps district maintained the design capability to design locks and dams. As a result, there is little standardization in the system and there is redundant expertise. While there are reasons not all locks and dams can be built alike, there could be savings achieved by standardizing and modularizing many of the components. Moreover, since we are recommending that we only build as many projects at a time as we can afford to

efficiently fund, we could employ a design center of expertise to design locks and dams, thereby promoting uniformity and increasing efficiency, while eliminating redundancy.

These are some of the key areas for improvement. The team's report goes into more detail on these and other measures that could be employed to increase efficiency and lower cost.

2. How can our water resources policy and our surface transportation policy be crafted in a way that is mutually beneficial and that creates jobs, helps our economy, and builds smart infrastructure?

Just as we have attempted to look at our nation's inland waterways as a system as opposed to a set of discrete components, the nation should look upon all of its transportation infrastructure as an interrelated system. There is an important place for every mode, but there are also places where each mode has a clear advantage over the others. Water transportation is safe, fuel efficient and limits emissions. Utilizing water where possible relieves highway and rail congestion, avoids the need for added infrastructure in the other modes and preserves valuable resources. Optimizing transportation logistics and using low cost barge transportation where possible saves money. That means that American manufactured and agricultural goods are more competitive in world markets, which bolsters these foundations of our economy. That means American consumers get the products and services they need for less, which gives them more to spend on other items. That supports all segments of our economy. So, while one can point out that building our inland waterways infrastructure creates construction and related jobs, and our inland marine transportation system employs thousands of workers, these jobs are just the tip of the iceberg. It is the benefits the users of the system get, which ultimately flow to all Americans, that justify the investments we make in the system.

In the case of our inland waterways infrastructure, we sell ourselves short if we limit our focus on its value as transportation infrastructure. In some areas, the economic impact of recreation, water supply and other non-transportation uses of our system far outweighs the transportation related benefits. So, not only must we do a better job of looking at the inland waterways as part of an integrated national transportation system, we must look at the non-transportation related benefits and include those benefits in any calculation of the overall value of the waterways to the nation.

Senator James M. Inhofe

1. Your testimony discusses how this plan would avoid significant project cost growth as well as economic benefits foregone. Would you please expand on that idea for us? How did the team come up with those numbers and who is it that benefits from those savings? Is it industry, the federal taxpayer or both?

The short answer is that everybody will benefit from implementing this plan. The industry and the general taxpayer (and it should be noted that the industry falls in both categories, since in addition to paying the fuel tax to support the waterways, the industry pays all the other taxes that businesses in America pay) will benefit from paying less to get the same projects completed. The nation as a whole reaps the benefits of the system. The benefit calculations set out in the

report were provided by the Corps of Engineers to the team. Set out below is my understanding of how they were calculated, based on information provided to the team by the Corps. I believe the team was very conservative in its projections with respect to these issues.

With respect to the project cost growth estimates, the team looked at cost growth from inefficient funding and from other factors. For inefficient funding, the team concentrated on projects that would not be expected to be fully funded at the outset and assumed that future projects costing $200 million or more would not be fully funded at the outset. Using historical cost growth as a guide, the team projected the future cost growth on these projects if we maintain the status quo compared to projections assuming implementation of the plan. We estimated that over the 20 year plan period, we face cost growth of $350 to $1,180 million if we continue to inefficiently fund our major projects. (See Report Section 4.3.4.1)

With respect to other cost growth factors, such as differing site conditions and those caused by design changes, we believe that the recommended improvements to the project delivery system detailed in Chapter 3 of the report will greatly enhance the confidence level of pricing estimates and reduce this category of overages. However, we recognize it cannot be entirely eliminated. Even if we only reduce this area of cost growth by only 25-30 percent, we can save between $230 and $925 million. (See Report Section 4.3.4.2)

With respect to benefits foregone, these refer to the National Economic Development benefits the Corps has calculated that these projects will provide to the nation at large using the criteria set out in regulation. If the project is not serviceable, it is not providing these economic benefits to the nation. Benefits forgone are those annual benefits that would have been realized if the project had been finished multiplied by the number of years of delay. It should be noted that thus far, the Corps has only calculated these benefits for the projects currently under construction, so we are unable to estimate the true cost of not implementing the plan in the form of benefits foregone. Section 4.3.4.3 of the report explains how this estimate was derived. Just looking at the projects currently under construction and comparing the benefits foregone under the status quo, less what would be foregone if these projects are finished earlier as set out in the plan, we are left with a difference of $2.8 billion.

Our nation is in a critical financial position and cannot afford to waste money or act in a way that does not allow us to capture all the benefits we can from every dollar we invest. That is why we believe it is so critical that our country adopt a plan to increase efficiency and eliminate waste in our inland waterways capital construction program. That is why the team worked hard to develop and deliver such a plan for consideration and implementation.

Senator BOXER. Thank you very much for that.
Mr. Jim Weakley, President, Lake Carriers' Association.
Welcome, sir.

STATEMENT OF JAMES H.I. WEAKLEY, PRESIDENT, LAKE CARRIERS' ASSOCIATION

Mr. WEAKLEY. Thank you, Madam Chairwoman.

Representing Lake Carriers' Association, Great Lakes Maritime Task Force, and the National Coalition, I will be focusing on Government trust, jobs, and marine transportation. All are vital to America's future.

Ships enable global and domestic trade. Unfortunately, our waterways—the very arteries of coastal infrastructure—barely survive a diet of neglect. Our ports fill with sediment faster than man or nature can sustain.

Members of this Committee, Senators Crapo, Klobuchar, Vitter, and Voinovich have taken the first step to end the national dredging crisis by co-sponsoring S. 3213. Thank you.

Restoring the trust in the Harbor Maintenance Trust Fund benefits all four of our Nation's coasts. California importers, Montana and Wyoming coal miners, Oklahoma ranchers, Idaho farmers, and Pennsylvania exporters depend on efficient water-borne transportation to receive goods, move products to market and expand their horizons. Marine transportation moves a ton of cargo farther, producing fewer emissions than other modes. Our Nation's ports handle 2.5 billion tons of domestic and international cargo annually, imports and exports worth more than $5.5 billion a day. Ports employ over 13.3 million Americans, 9 percent of our total work force. Jobs paying $649 billion in 2007. One billion dollars in exports creates 15,000 new jobs. Our ports keep America open for business.

We do it by employing economies of scale. One laker can carry as much as 2,800 trucks. And the laws of physics requiring less horsepower to move a ton of cargo. If trucks were as efficient as ships, they would only need a lawnmower engine.

A lack of dredging forces light loading. For every inch of depth lost, lakers forfeit 270 tons of cargo. For each inch silted in, American lakers leave 8,000 tons of Minnesota ore in Duluth, enough to manufacture 6,000 cars. We leave enough Montana or Wyoming coal behind to produce 3 hours of Detroit's electricity, or we abandon enough stone for 24 Ohio homes.

Tragically, losses are measured in feet. The impacts are systemwide. This inefficiency makes American products more expensive and exports jobs. Dunkirk's port closed in 2005. More will follow. Similar problems exist on our other coasts. A Corps study estimates 30 percent of the 95,000 vessel calls at U.S. ports were limited by inadequate channels.

Tributaries to the Great Lakes naturally deposit more than 3.3 million cubic yards of sediment per year. However, only once in the past decade has an Administration proposed enough money to remove it. An annual investment of $82 million by industry via the fund, and $6 million by the Treasury results in a transportation rate savings of $3.6 billion.

On a per-ton basis, the investment of 50 cents results in a payback of $41. And the 3 cents that taxpayers invest returns $590.

Established in 1986, the Harbor Maintenance Trust Fund collects a tax on cargo value. Industry payments exceed fund expenditures. In 2009, $1.3 billion was collected. However, only $800 million was expended. Most harbors are left high and dry. Annually, we contribute hundreds of millions to this trust gap. The fund surplus is $5.1 billion.

S. 3213 is a solution. Modeled after legal fixes for air and highway trusts, it balances annual fund revenues and expenditures. Basing future expenditures on future revenues, the bill doesn't score or violate the pay as you go rule. Future budgets should reduce earmarks for ports abandoned by the Administration. Based on AIR–21's results, the top line of the Corps' budget should increase. If it had been in place for 2010, harbor maintenance would have increased by hundreds of millions, yet a mere 2 percent of the energy and water appropriations.

I respectfully ask you to pass WRDA and incorporate the Harbor Maintenance Act. We need to revive our dying infrastructure with the angioplasty of dredging, maintain it with a healthy diet. It is a matter of trust.

Thank you.

[The prepared statement of Mr. Weakley follows:]

Testimony of
James H.I. Weakley
President, Lake Carriers' Association

Hearing on
Water Resources Development Act of 2010:
Legislative and Policy Proposals to Benefit the Economy,
Create Jobs, Protect Public Safety,
And Maintain America's Water Resources Infrastructure

Senate Committee on Environment and Public Works

Wednesday, November 17, 2010
406 Dirksen Senate Building

Testimony of James H.I. Weakley, President, Lake Carriers' Association.
Hearing on Water Resources Development Act of 2010: Legislative and Policy Proposals to Benefit the Economy, Create Jobs, Protect Public Safety, And Maintain America's Water Resources Infrastructure.
Wednesday, November 17, 2010, 406 Dirksen Senate Building.

Thank you for the opportunity to testify today. I am Jim Weakley and I am representing Lake Carriers' Association, Great Lakes Maritime Task Force, and Realize America's Maritime Promise, a national coalition. I will be focusing on government trust, jobs and marine transportation. All are vital to America's future.

WHO I REPRESENT

Lake Carriers' Association ("LCA") represents 18 American companies that operate 55 U.S.-flag vessels on the Great Lakes. Founded in 1880, LCA is one of the oldest trade associations in the United States. In a typical year, our members haul upwards of 100,000,000 tons of cargo on the Lakes. Those cargos are the raw materials that drive our economy – iron ore and fluxstone for steel production, coal for power generation, limestone and cement for the construction industry....

Great Lakes Maritime Task Force ("GLMTF") is the largest labor/management coalition ever to promote shipping on the Great Lakes and Seaway, America's Fourth Sea Coast. Since its founding in 1992, GLMTF has grown to almost 90 members and represents shipowners and operators, shoreside and shipboard labor, shipyards, terminal operators, public port authorities, cargo shippers, dredgers and other marine service providers....

Realize America's Maritime Promise ("RAMP") is a national coalition of more than 150 shipping companies, shippers, labor organizations, dredging contractors, ports and other waterway users that have come together in an effort to address the inherent unfairness of a system that collects revenues but does not use them for their intended purpose: DREDGING.

TESTIMONY

Ships enable domestic and global trade. Unfortunately, our waterways, the very arteries of coastal infrastructure, barely survive the diet of neglect. Nature is filling our ports with sediment faster than Man is removing it.

Members of this committee, Senators Crapo, Klobuchar, Vitter and Voinovich, have taken the first step to end the national dredging crisis by cosponsoring S.3213. Thank you. Restoring the trust in the Harbor Maintenance Trust Fund benefits all four of our Nation's coasts. California importers, Oklahoma ranchers, Idaho and Oregon farmers and Pennsylvania exporters depend on efficient waterborne transportation to receive goods, move products to market, and expand their horizons.

Marine transportation moves a ton of cargo farther while producing fewer emissions than other modes. Our Nation's ports handle 2.5 billion tons of domestic and international cargo annually, and imports and exports worth more than $5.5 billion per day. Ports employed over 13.3 million Americans, 9 percent of the total workforce; and those jobs paid $649 billion in 2007. $1 billion in exports creates 15,000 new jobs. Our ports keep America "open for business."

We do it by employing economies of scale – one "laker" can carry as much as 2,800 trucks – and the laws of physics – requiring less horsepower to move a ton of cargo. If semis were as efficient, they would only need a lawnmower engine.

A lack of dredging forces "light loading." For every inch of draft lost, lakers forfeit as much as 270 tons of cargo. For each inch silted in, American lakers leave 8,000 tons of Minnesota ore in Duluth, enough to manufacture 6,000 cars. We leave enough Montana or Wyoming coal behind to produce 3 hours of Detroit's electricity, or abandon enough stone for 24 homes.

Tragically, lost draft is measured in feet. The impacts are system wide. This inefficiency makes American products more expensive and exports jobs. Dunkirk's port closed in 2005. More will follow. Similar problems exist on our other coasts. A Corps study estimated 30 percent of the 95,550 vessel calls at U.S. ports were limited by inadequate channels.

Tributaries to the Great Lakes naturally deposit more than 3.3 million cubic yards of sediment per year; however, only once in the past decade has an Administration proposed spending enough money to remove it. An annual investment of $82 million by industry via the Fund and $6 million from the Treasury into Great Lakes navigation results in the transportation rate savings of $3.6 billion. The investment of $1 from the trust fund results in a payback of $41, and $1 from the taxpayers returns $590.

Established in 1986, the Harbor Maintenance Trust Fund collects the tax on cargo value. Industry payments exceed Fund expenditures. In 2009, it collected $1.3 billion; however, only $808 million was expended. Most harbors were left high and dry. Annually, we contribute hundreds of millions to this "trust gap." The Fund's surplus is $5.1 billion.

S.3213 is the solution. Modeled after legislative fixes for air and highway trust funds, it balances annual Fund revenues and expenditures. Basing future expenditures on future revenues, the bill doesn't "score" or violate the "pay-as-you-go" rule. Fewer "earmarks" for ports currently abandoned by the Administration should be required in future budgets.

Based on AIR-21 results, the "top line" of the Corps' budget should increase. If in place for 2010, harbor maintenance would have increased by hundreds of millions, a mere 2 percent of the total Energy and Water appropriations.

I respectfully urge you to pass WRDA and incorporate the Harbor Maintenance Act. We are on the verge of a national navigation heart attack. We need to revive our dying infrastructure with the angioplasty of dredging and maintain it with a healthy maintenance diet.

It is a matter of Trust.

James H. I. Weakley

President, Lake Carriers' Association
President, Great Lakes Maritime Task Force
Member, Restore America's Maritime Promise

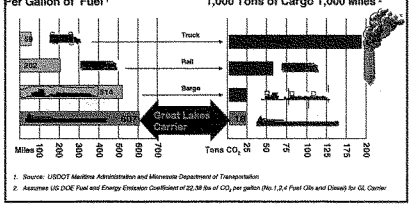
WRDA & Harbor Maintenance Act S. 3213

Senate Environment & Public Works Hearing
Nov 17, 2010

S.3213 Restores Trust

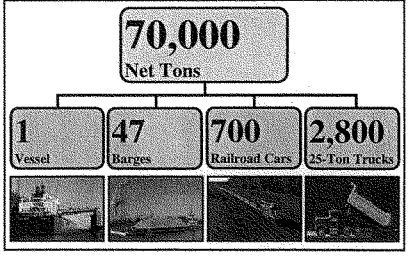
- Harbor Maintenance Act:
  - Requires annual amount **appropriated** from HMTF to **match** projected annual **revenue** into HMTF
  - Modeled on AIR - 21
  - Should not "score" – **CBO has scored it as $0**
  - Should **not** violate "**pay-as-you go**" rule
  - Should increase ACOE's "top line" – Highway/Air
  - Insulated from inflation – value based tax
  - Increases HMTF spending – **2% of Energy & Water Appropriations**
  - **Reduces** need for "**earmarks**!"

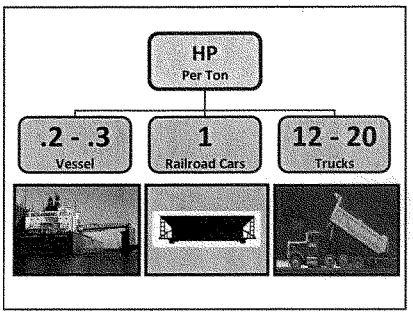
WATERBORNE TRANSPORTATION IS ... ♤Safer ♤More Fuel-Efficient ♤Fewer Emissions THAN RAIL OR TRUCK TRANSPORTATION

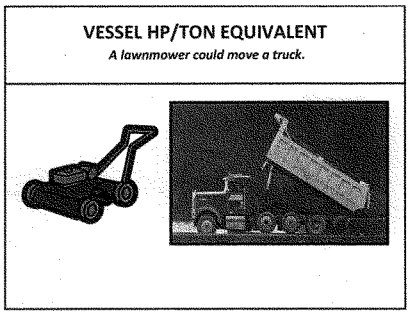


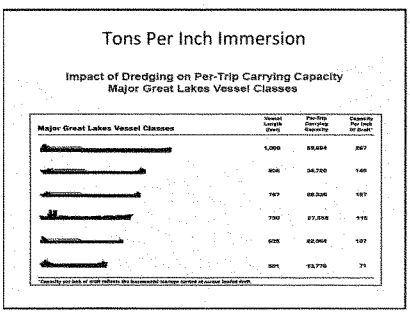
1. Source: USDOT Maritime Administration and Minnesota Department of Transportation
2. Assumes US DOE Fuel and Energy Emission Coefficient of 22.38 lbs of CO_2 per gallon (No.1,2,4 Fuel Oils and Diesel) for GL Carrier

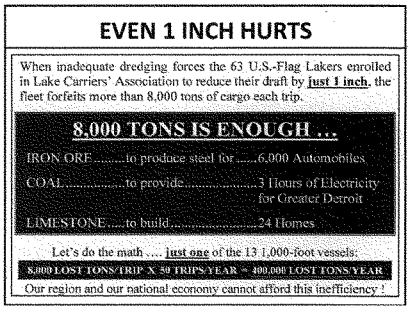
LAND-BASED MODES OF TRANSPORTATION DON'T STACK UP TO SHIPS !

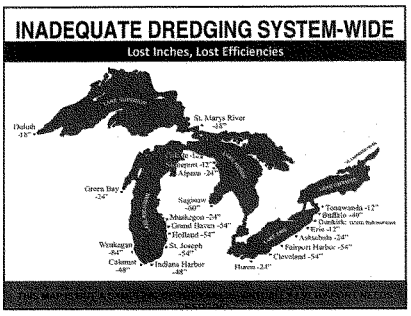


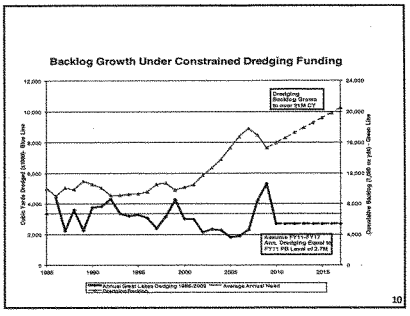

HP
Per Ton
.2 - .3
Vessel
1
Railroad Cars
12 - 20
Trucks

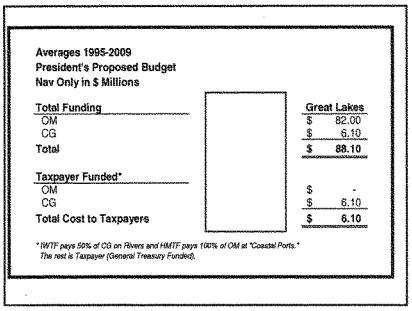

VESSEL HP/TON EQUIVALENT
A lawnmower could move a truck.


Tons Per Inch Immersion
Impact of Dredging on Per-Trip Carrying Capacity
Major Great Lakes Vessel Classes
Major Great Lakes Vessel Classes


EVEN 1 INCH HURTS
When inadequate dredging forces the 63 U.S.-Flag Lakers enrolled in Lake Carriers' Association to reduce their draft by just 1 inch, the fleet forfeits more than 8,000 tons of cargo each trip.
8,000 TONS IS ENOUGH ...
IRON ORE ..... to produce steel for ..... 6,000 Automobiles
COAL ..... to provide ..... 3 Hours of Electricity for Greater Detroit
LIMESTONE ..... to build ..... 24 Homes
Let's do the math .... just one of the 13 1,000-foot vessels:
8,000 LOST TONS/TRIP X 50 TRIPS/YEAR = 400,000 LOST TONS/YEAR
Our region and our national economy cannot afford this inefficiency !



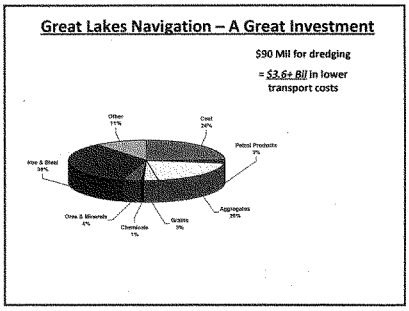




Averages 1995-2009
President's Proposed Budget
Nav Only in $ Millions

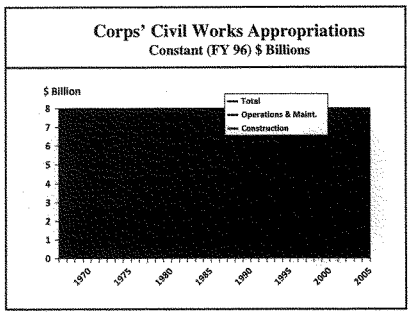
Total Funding	Great Lakes
OM	$ 82.00
CG	$ 6.10
Total	$ 88.10
Taxpayer Funded*	
OM	$ -
CG	$ 6.10
Total Cost to Taxpayers	$ 6.10

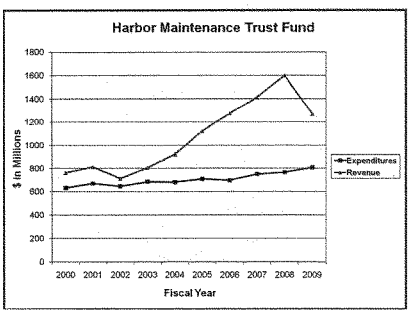
*IWTF pays 50% of CG on Rivers and HMTF pays 100% of OM at "Coastal Ports."
The rest is Taxpayer (General Treasury Funded).

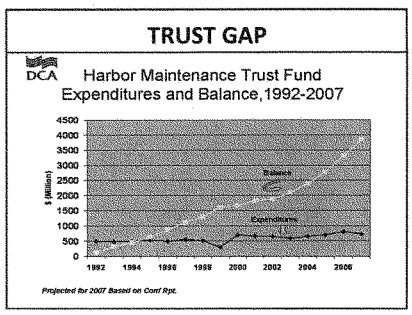


Averages 1995-2009
President's Proposed Budget
Navigation Only

	Great Lakes
TRANSPORATION RATE SAVINGS *(Benefit)*	$3.6 *Billion*
AVERAGE TONS	176.5 *Million*
INVESTMENT	
Total / Ton	$ 0.50
Taxpayer / Ton	$ 0.03
RETURN BENEFIT/COST – PER DOLLAR	
Return on Investment	$ 40.86
Return on Taxpayer Investment	$ 590.16







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  - Insulated from inflation – value based tax
  - Increases HMTF spending – **2% of Energy & Water Appropriations**
  - **Reduces** need for **"earmarks!"**

Lake Carriers' Association

The Greatest Ships on the Great Lakes

JAMES H. I. WEAKLEY, PRESIDENT
440-333-9995 • weakley@lcaships.com

January 4, 2011

Responses to U.S. Senate Environment and Public Works Committee Follow-Up Questions for Mr. Jim Weakley (Lake Carriers' Association) From November 17, 2010 Hearing on WRDA 2010

Question from Senator Barbara Boxer:

1. Mr. Weakley, according to statistics from the American Association of Port Authorities, the port industry supports over 13 million jobs and more than $3.15 trillion in marine-cargo-related spending. The California Marine Affairs and Navigations Conference estimates that California ports alone support over 1 million jobs.

Given the vital role our ports play in the national and regional economies, what job creation and other economic benefits can we expect from increasing investment in harbor maintenance as part of the next Water Resources Development Act? How can advancing a WRDA bill and continuing to invest in the projects it authorizes help to make our ports more competitive with ports around the world?

Response: The size of vessels calling at U.S. ports continues to increase, driven by continual business efforts to keep up with increasing levels of trade, improve efficiency and lower costs. According to the Bureau of Transportation Statistics, the average size (measured in cargo capacity by weight) of container vessels calling at U.S. ports increased 26% between 2000 and 2007. Today's largest containerships can carry the equivalent of more than 12,000 twenty-foot containers. While few U.S. ports will need to accommodate vessels of this size, most U.S. ports will have to accommodate larger vessels than they currently serve as older vessels are retired and replaced with larger vessels. The width and depth of harbor channels and turning basins will need to be increased and maintained to accommodate these vessels.

According to the American Association of Port Authorities, more than 90% of the nation's top 50 ports in foreign waterborne commerce, representing nearly 99% of U.S. trade by weight and 61% by value, require regular maintenance dredging to remove the continual accumulation of sediment. Even at current maintenance dredging funding levels, many ships are being forced to carry a fraction of their intended capacity or risk running aground, a situation that increases the risk of pollution. A loss of one-foot of channel depth will reduce the volume of U.S. coal exported on a single vessel by 2,700 tons. The same one-foot loss of channel depth reduces the volume of taconite (iron ore) and other dry-bulk commodities carried by a Great Lakes bulk carrier by more than 3,200 tons. Similar impacts are felt by agricultural exporters. Since virtually all U.S. exporters compete on a price basis in an international marketplace with those from other countries, continued investment in U.S. harbors is critical to growing the U.S. economy through increased exports.

Continued..../

Studies of the benefits-to-costs ratio of maintenance dredging show the positive economic benefits to this activity. For example, according to a recent study conducted for Cleveland Harbor in Ohio, shipping activities there directly employ 2,000 people and indirectly employ 10,000 people. The Army Corps of Engineers (Corps) determined in 2004 that maintenance dredging of Cleveland Harbor produced a benefits-to-cost ratio of between 1.25 and 4.78. The County of Del Norte, CA recently noted that the Corps determined in 2006 that maintenance dredging of Crescent City Harbor would have a benefits-to-cost ratio of between 2.0 and 5.0. Unfortunately, harbors such as these receive little or no maintenance dredging due to underutilization of the Harbor Maintenance Trust Fund (HMTF). Even the maintenance needs of larger harbors are only partially funded. Maintaining the Houston Ship Channel at its project depth would generate $87 million annually at the nation's 3rd largest port, yet it only receives 60% of its needed O&M funds.

Passage of a WRDA bill to authorize full use of HMTF revenues and improvements to U.S. harbors is critical to maintaining U.S. economic competitiveness in the world market as well as the survival of many smaller harbor communities.

Questions from Senator Thomas R. Carper:

1. What are some innovative financing and project delivery tools that you have seen work in your organizations that could help reduce the backlog of projects, lower transportation costs, and deliver projects more efficiently and effectively?

Response: The dredging industry has been working closely with the U.S. Army Corps of Engineers to establish procedures that will improve project delivery, and ensure that the design and execution of navigation dredging reflect the most cost-effective and efficient means possible. The Corps and industry have established a formal partnering process that enables specific project delivery teams to address issues and procedures that may impact execution of the most effective business process. Integrated with these engineering solutions is a commitment to ensure sustainable, environmentally sound dredging and dredged material disposal. Current project funding constraints often interfere with execution of the most efficient project plan, resulting in higher transportation costs.

2. How can our water resources policy and our surface transportation policy be crafted in a way that is mutually beneficial and that creates jobs, helps our economy, and builds smart infrastructure?

Response: Both WRDA and surface transportation authorization bills should include a significant focus on facilitating the movement of freight. Improving freight transportation infrastructure will reduce the cost of domestic freight transportation and increase the efficiency of U.S. industrial activity, the competitiveness of U.S. exports and U.S. economic activity and employment. This represents the most economically efficient (smart) use of tax dollars. WRDA legislation should include language to enforce the full expenditure of Harbor Maintenance Trust Fund revenues for their authorized purposes.

Questions from Senator James M. Inhofe:

1. I support more money for operation and maintenance activities at our coastal and Great Lakes ports and harbors, but I am concerned about unintended consequences for the rest of the Corps program. We are in a very different fiscal and economic situation today than we were after AIR-21, and I am not confident we would see the same budget increases. Are you, and the groups you represent, willing to work with me to accomplish your goals in a way that addresses my concerns?

Response: Yes, the Realize America's Maritime Promise/HMTF Coalition wants to work with you and other EPW Committee members to enact WRDA legislation that ensures that all of our nation's water resources infrastructure needs, including harbor maintenance, will be met.

2. The backlog of maintenance needs at our nation's ports and harbors is currently more than enough to make use of every penny of annual receipts into the Trust Fund. Is there a point in time, though, at which we will be caught up and may not need that entire amount? If so, do you have a sense of when that might be?

Response: There may be, but it depends on several factors.

Because sediment continuously accumulates in most harbor channels, it is not practicable to ensure that the full length and width of every federally-maintained channel is maintained at its authorized depth every day of every year. This must be balanced, however, with the need of maritime commerce for relatively consistent and predictable channel depths and widths in order to plan vessel voyages, the economic benefits of efficient ocean transportation, the impact of annual increases in harbor maintenance costs due to channel expansion projects and inflation, and the potential for WTO sanctions if the Harbor Maintenance Tax on imports continues to be significantly underutilized to facilitate international ocean transportation.

Clearly, the current level of harbor maintenance falls well below the appropriate balance point among these factors because harbor channel depth and width availability is decreasing and the maintenance dredging backlog is increasing. Depending on how quickly that backlog is reduced, reaching that balance point may require an initial effort somewhat greater than the effort to maintain that balance point. Predicting the future harbor maintenance cost profile would require obtaining longer range Army Corps of Engineers capability projections, predicting the long-term rate of channel expansions and inflation, and reaching a policy agreement on a standard for the percentage of time that a percentage of project depth, width, and length will be maintained.

Sincerely,

James H. I. Weakley
President

JHIW:lca
G:\WEAKLEY\0-LETTER\2011\010411 EPW.docx

Senator BOXER. Well said.

Mr. Steve Verigin, we welcome you to talk about levee safety or whatever other issues you want.

STATEMENT OF STEPHEN W. VERIGIN, P.E., G.E., VICE PRESIDENT, GEI CONSULTANTS, INC., AND MEMBER, NATIONAL COMMITTEE ON LEVEE SAFETY

Mr. VERIGIN. Thank you, Chairman Boxer.

Today I would like to describe the immediate need for establishing a national levee safety program and how that program would strengthen the current work to upgrade the levee system in California, a State with one of the Nation's highest flood risks and the one with which I am most familiar.

The National Committee on Levee Safety was convened in 2008 at the direction of Congress and mostly comprised of non-Federal members. Through our work we have learned that our levee safety reality is unfortunately filled with risk and uncertainty. We don't know how many miles of levees there are in the United States. There may be as many as 100,000 miles of non-Federal levels in addition to the 14,000 miles of Corps-owned and operated levees that are currently being inventoried.

There are no national levee engineering standards. Our flood risk is growing due to aging structures, lack of proper maintenance, increasing development behind levees, and a lack of adequate funding for remediation. Many communities and citizens are unaware of their flood risk and believe that they will be protected for any size flood. And even our best levees that protect against a 100-year flood have a high chance—1 in 4—to experience a flood larger than that during a 30-year mortgage.

To address this reality the committee made 20 specific recommendations. A national levee safety program will be a long-term investment, moving us from a reactive disaster assistance environment to a proactive, safety-oriented culture. The committee believes the need is urgent and is grateful that you are considering a national program in the next WRDA.

We understand that in these difficult economic times it is not feasible to immediately implement all the recommendations in the strategic report. It is, however, timely that we take action so that we don't lose the momentum, efforts, and accomplishments that we realized from the now not so recent events of Hurricane Katrina and the flooding of New Orleans.

The 2009 report to Congress proposed a phased schedule for implementation. In keeping with that strategy we would like to propose the highest recommendations as inclusion in the next WRDA. First, to expand and maintain the national levee data base by conducting an inventory and inspection of all levees in the United States, namely, those outside of the U.S. Army Corps' of Engineers authorities.

Establish a national levee safety program likely embedded in an existing Federal agency. Develop national levee safety standards, including tolerable risk guidelines and a hazard potential classification system, and swiftly address growing concerns regarding liability for damages resulting from levee failures. This is important,

as there is concern that States will be reluctant to take on levee safety programs for fear of additional liability.

Furthermore, we think that WRDA should authorize the implementation of the next highest priorities, and that would be to design and incentivize the development of State levee safety programs and to establish the National Levee Rehabilitation Improvement and Flood Mitigation Fund.

For the past 6 months the committee has been soliciting feedback from a variety of stakeholders. We have received the following major comments. A complete national inventory of all levees is all necessary to understand the Nation's risk and effectively prioritize program needs. A national levee safety program should support good flood risk management. A national levee safety program should simplify, streamline, and align State, Federal, and local programs. Funding for remediation of existing aging and deficient levees is needed and necessary to attract State and local government to a national program.

Some stakeholders are concerned over the impacts of requiring risk-based insurance, and there needs to be more dialog to ensure that needed operation, maintenance, and repairs can occur in a timely fashion without compromising environmental regulations.

I would like to complete this testimony by describing some of the specifics in California and how the new program would apply. California's Central Valley is one of the Nation's largest Federal levee systems, 1,600 miles in length with generally fragile levees, not up to the task of protecting the 600,000 people and $50 billion of infrastructure behind them. At the downstream end of the system lies the Sacramento-San Joaquin Delta, also with many fragile levees vulnerable to earthquake damage that would severely interrupt the water delivery to 24 million Californians. And Sacramento, in the heart of the Central Valley, is the Nation's leading major city that is at most risk of a New Orleans-type flooding event. Consequently, California voters approved $4.9 billion in State funds, mostly for Central Valley region.

Implementation of a national levee safety program will greatly assist California in inventorying and assessing the condition of all of the State's estimated 14,000 miles of levees. By having national standards, rehabilitation and improvement projects will be designed and constructed consistent with Corps, FEMA and other flood management agencies. The National Levee Safety Program will provide the leadership that will guide the State toward achieving future compliance for projects currently underway in formulating the future California State levee safety program.

In recent years California has developed the capability to construct major flood repair and improvement projects with funding from State bonds and local property assessments. However, the $4.9 billion in State bond funds is not adequate to meet all of the need. California is well-poised to utilize funding from the National Levee Rehabilitation Improvement and Flood Mitigation Fund to complete the job.

To reinforce the urgent need for establishing a national levee safety program, I have attached news clips from the recent Iowa flooding in August and the Wisconsin flooding in September. Both

events caused severe damage and levee failures and remind us that we should not grow complacent.

Thank you.

[The prepared statement of Mr. Verigin follows:]

WRITTEN TESTIMONY

OF

STEPHEN W. VERIGIN, P.E., G.E.
MEMBER OF NATIONAL COMMITTEE ON LEVEE SAFETY

BEFORE THE
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ON
WATER RESOURCES DEVELOPMENT ACT OF 2010: LEGISLATIVE ISSUES

NOVEMBER 17, 2010
10:00 A.M. – DIRKSEN SENATE OFFICE BUILDING, ROOM 406

Chairman Boxer, Ranking Member Inhofe, and members of the Committee,

Thank you for the opportunity to testify before you today. My name is Stephen W. Verigin and I am a member of the National Committee on Levee Safety, a practicing consulting engineer and a former deputy director for the California Department of Water Resources. I am a registered professional engineer with over 30 years of dam and levee engineering experience. I would like to thank you for the opportunity to speak to you about the recommendations of the National Committee on Levee Safety and on California's flood issues.

As you begin consideration of the next Water Resources Development Act (WRDA), I urge you to enact the measures needed to improve levee safety, reduce the nation's very serious flood risks, and assist California in addressing its acute flood risk.

The efforts of the National Committee on Levee Safety (hereafter, the Committee) represent a great example of federal, state, and local government representatives working closely and cooperatively with the private sector and professional associations to address a national problem and arrive at effective recommendations for solutions. The Committee was formed at the direction of Congress, in Section 9003 of WRDA 2007, to develop recommendations for a National Levee Safety Program (NLSP). On January 15, 2009, the Committee completed a draft report containing 20 recommendations for a National Levee Safety Program. On behalf of the Committee, we urge you to consider legislation to implement the recommended National Levee Safety Program and to enact those recommendations contained in the National Committee on Levee Safety draft report to Congress that are appropriate to include in a WRDA bill.

We are at a critical juncture in our nation's history – the flood risk to people and infrastructure is growing at an alarming rate as a result of inadequate attention and funding for the nation's levee systems. The stark reality of our nation's levee systems, both federal and nonfederal, is that they are generally inadequate and deteriorating, and that we lack sufficient information to predict their level of performance. These levee systems serve as protection from flooding for a great portion of the nation's population and infrastructure. The National Levee Safety Program, potentially as part of a broader national flood risk management approach responding to the possible impact of climate change (including rising water levels), is critical to protecting the public and other infrastructure investments and preserving our economic welfare.

What We Have Learned About the Nation's Levees

As the nation's population spread across the continent in the mid-1800s, communities were established along river systems because rivers were the principal transportation system and because water was needed for both agricultural and domestic use. Over time, farmers and communities found the need to begin constructing long earth embankments to prevent flood waters from inundating their lands. Many of these embankments, or levees, were crudely constructed long piles of dirt without the benefit of modern engineering or construction techniques (see Fig. 1). These initial embankments still form the core of many of the levee systems currently used to protect the nation's critical infrastructure and the public in both urban and rural areas.

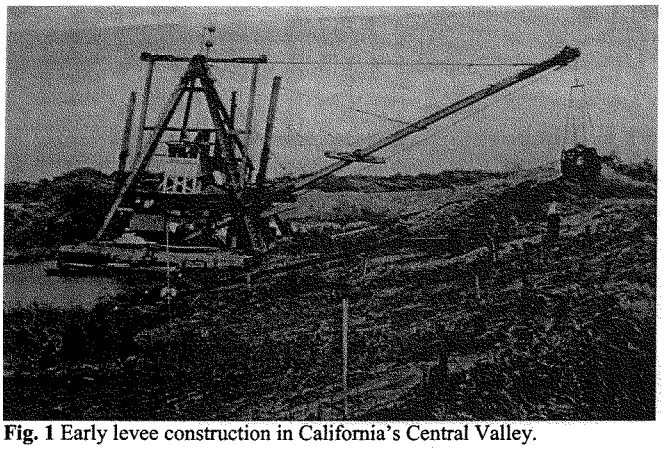


Fig. 1 Early levee construction in California's Central Valley.

The current levee safety reality for the United States is stark:

- We do not know where all the levee systems are, what they protect or what level of performance we can expect from them. There are just over 14,000 miles of levees in the U.S. Army Corps of Engineer programs, but that is a small portion of the levees in the nation. Preliminary estimates indicate there may be more than 100,000 miles of levees across the nation, and tens of millions of people live and work behind them. For these levees we have little information regarding their level of protection or reliability.

- We do know that levees are abundant in many areas of the country and are integral to our citizens' lives, economic prosperity, and physical security. Cities such as New Orleans, Dallas, St. Louis, Sacramento, Portland, Washington, D.C., Des Moines, and Kansas City are all protected by levees.

- Many urban areas protected by levees, particularly those in deep floodplains, place people who live behind them at an unacceptably high risk. Failure of such levees has recently resulted in high loss of life, property damage, economic losses, environmental damages, and the disruption of social and cultural community fabric.

In addition to human life and private property, levees protect critical public infrastructure such as schools, hospitals, wastewater treatment plants, oil refineries, power plants and transportation systems.

- The consequences of levee failures and overtopping can be devastating: the loss of homes, businesses, infrastructure, cherished possessions, and sometimes, tragically, loved ones. Some recent examples include:
    - 1993 Midwest floods – Losses totaled $16 billion. 50,000 private homes were destroyed and approximately 40,000 commercial structures were damaged.
    - Hurricanes Katrina and Rita – 771 people died due to levee/floodwall failures or overtopping and losses totaled $200 billion. (See Fig. 2.)

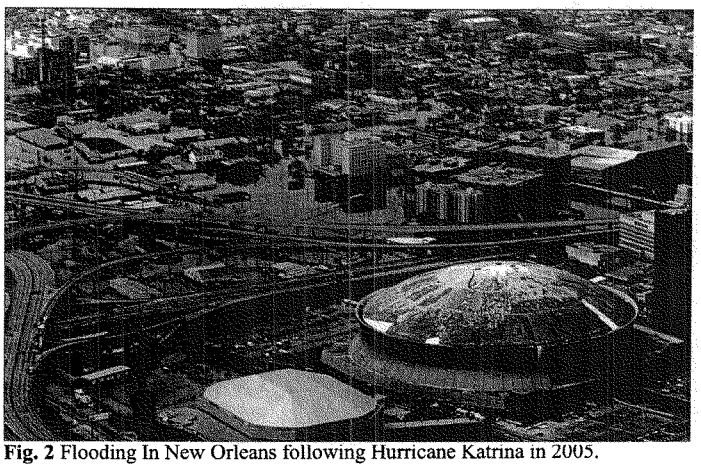


Fig. 2 Flooding In New Orleans following Hurricane Katrina in 2005.

- Many individuals and communities in leveed areas do not understand their flood risk. Many believe that levees – by themselves – make the public safe from flooding. Levees only reduce the risk of flooding – they do not eliminate the risk.
- In many areas, levees have inadvertently increased flood risks by attracting residential and commercial development into the floodplain, increasing the speed at which flooding occurs, and increasing the depth and duration of flooding when water gets trapped within the leveed area after a levee break;
- There are currently no national policies, standards or best practices relating to the safety of levees.

Unintended Consequences of the Existing Federal Policies Regarding Levee Safety

Public policies have led to unintended consequences that also increase flood risks and consequences. The National Flood Insurance Program was created in 1968 to make federally-backed flood insurance available to those with property in participating communities, which was otherwise not available or prohibitively expensive. Recognizing the importance of flood insurance in high risk flood areas, Congress, in the Flood Disaster Protection Act of 1973 (as amended) and the National Insurance Reform Act of 1994, requires federally-regulated lending institutions to make sure that mortgage loans in high risk flood areas are protected by flood insurance, thereby protecting the collateral upon which that mortgage is based. This is often referred to as the "mandatory purchase requirement" for flood insurance for those with property in the Special Flood Hazard Area (SFHA). The NFIP uses the 1-percent-annual-chance flood standard (100-year flood) to determine which areas are in the SFHA. Currently, homeowners living behind levees designated, built and maintained to meet or exceed the 1-percent annual chance event are: 1) exempt from the mandatory purchase requirement, and 2) are not designated on FEMA maps as being in a SFHA. This is a problem for two reasons:

First, the 1-percent-annual-chance event was never intended to be a safety standard, but has inappropriately become a design criterion for many communities as it allows those living behind a levee at this minimum to avoid the mandatory purchase requirement for flood insurance. This trend has been exacerbated by the 1986 WRDA, which established local sponsor cost sharing requirements for project sponsors to U.S. Army Corps of Engineers projects, incentivizing sponsors to cut costs whenever possible. The Committee believes that the inappropriate use of the 100-year standard as a safety standard has allowed an increase in the numbers of people and amount of property at risk in leveed areas.

Second, if a levee is accredited by FEMA under the NFIP, the maps created do not show that area to have any flood risk. This combined with the exemption from flood insurance lead many individuals and communities behind levees to mistakenly believe they do not need flood insurance, and that they are protected from all flooding by that levee.

Government officials and the general public often have only a limited understanding of levees and the risks associated with them. For example, some believe that a 100-year level of flood protection means that a flood will only occur once in 100 years. In fact, over the life of a typical 30-year mortgage, the chance of a 100-year flood occurring is actually 26 percent, a dangerously high risk (see Fig. 3). A 200-year level of flood protection, the new standard for urban areas in California's Central Valley, corresponds to a 14 percent chance of flooding over a 30-year period.

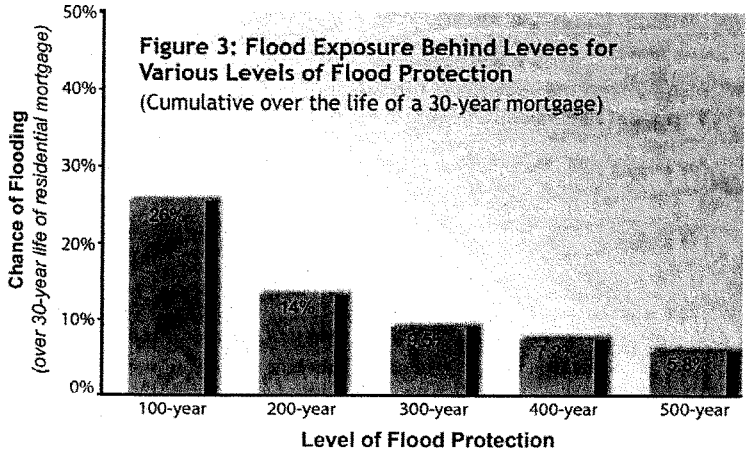


Fig. 3 Chance of a Flood over the Life of a 30-Year Mortgage

It is not until we reach a 500-year level of flood protection that the chance of flooding starts diminishing to a relatively small chance (i.e., approximately six percent over a 30-year period). For comparison, the standard for flood protection along rivers in the Netherlands is a 1200-year level of flood protection, and for coastal flooding from the North Sea, it is a 10,000-year level of flood protection. If we carefully examined the capacities of our levee systems, we would probably find that many, if not most, of the U.S. levee systems do not actually provide a 100-year level of flood protection.

Our federal programs and policies must be aligned to improve levee safety.

Risks from Levees Are Misunderstood and Increasing

As with all flood control structures, levees only reduce the risk to individuals and property behind them; they do not eliminate the risk. For too long, the partnership of local, state, and federal agencies has allowed the communities in leveed areas to believe that the levees – by themselves – make the public safe from flooding. In fact, if we rely on levees that are improperly sized or deficient, levees can dramatically increase our risks as they can fail catastrophically.

Our levees are aging. The average age of levees within the U.S. Army Corps of Engineers programs is approximately 50 years, and the age of many nonfederal levees can be much older – 100 years or more. Many levees were originally constructed without the benefit of modern

engineering techniques and now provide only limited protection. Advancements in the state of art for engineering and science have been considerable, leaving many levees with features that have serious design, construction and operational inadequacies.

Many levees originally constructed to protect agricultural fields now protect large urban communities and the infrastructure they depend on. Development in leveed areas – residential, industrial, critical facilities and public infrastructure – has resulted in the steady increase of risk to life safety and property damage simply because we rely on them to protect more.

The Committee's Recommendations

The Committee's Report on a NLSP embraces three main concepts: (1) the need for leadership via a National Levee Safety Commission that provides for state delegated programs, national technical standards, risk communication, and coordinating environmental and safety concerns; (2) the building of strong levee safety programs in and within all states that in turn provide oversight, regulation, and critical levee safety processes; and (3) a foundation of well aligned federal agency programs and processes.

Under the category of **Providing Comprehensive and Consistent National Leadership**, the Committee's recommendations are:

1. Establish a National Levee Safety Commission
2. Expand and Maintain the National Levee Database
3. Adopt a Hazard Potential Classification System
4. Develop and Adopt National Levee Safety Standards
5. Develop Tolerable Risk Guidelines
6. Change "Levee Certification" to "Compliance Determination"
7. Subject Levee Compliance Determinations (Certifications) to Peer Review
8. Swiftly Address Growing Concerns Regarding Liability
9. Develop Comprehensive National Public Involvement and Education/Awareness Campaign
10. Provide Comprehensive Technical Materials and Direct Technical Assistance
11. Develop a National Levee Safety Training Program
12. Develop and Implement Measures to Harmonize Levee Safety Activities with Environmental Protection
13. Conduct a Research and Development Program

Under the category of **Building and Sustaining Strong Levee Safety Programs in All States**, the Committee's recommendations are:

14. Design and Delegate Program Responsibilities to States
15. Establish a Levee Safety Grant Program
16. Establish the National Levee Rehabilitation, Improvement, and Flood Mitigation Fund

Under the category of **Aligning Existing Federal Programs (Incentives and Disincentives)**, the Committee's recommendations are:

17. Explore Potential Incentives and Disincentives
18. Mandate Purchase of Risk-Based Flood Insurance in Leveed Areas
19. Augment the Mapping Program established by the Federal Emergency Management Agency (FEMA) so as to improve risk identification and communication
20. Align FEMA's Community Rating System (CRS) to Reward Development of State Levee Safety Programs

Further explanation of each recommendation is attached as Appendix A and copies of the report provided with this testimony.

The recommended program builds upon a vision of shared responsibility at all levels of government and with the public. While the development of the national program is important for consistency of standards and practices, major elements are best performed at the state and local levels.

Phased Strategic Implementation

The Committee recommends phased strategic implementation as follows:

Phase I: Immediately implement critical actions, establish a NLSP, complete an inventory and initial inspection of all levees, establish a Coordinating Council on Communications for Levees, require mandatory risk-based flood insurance purchase in leveed areas, and address barriers associated with levee liability.

Phase II: Use a five to seven-year period that overlaps Phase I to incentivize the development of state levee safety programs through the deployment of a National Levee Safety Code, training, research and development, technical assistance and materials, start-up grants for states, and funds for rehabilitation and mitigation.

Phase III: Transition to a steady state future where state and local levee safety activities are sustained through incentives and encouraged through disincentives such as withholding funds from existing programs. Levee safety decisions will be guided by the completion of Tolerable Risk Guidelines.

What We Are Hearing

The Committee is in the process of soliciting reactions, input and suggestions from a wide variety of stakeholders on the 2009 recommendations per our Stakeholder Involvement Plan (available on www.leveesafety.org). To date we have held six regional workshops in Binghamton, NY; Kansas City, MO.; Covington, KY.; Dallas, TX; Sacramento, CA; and Portland, OR, and we travel to Augusta, GA., next month. Workshop participants, including levee owners, representatives of local, state, and federal agencies, and elected officials, have welcomed the opportunity to learn more about the recommendations proposed for a National Levee Safety Program and provide feedback to the Committee.

In every workshop, participants wholeheartedly confirmed the urgency and importance of addressing levee safety and generally supported the Committee's recommendations.

Several major themes have emerged in stakeholder comments:

- We should ensure that the implementation of a National Levee Safety Program promotes alignment of existing programs and simplifies them so as not to create additional burden and cost for state and local governments;
- We should ensure that a National Levee Safety Program complements overall flood risk management principles and does not inadvertently increase risk in the future by attracting more people to live and work behind unreliable levees;
- A complete national inventory of all levees in the U.S. is an important step in understanding and communicating our national, regional and local flood risk and effectively prioritizing risk reduction activities;
- Funding for aging and deficient levee systems is sorely needed. Eligibility for funding should be targeted where opportunities for risk reduction is the greatest, accountability can be confirmed and should be flexible enough to support the site-specific suite of activities (both structural and nonstructural) necessary to most effectively reduce risk;
- Some stakeholders are concerned with the Committee's recommendation requiring risk-based flood insurance for all structures behind levees. Affordability of premiums, especially for low-income residents, is a concern as well as perception of fairness – those living behind levees will be paying twice – once through an assessment for levee operations and maintenance and once for insurance. Other stakeholders feel the recommendation is desirable and more equitable than the current situation in that it takes an important first step in helping to move the nation from an expensive and reactive disaster relief environment and shifts some of that responsibility for flood damage reduction to the people and communities living in the riskiest areas.
- A significant problem for some levee operators is the conflict between desired and timely operations, maintenance and repair activities needed to maintain the reliability of levees and complying with existing environmental statutes such as the Endangered Species Act and the Clean Water Act. Further dialogue is needed to explore this issue.
- Some stakeholders are concerned about the impacts that liability issues may have in the ability and desire of states to develop the recommended state levee safety programs as well as a dampening interest by the private sector to provide evaluation, design, or construction services. The outcome the liability situation is far from clear, but if the situation worsens, the public will be placed further at risk.

Conclusion

A National Levee Safety Program would be an investment that moves the country away from a reactive disaster assistance environment to a proactive safety-oriented culture where the general public and governments at all levels are informed and participating in the shared responsibilities of flood risk management.

One of the dichotomies of levees is that, while these structures have afforded the country economic prosperity, they have also tended to cost the U.S. taxpayer when it comes to paying for disaster response, damages, and repairs when these same levees fail. The average yearly national

cost can run in the billions. The potential risk exposure in the future is even greater. Although there are costs for a NLSP, they will be long-term investments in public safety and continued economic prosperity. These investments will provide major returns in the form of avoided loss of life, reduced economic losses, and the prevention of regional and national impacts over the long term. With growing development and consequences in many leveed areas, the benefits of a strong levee safety program will only increase. Based on current trends, disaster assistance and recovery cost will likely continue to increase unless the country significantly changes its floodplain management practices at all levels of government.

Not only does the concept of levee safety fit within national infrastructure needs – protecting roads and bridges – but levee safety is also very much a state and local issue, as levees protect so much local infrastructure - such as homes, local businesses, schools, and water and sewer treatment plants – from frequent flooding.

We view the report as a beginning – not an end – to addressing the issue of levee safety, and look forward to working with you to implement a National Levee Safety Program through the Water Resources Development Act. In the spirit of a good beginning, the Committee is beginning to seek additional stakeholder and agency input through a series of national and regional outreach sessions.

In addition, the Committee is continuing to work on strategic implementation of its recommendations by working within its existing authorities to:

- Assist the U.S. Army Corps of Engineers in expanding the National Levee Database through the submission of voluntary information from all levees in the nation not under U.S. Army Corps of Engineer's authorities;
- Serve as technical advisors to foundational documents necessary for the development of eventually national standards such as the International Levee Manual and Tolerable Risk Guidelines;
- Assist the Federal Emergency Management Agency in improving communication regarding flood risk, especially as related to levees;
- Research federal programs to provide detailed recommendations on improvements of alignment of federal programs to increase safety of people and property behind levees; and
- Refine costs and benefits of a National Levee Safety Program.

Please consider the Committee as a resource as you develop the next WRDA bill or related legislation. Additional information can be found at www.leveesaftey.org.

This concludes my testimony. Again, thank you for allowing me to testify on the work of the National Committee on Levee Safety. I will be happy to answer any questions you may have.

Appendix A

Recommendations of the National Committee on Levee Safety Explained

Comprehensive and Consistent National Leadership

1. Establish a commission to provide national leadership and comprehensive and consistent approaches to levee safety including standards, research and development, technical materials and assistance, training, public involvement and education, collaboration on environmental and safety issues, facilitation of the alignment of federal programs and design, and delegation and oversight of a delegated program to states.

2. Expand and maintain the National Levee Database (NLD) to include a one-time inventory and inspection of all nonfederal levees by the U.S. Corps of Engineers. Baseline information would be included and maintained in an expanded NLD in order that critical safety issues, true costs of good levee stewardship, and the state of individual levees can inform priorities and provide data for needed risk-informed assessments and decision making.

3. Adopt a Hazard Potential Classification System as a first step to identify and prioritize hazard in leveed areas. Because of a lack of data regarding probability of failure, initial classifications should be based solely on consequences in order to assist in setting priorities, criteria and requirements as the NLSP is being established.

4. Develop and adopt National Levee Safety Standards that will assist to ensure the best engineering practices are available and implemented throughout the nation at all levels of government.

5. Develop Tolerable Risk Guidelines in order to facilitate an understanding of the options to reduce identified risks, weigh both structural and non-structural alternatives to flood risk management, and consider potential life loss in the decision-making process.

6. Change "levee certification" to "compliance determination" to better articulate the intent that "certification" under the National Flood Insurance Program (NFIP) requirements does not constitute a safety guarantee or warranty. The purpose of this change is to more clearly communicate residual risks of living and working in leveed areas.

7. Subject levee certifications (compliance determinations) under FEMA's NFIP to peer review in order to increase confidence in technical determinations of compliance.

8. Swiftly address growing concerns regarding liability for damages resulting from levee failures through exploration of a range of measures aimed at reducing the potential liability of engineering firms and/or government agencies that perform engineering services for levee systems (e.g. inspections, evaluations, design, construction administration, certification or flood fighting). Congress should address this liability concern as a first priority in order to help ensure state and local interest in developing levee safety programs, and to prevent much needed levee repairs, rehabilitation and certification from coming to a halt.

9. Develop a comprehensive National Public Involvement and Education/Awareness Campaign to communicate risk and change behavior in leveed areas as an essential element of levee safety to improve public understanding of the role of levees, associated risks and individual responsibilities to empower people to make risk-informed choices.

10. Provide comprehensive technical materials and direct technical assistance. This is crucial to the successful implementation of consistent national standards to states, local communities and owner/operators.

11. Develop a national levee safety training program that includes a combination of courses, materials, curricula, conferences and direct assistance resulting in an increase in the level of expertise and knowledge in all aspects of levee safety. This would include the development of curricula and certification requirements for Certified Levee Professional programs.

12. Develop and implement measures to more closely harmonize levee safety activities with environmental protection requirements to ensure critical levee operations and maintenance are not delayed and that, where possible without compromising human safety, environmentally friendly practices and techniques are developed and used.

13. Conduct a Research and Development program that will continually advance state-of-the-art technologies and practices for levee safety and conduct critical operations and maintenance activities in as cost-effective and environmentally-friendly manner as possible.

Building and Sustaining Levee Safety Programs in All States

14. Design and delegate program responsibilities to states to assist state and local governments to develop effective levee safety programs focused on continual and periodic inspections, emergency evacuation, mitigation, public involvement and risk communication/awareness, etc.

15. Establish a levee safety grant program to assist states and local communities develop and maintain the institutional capacity, necessary expertise and program framework to quickly initiate and maintain levee safety program activities and requirements (cost shared).

16. Establish the National Levee Rehabilitation, Improvement, and Flood Mitigation Fund to aid in the rehabilitation, improvement or removal of aging or deficient national levee infrastructure. Investment (cost shared) is recommended to be applied to the combination of activities, both structural and nonstructural, that combined would maximize overall risk reduction and initially be focused in areas with the greatest risk to human safety.

Aligning Existing Federal Programs (Incentives and Disincentives)

17. Explore potential incentives and disincentives for good levee behavior through alignment of existing federal programs.

18. Mandate purchase of risk-based flood insurance in leveed areas to reduce economic flood damages and increase communities' and individuals' understanding that levees do not eliminate risk from flooding.

19. Augment FEMA's mapping program to improve risk identification and communication in leveed areas, and consolidate critical information about flood risk.

20. Align FEMA's Community Rating System (CRS) to reward development of state levee safety programs by providing further incentives to communities to exceed minimum program requirements and benefit from lower risk-based flood insurance rates to policy holders who live in leveed areas.

For more information on the NCLS and its recommendations for a National Levee Safety Program, please visit:

http://www.leveesafety.org

DRAFT:

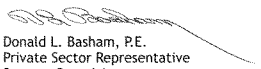
RECOMMENDATIONS FOR A NATIONAL LEVEE SAFETY PROGRAM

A Report to Congress from the National Committee on Levee Safety

An Involved Public and Reliable Levee Systems

January 15, 2009

The members of the National Committee on Levee Safety are pleased to submit this report to Congress.



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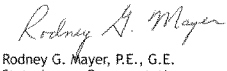

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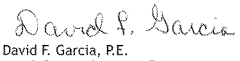

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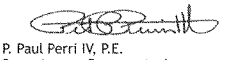

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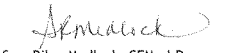

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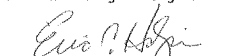

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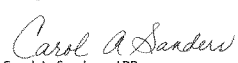

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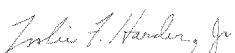

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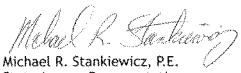

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Cover Photo: View of New Orleans after Hurricane Katrina. August 2005

Acknowledgments

We would also like to acknowledge the dedicated efforts of the many contributors, presenters, support staff, contractors, and committee preparations for the National Committee on Levee Safety. The following organizations and personnel made this report possible:

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National Committee on Levee Safety Review Team—please see Appendix D for a list of individual and organization reviewers.

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Most importantly, the Committee members would like to thank their families, friends and co-workers for their support during the intense 3-month report development period.

DRAFT:

This report has been prepared in accordance with Section 9003 of WRDA 2007 and should not be construed as an Army or Administration position on the recommendations contained herein. Under departmental procedures, the official position on the merits of the recommendations contained within this report may be developed by the Secretary of the Army in response to a request from the Chairman of the Committee having jurisdiction, and then only after coordination with the Office of Management and Budget and other agencies.

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Executive Summary

"The Committee worked assiduously from October 2008 to January 2009, evaluating a wide range of technical, policy and regulatory strategies, with a public safety ethic guiding all decisions. We view the report as the beginning—not the final word—in a national dialogue leading to action among a broad range of stakeholders on our shared responsibilities in levee safety and flood risk management. As a group, we cannot over-emphasize the urgency of these recommendations."

Steven L. Stockton, P.E., SES
Chair, National Committee on Levee Safety

This report contains the recommendations and strategic plan for implementation for a *National Levee Safety Program* from the National Committee on Levee Safety (Committee). The Committee is a diverse group of professionals from federal, state, local/regional governments and the private sector that have worked diligently at representing national interests in levee safety. The report is in response to Title IX, known as the National Levee Safety Act of the Water Resources Development Act of 2007, specifically Section 9003. As a group, we cannot over-emphasize the urgency of these recommendations.

We are at a critical juncture in our nation's history—a burgeoning growth of risk to people and infrastructure as a result of more than 100 years of inattention to levee infrastructure combined with an economy and social fabric that are in a particularly vulnerable state. The long history of levees in the United States is full of lessons from both successes and failures. The devastating floods of the late 1920s and 1930s brought a long period of unregulated and poorly constructed levees into focus, resulting in the construction of more robust levee systems for the decades of the 1930s through 1960s. Inopportunely, the 1960s through the 1980s ushered in new national policies relating to flood insurance, cost sharing for flood control projects, and new owner/operator responsibilities that had the unintended effect of targeting levee designs to only the 1%-annual-chance (100-year) event. This then became the beginning of a dangerous and inappropriate association of the 1%-annual-chance (100-year) event as a safety standard. Our relative complacency during the numerous natural events that continued to wreak economic catastrophes in recent decades was shattered in 2005 in New Orleans. It was the catastrophic loss of life associated with Hurricane Katrina that once again refocused the nation and became the catalyst for the National Levee Safety Act and this report.

The current levee safety reality for the United States is stark—uncertainty in location, performance and condition of levees and a lack of oversight, technical standards, and effective communication of risks. A look to the future offers two distinct possibilities: one where we continue the status quo and await the certainty of more catastrophes or one where we take reasonable actions and investments in a *National Levee Safety Program* that turns the tide on risk growth. We strongly recommend the latter.

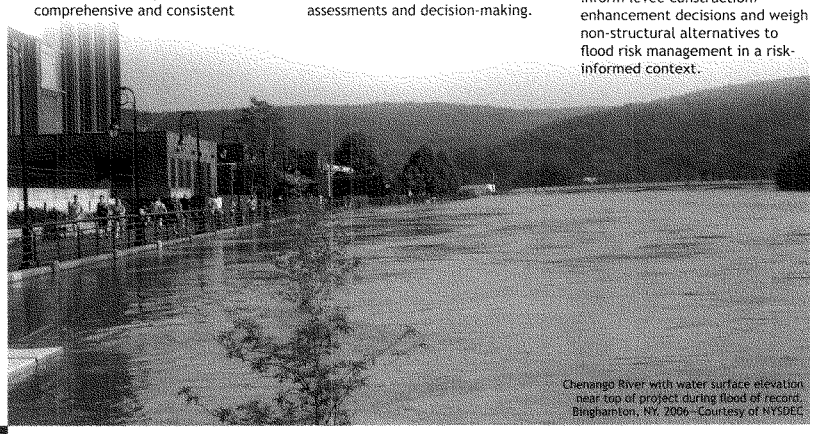
The Committee's recommendations are prefaced by recognition of a need for a broader national flood risk management approach, the benefits of integrating national dam safety and levee safety programs, and call for leveraging levee safety as a critical first step in a national infrastructure investment. The Committee also recognizes that levee systems commonly share the same space as water conveyance and critical ecosystems and habitats, and that working with these interests is vital in effectively managing flood risks.

The specific recommendations for a *National Levee Safety Program (NLSP)* embrace three main concepts: (1) the need for leadership via a *National Levee Safety Commission (Commission)* that provides for state delegated programs, national technical standards, risk communication, and coordinating environmental and safety concerns; (2) the building of strong levee safety programs in and within all states that in turn provide oversight, regulation, and critical levee safety processes; and (3) a foundation of well-aligned federal agency programs and processes.

The following is a summary of the twenty recommendations:

Providing Comprehensive and Consistent National Leadership

1. **Establish a National Levee Safety Commission** to provide national leadership and comprehensive and consistent approaches to levee safety including standards, research and development, technical materials and assistance, training, public involvement and education, collaboration on environmental and safety issues, facilitation of the alignment of federal programs and design, delegation and oversight of a delegated program to states.
2. **Expand and Maintain the National Levee Database** to include a one-time US Army Corps of Engineers (Corps) inventory and inspection of all non-federal levees. Baseline information will be included and maintained in an expanded National Levee Database (NLD) in order that critical safety issues, true costs of good levee stewardship, and the state of individual levees can inform priorities and provide data for needed risk-informed assessments and decision-making.
3. **Adopt a Hazard Potential Classification System** as a first step in identifying and prioritizing hazard in leveed areas. Due to a lack of data regarding probability of failure, initial classifications should be based solely on consequences in order to assist in setting priorities, criteria, and requirements as the NLSP is being established.
4. **Develop and Adopt National Levee Safety Standards** that will assist in ensuring that the best engineering practices are available and implemented throughout the nation at all levels of government.
5. **Develop Tolerable Risk Guidelines** in order to facilitate an understanding of the options to reduce identified risks, how uncertainty affects this understanding, and to better inform levee construction/ enhancement decisions and weigh non-structural alternatives to flood risk management in a risk-informed context.



Chenango River with water surface elevation near top of project during flood of record, Binghamton, NY, 2006--Courtesy of NYSDEC

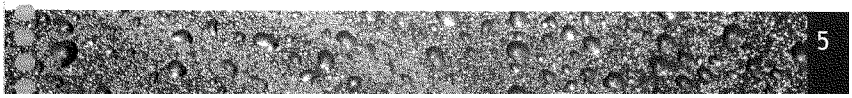
6. **Change "Levee Certification" to "Compliance Determination"** to better articulate the intent that "certification" under the National Flood Insurance Program (NFIP) requirements does not constitute a safety guarantee or warranty. The purpose of this change is to more clearly communicate residual risks of living and working in leveed areas.
7. **Subject Levee Certifications (Compliance Determinations) under FEMA's National Flood Insurance Program to Peer Review** in order to increase confidence in technical determinations of compliance.
8. **Swiftly Address Growing Concerns Regarding Liability for Damages Resulting from Levee Failures** through exploration of a range of measures aimed at reducing the potential liability of engineering firms and/or government agencies that perform engineering services for levee systems (e.g. inspections, evaluations, design, construction administration, certification, or flood fighting). Congress should address this liability concern as a first priority in order to help ensure state and local interest in developing levee safety programs, and to prevent much needed levee repairs, rehabilitation and certification from coming to a halt.
9. **Develop a Comprehensive National Public Involvement and Education/Awareness Campaign to Communicate Risk and Change Behavior in Leveed Areas** as an essential element of levee safety by improving public understanding of the role of levees, associated risks, and individual responsibilities to empower people to make risk-informed choices.
10. **Provide Comprehensive Technical Materials and Direct Technical Assistance** crucial to the successful implementation of consistent national standards to states, local communities and owner/operators.
11. **Develop a National Levee Safety Training Program** including a combination of courses, materials, curricula, conferences, and direct assistance resulting in an increase in the level of expertise and knowledge in all aspects of levee safety. This would include the development of curricula and certification requirements for *Certified Levee Professional* programs.
12. **Develop and Implement Measures to More Closely Harmonize Levee Safety Activities with Environmental Protection Requirements** to ensure that critical levee operations and maintenance is not delayed and that, where possible without compromising human safety, environmentally-friendly practices and techniques are developed and used.
13. **Conduct a Research and Development Program** that will continually advance state-of-the-art technologies and practices for levee safety and conducting critical operations and maintenance activities in as cost-effective and environmentally friendly manner as possible.

Building and Sustaining Strong Levee Safety Programs in All States

14. **Design and Delegate Program Responsibilities to States** to assist state and local governments in developing effective levee safety programs focused on continual and periodic inspections, emergency evacuation, mitigation, public involvement and risk communication/awareness, etc.
15. **Establish a Levee Safety Grant Program** to assist states and local communities in developing and maintaining the institutional capacity, necessary expertise, and program framework to quickly initiate and maintain levee safety program activities and requirements (cost shared).
16. **Establish the National Levee Rehabilitation, Improvement, and Flood Mitigation Fund** to aid in the rehabilitation, improvement or removal of aging or deficient national levee infrastructure. Investment (cost-shared) is recommended to be applied to the combination of activities, both structural and non-structural, that would maximize overall risk reduction and initially be focused in areas with the greatest risk to human safety.

Aligning Existing Federal Programs (Incentives and Disincentives)

17. **Explore Potential Incentives and Disincentives** for good levee behavior through alignment of existing federal programs.



18. **Mandate Purchase of Risk-Based Flood Insurance in Leveed Areas** to reduce economic flood damages and increase understanding of communities and individuals that levees do not eliminate risk from flooding.
19. **Augment FEMA's Mapping Program** to improve risk identification and communication in leveed areas and consolidate critical information about flood risk.
20. **Align FEMA's Community Rating System (CRS) to Reward Development of State Levee Safety Programs** by providing further incentives to communities to exceed minimum program requirements and benefit from lower risk-based flood insurance rates to policy holders who live in leveed areas.

The Committee recommends phased strategic implementation as follows:

- **Phase I:** Immediately implement critical Congressional and federal agency actions including legislation establishing a *National Levee Safety Program*, completion of an inventory and initial inspection of all levees, establish a *Coordinating Council on Communications for Levees*, requiring mandatory risk-based flood insurance purchase in leveed areas, and addressing barriers associated with levee liability.
- **Phase II:** A five to seven year period that overlaps Phase I that incentivizes the development of state levee safety programs through the deployment of a *National Levee Safety Code*, training, research and development, technical assistance and materials, start-up grants for states, and funds for rehabilitation and mitigation.
- **Phase III:** Transition to a steady state future where state and local levee safety activities are sustained through incentives, and encouraged through disincentives such as withholding funds from existing programs. Levee safety decisions will be guided by the completion of *Tolerable Risk Guidelines*.

A *National Levee Safety Program* is a wise investment that moves the country away from a reactive disaster assistance environment to a proactive safety-oriented culture where the general public and governments are informed and able to participate in shared responsibilities of risk management and where levees are reliable. In the post-Katrina environment we have a clear and well-justified call to action. Levee safety deserves a priority focus within national infrastructure needs as levees protect much of the other infrastructure—such as roads, bridges, schools, and water and sewer treatment plants—from frequent flooding.

The Committee is encouraged by the question asked by Congress in the Levee Safety Act and the validation provided by the Committee's external review team. We view the report as a beginning, not an end, to addressing the issue of levee safety and eagerly anticipate the continued dialogue and action regarding the recommendations in the report. In the spirit of a good beginning, the Committee will seek additional stakeholder and agency input through a series of national and regional listening sessions that were beyond the accelerated pace of the report, but are important as one of the next steps in realizing a *National Levee Safety Program*.

Goals for the *National Levee Safety Program* Title IX, National Levee Safety Act

(1) Ensuring the protection of human life and property by levees through the development of technologically, economically, socially, and environmentally feasible programs and procedures for hazard reduction and mitigation relating to levees.

(2) Encouraging use of the best available engineering policies and procedures for levee site investigation, design, construction, operation and maintenance, and emergency preparedness.

(3) Encouraging the establishment and implementation of an effective national levee safety program that may be delegated to qualified states for implementation, including identification of incentives and disincentives for state levee safety programs.

(4) Ensuring that levees are operated and maintained in accordance with appropriate and protective standards by conducting an inventory and inspection of levees.

(5) Developing and supporting public education and awareness projects to increase public acceptance and support of state and national levee safety programs.

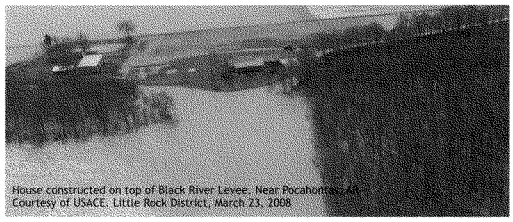
(6) Building public awareness of the residual risks associated with living in leveed areas.

(7) Developing technical assistance materials for state and national levee safety programs.

(8) Developing methods to provide technical assistance relating to levee safety to non-federal entities.

(9) Developing technical assistance materials, seminars, and guidelines relating to the physical integrity of levees in the United States.

Vision and Approach



House constructed on top of Black River Levee, Near Pocahontas, AR
Courtesy of USACE, Little Rock District, March 23, 2008

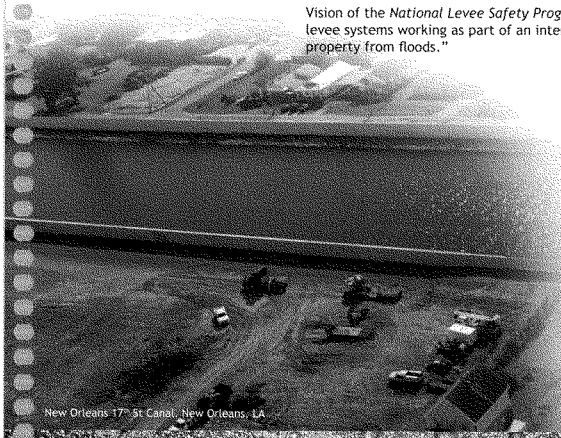
Mission Statement

(from Title IX of the Water Resources Development Act of 2007)

"The committee shall develop recommendations for a *National Levee Safety Program*, including a strategic plan for implementation of the program."

Vision for Levee Safety in the United States

Vision of the *National Levee Safety Program*—"An involved public and reliable levee systems working as part of an integrated approach to protect people and property from floods."



New Orleans 17th St Canal, New Orleans, LA

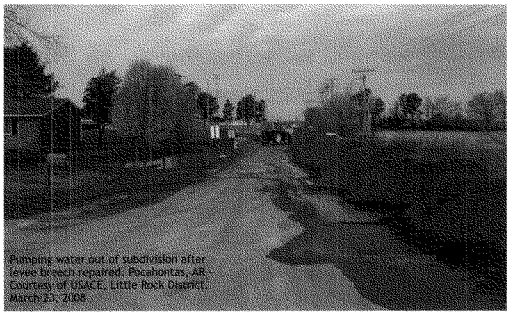
Focus of this report and its relationship with the broader issue of Flood Risk Management

In developing a strategic plan and recommendations for a *National Levee Safety Program (NLSP)*, the Committee focused on those foundational elements defined in the Levee Safety Act, that support the vision statement, while the broader issues of flood risk management were distinguished from those issues specific to Levee Safety. Main areas of focus were:

- Employing sound technical practices in levee design, construction, operation, inspection, assessment, security, and maintenance
- Ensuring effective public education and awareness of risks involving levees

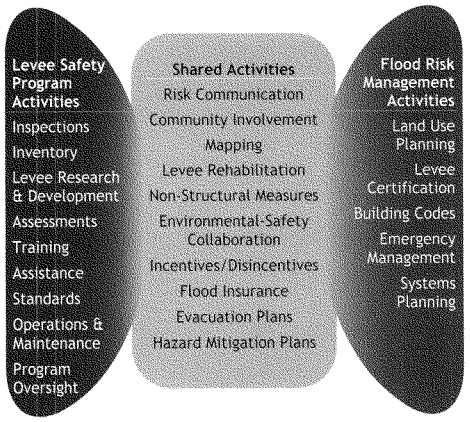
- Establishing and maintaining competent levee safety programs and procedures that emphasize the protection of human life
- Implementing feasible governance solutions and incentives that encourage and sustain effective levee safety programs at all levels of government, including basic hazard reduction and mitigation measures related to levees

In order to achieve our stated purposes, the above four aspects of levee safety were the Committee's primary focus. The Committee explored other goals and connectivity with related flood risk management elements such as insurance, floodplain management, and evacuation, and included recommendations on these issues where they were considered directly related to the scope set out in the Levee Safety Act. Other flood risk management elements, such as land use development and building codes, were less directly related to levee safety and thus deemed outside of the scope of this report. We have endeavored to create a set of recommendations that, as a package, will not only result in a meaningful, comprehensive levee safety program, but place levees in their appropriate place in an overall flood risk management context. After all, in some cases, the safest levee is no levee at all.

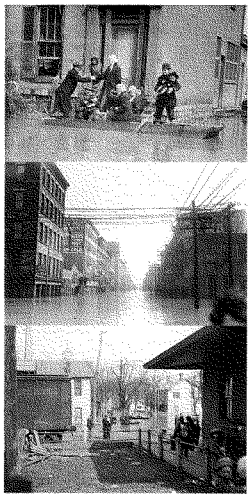


Pumping water out of subdivision after levee breech repaired. Pocahontas, AR. Courtesy of USACE, Little Rock District. March 23, 2008

Figure 1: Intersection of Levee Safety And Flood Risk Management Activities with the NCLS Report on a *National Levee Safety Program*



Background, Context, and Urgency



The Evolution of Levee Policy in the United States

A Long History

The history of levees in the United States predates even colonization by Europeans. Early Native Americans constructed raised earthen structures along the Ohio and Mississippi Rivers as safe havens from flooding. During the intervening hundreds of years, techniques became more sophisticated, but the general policy of elevating above the flood was still considered effective, if not often employed. From the early days of the country until the 1930s, levee construction around the United States was both sporadic and unsophisticated, and without the benefit of engineering or science practices. Crudely constructed embankments were used to channelize rivers to permit upstream mining (California), protect agriculture and developed areas from riverine flooding (nationwide), transport water for irrigation (West), and provide inland protection along large natural lakes (Florida). These "levees," as we now call them, were prone to breaching from internal defects and overtopping, were essentially unregulated and unmanaged, and often lacked good operation and maintenance practices.

An Early Renaissance Period

The devastation and significant loss of life caused by the great floods on the Mississippi and Ohio Rivers during the late 1920s and 1930s spurred a Congressional response, ultimately resulting in the Flood Control Acts of 1928 and 1936. These Acts established federal interests in the design and construction of flood control structures such as levees and dams that were to be executed by the Corps at full federal expense. What followed this landmark legislation was the design and construction of thousands of miles of robust levee systems, many providing protection from the "Standard Project Flood"—the largest reasonable flood that could be expected in the basin. Although these levees do not have a level of flood frequency assigned to them, many provided protection from unusual to extreme flooding in the range of 0.2%-annual chance (500-year flood) to 0.1%-annual chance (1,000-year flood). This trend in robust levee construction

Figure 2: 1928 Flood Contol Act

1928 Flood Control Act

- Established Federal Interest in Flood Control Structures
- Authorized Flood Control Projects on Mississippi River Drainage Basin and Sacramento River
- Other Flood Control Acts and projects to follow

continued for almost four decades until new national policies began unintentionally encouraging the construction of less protective levee systems.

Unintended Consequences

In 1968 Congress enacted the National Flood Insurance Program (NFIP). One of the primary purposes of the NFIP was to address the inability of the public to secure privately backed insurance for economic losses from flooding. Administered by the Department of Homeland Security, the NFIP designated the 1%-annual-chance event (100-year flood) as a special flood hazard area in which those holding federally related mortgages would be required to purchase flood insurance. Never intended to be a safety standard, the 1%-annual-chance event soon became a target design level for many communities as it allowed unrestricted development to continue and provided relief from mandatory flood insurance purchase for homeowners behind levees accredited to meet the 1%-annual-chance event within a relatively economical initial construction cost.

Meanwhile, an interesting parallel was occurring in regards to dams in the United States resulting in a National Dam Safety Program. The destruction and, more significantly, the loss of life as a result of the catastrophic failures of Teton Dam (Idaho, 1976) and Kelly Barnes Dam (Georgia, 1977), resulted in legislation and executive orders for a new national policy initiating the development of the National Dam Safety Program and establishment of the National Dam Safety Review Board, administered and led by

Excerpt from "Risk Analysis and Uncertainty in Flood Damage Reduction Studies"

(2000) National Research Council

Why the 100-Year Flood?

The concept of the 100-year flood is central to the National Flood Insurance Program and to many of the Corps's flood damage reduction activities. Hundreds of government officials administer or work within these flood mitigation and damage reduction programs, to which millions of taxpayer dollars have been devoted. Many consultants are employed in mapping the nation's 100-year floodplains and scores of university professors analyze the hydrological, statistical and public policy implications of the 100-year flood. Given the economic and social importance of these efforts, one would assume that the selection of the 100-year flood as a defining hydrological event is based on sound scientific and statistical foundations.

Gilbert White, professor emeritus of geography at the University of Colorado, is widely recognized as a leader in promoting sound US flood management strategies. In 1993, Professor White provided an oral interview to Martin Reuss, the Corps of Engineers senior historian. In that interview, White's response to a question about the selection of the 100-year flood sheds some light on the rational for its selection. Given his knowledge of and experience in the US floodplain management, Gilbert White's account may be among the better explanations for the prominence of the 100-year flood in US floodplain management and policy.

In response to the question "How do you take into account to so-called catastrophic flood--the once in 100-years flood?", White stated:

"There was a very interesting development of the notion that there could be a flood of sufficiently low frequency that no effort should be made to cope with it. The Federal Insurance Administration picked one percent [or] a recurrence interval of a hundred years. And some of us were involved in that because we recognized that they initially had to have some figure to use. The one-percent flood was chosen. I think Jim Goddard and TVA colleagues would be considered parties to the crime. With the lack of any other figure, the concept taken from TVA's "intermediate regional flood" seemed a moderately reasonable figure. We generally use the term "catastrophic flood" for events of much lesser frequency.

This goes back to my earlier criticism of the FIA and it's determination to cover the country promptly. In covering the country promptly they established one criterion--the 100-year flood. I think it would have been much more satisfactory if they had not tried to impose a single criterion but had recognized that there could be different criteria for different situations. This could have been practicable administratively even though a federal administrator would say it's far easier, cleaner, to have a single criterion that blankets the country as a whole.

What's the effect of a having criterion of 100 if in doing so a local community is encouraged to regulate any development up to that line and then to say we don't care what happens above that line? We know that in a community like Rapid City the floods were of a lesser frequency than 100 years, and a community ought to be aware of this possibility.

A simplified national policy tended to discourage communities from looking at the flood problem in a community-wide context, considering the whole range of possible floods that would occur.

So I would say that any community ought to be sensitive to the possibility of there being a 500-year flood, or a 1,000-year flood. It should try to consider what it would do in that circumstance, and wherein it could organize its development so that if and when that great event does occur it will have the minimum kind of dislocation."

Gilbert White referred to several risk-related topics addressed in this report. For example, his comment regarding the value of using different criteria for different situations buttresses the Corps's adoption of risk analysis techniques and the abandonment of the levee freeboard principle. As White pointed out, different geographical areas are subject to different levels of flood risk and uncertainty and thereby require different margins of safety. The committee also agrees with Professor White's comments regarding flood hazard preparedness for floods of *all* magnitudes. This committee recommends that rather than focusing on a single event--the 100-year flood--that the Corps examine the risks of flooding from the full range of possible floods.

FEMA. Today, 49 of 50 states have qualified dam safety programs that provide for public safety through review, regulation, and standards for dams. Unfortunately, there was no correlation between dams and the similar potential that existed for levees.

The 1986 Water Resources Development Act provided new requirements for local cost sharing of flood control projects constructed by the Corps. It also required that lands, easements, rights of way and real estate were to be provided by local sponsors along with an agreement for local sponsors to provide for all operations, maintenance, repair, rehabilitation, and replacement of flood control works. These additional financial burdens on local communities made affordability of new levees and repairs of existing levees an emerging issue and began an unintended shift away from watershed development to individual projects. Combined with the growing and unintended desirability of simply meeting the minimum certification requirements, the affordability concerns resulted in many levee systems over the last 30 years being constructed to provide protection to only the 1%-annual-chance event—a de facto, unintentional, and dangerous adoption of an actuarial standard as a safety standard.

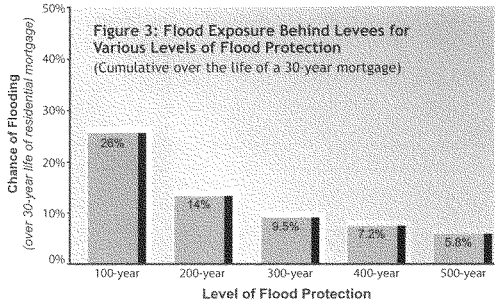
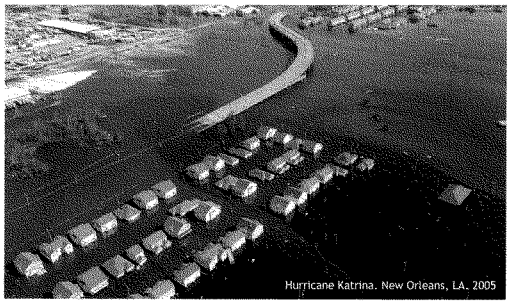


Figure 3: Flood Exposure Behind Levees for Various Levels of Flood Protection
(Cumulative over the life of a 30-year mortgage)

Complacency Regarding Levees

Riverine flooding on the Mississippi River (1993) and in California (1986 and 1997) spurred additional federal interest in flooding and the role of levees in flood damage reduction and floodplain management when substantial economic damage resulted. Even so, greater catastrophe was only narrowly avoided as most major levee systems protecting heavily urbanized areas held and there was little loss of life. Similarly, several hurricanes along the Florida peninsula (Andrew in 1992, Opal in 1995, Charley, Ivan, Frances, and Jeanne in 2004, and Dennis and Wilma in 2005) and eastern seaboard (Hugo, 1989) resulted in substantial flooding and economic damage but little loss of life. A number of comprehensive and significant reports followed these events, including the "Sharing the Challenge" (Galloway) Report and the Interagency Levee Policy Committee Report (FEMA). Although these reports had well-justified and comprehensive recommendations regarding levees,



Hurricane Katrina. New Orleans, LA. 2005

"A flood catastrophe represents a national security issue. Floods especially attack the poor, the disabled and the elderly. They affect our people, our economy, and our environment. How to deal with them has been the subject of many studies over the years and we keep coming back to the same recommendations.

In the future we need to take an approach to flood damage reduction that brings all of the players to the table in a collaborative approach that shares responsibilities and funding. The federal government, acting alone, may not be able to afford new projects but, where it already has been committed to provide protection and where it now provides protection, it has an obligation to provide an appropriate level of protection and to carry out the maintenance necessary to insure system integrity.

Given the tragedies we have seen over the last weeks, the governments and the public must be prepared to take action to "do it right"—to take recommendations out of the too hard box and move ahead."

Statement of Gerald E. Galloway, PE, PhD
Glenn L. Martin Institute Professor of Engineering
University of Maryland, College Park, MD 20742
to the Committee on Transportation and Infrastructure
Subcommittee on Water Resources and the Environment
US House of Representatives
October 27, 2005

at that time there was little appetite for creating a levee safety program on a national scale. To date few of the recommended actions have been implemented.

Part of our complacency is related to a misunderstanding of flood risk by decision makers and the general public. Some believe that a 1%-annual-chance (i.e., 100-year) level of flood protection corresponds to a high level of flood protection, perhaps meaning that a flood would not occur for another 100 years. In actuality, a 100-year level of flood protection means that there is a 26% chance of flooding during the 30-year life of a typical mortgage. As shown in the figure on the previous page, even a 200-year level of flood protection corresponds to a 14% chance of flooding over a 30-year period. These are actually pretty high levels of risk considering that playing one round of Russian Roulette is comparable to a 17% chance of disaster. It is not until we reach a 500-year level of flood protection that the chance of flooding starts getting down to a relatively small chance (i.e., approximately 6% over a 30-year period).

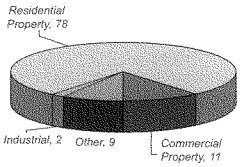
A Wakeup Call

Hurricanes Katrina and Rita (2005) in the Gulf Coast, changed everything. With economic damages estimated to be more than $200 billion dollars and a loss of life of more than 1,800 persons, the role of levees in providing for public safety and flood risk management was again prominently thrust back into the national spotlight. In the midst of an unprecedented federal investment in levee infrastructure and flood insurance in the greater New Orleans area, Congress passed the Water Resources Development Act of 2007—a key element of which was Title IX,

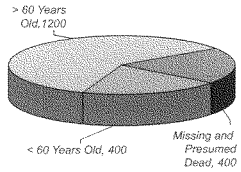
Specific Findings:

Figure 4: Consequences of Failure from Hurricane Katrina*

▶ Economic Losses by Percent



▶ New Orleans Loss of Life By Age



Intergovernmental Performance Evaluation Team Report, 2007

also known as the National Levee Safety Act. The Act seeks to develop basic information on federal levees (database, inventory, inspection, and assessments of levees). It also called for this National Committee on Levee Safety. Later in 2008, the flooding and breaching of levees in the Midwest reinforced the sense of urgency. It is the task of this Committee and the purpose of this report to provide recommendations to Congress, including a strategic plan for implementation, for a *National Levee Safety Program*. These tasks require that the current state of levees in the United States—our "Levee Truths"—be fully understood.

**Since publication of above graph the Louisiana Department of Health and Hospitals placed the final number of confirmed fatalities at 1,810 in all states due to Hurricane Katrina.*

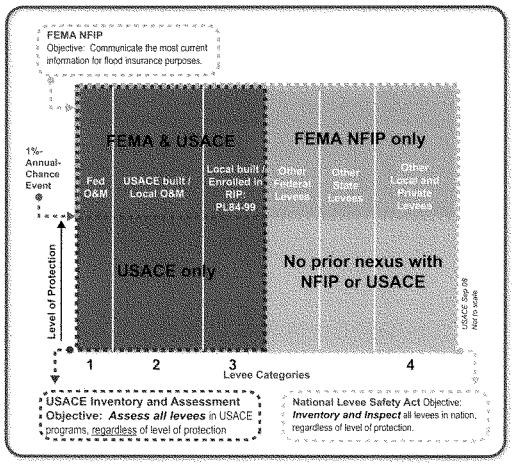
The Current State of Levees and Public Safety

An understanding of the current state of levee safety in the United States is necessary if we are to confront the years of neglect and understand the genesis of a new *National Levee Safety Program*.

Levees are now abundant and integral to economic development in many communities in the United States:

- An inventory of the levees under the Corps authorities alone indicates that there are over 2,000 federal levee systems, totaling over 14,000 miles of infrastructure.
- Although the true extent of the national inventory is yet unknown, California has found that the levees designed and constructed by the Corps may represent only 15% of the levees in the state—by implication as many as 100,000 miles or more of levees may exist in the nation.
- Extrapolating from the federal inventory, it is estimated that tens of millions of people live and work in leveed areas.
- In addition to protecting people and residential property, levees protect much of the civil infrastructure that permits society to function free from frequent flooding, including: roads, railways, bridges, utility systems, water treatment plants, port facilities, critical public service facilities such as fire and police departments and hospitals, sewage treatment plants, refineries and fuel depots, and substantial industry and manufacturing facilities. Levees protect critical infrastructure, facilitating and yielding an economic multiplier effect for communities.

Figure 5: Universe of Levees



Although proven beneficial in investment and function, levees have inadvertently increased flood risks in the country by attracting development to the floodplain:

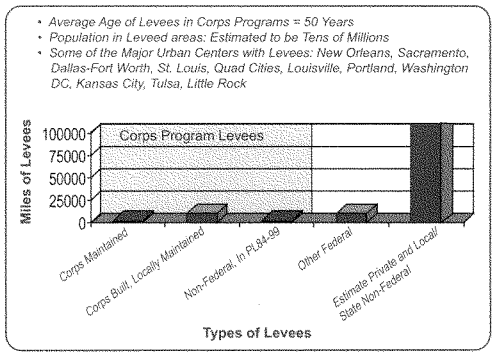
- On average, Corps levee systems currently provide a 6:1 return ratio on flood damages prevented compared to initial costs. Larger, more robust levee systems such as the Mississippi River and Tributaries system provide a 24:1 return ratio on investment. Well-designed, constructed, operated, and maintained levees continue to be economically well-justified federal and non-federal investments.
- Levees can also attract development to the floodplain that would not otherwise be there. The continual growth of population and economic investment behind levees is now considered the dominant factor in the national flood risk equation (Dr. Pilke, University of Colorado, Wye River Summit, December 2006), outpacing the effects of increased chance of flood occurrence and the degradation of levees. In the 2006 Census, the two fastest growing counties in the United States were St. Bernard Parish and Orleans Parish, both located within the devastated areas of New Orleans, Louisiana.

- The trend for people and communities to locate near rivers and coastal areas is undeniable and will not realistically change in the near future. The link between this natural co-location and the economic welfare of the nation, as witnessed by the effects of Hurricane Katrina on the petro-chemical and fishery industries, is obvious. However, as a nation, we have not wisely developed leveed areas in a manner to both realize the benefits of rivers and manage the risks of flooding.

As with all flood control structures, levees only reduce the risk to individuals and structures behind them, they do not eliminate the risk:

- For too long, the partnership of local, state, and federal agencies has allowed the communities in leveed areas to believe that levees--by themselves--make the public safe from flooding. As with virtually any human activity, risks are never eliminated as some residual chance of catastrophe remains and the likelihood of flooding is greater than may be fully appreciated by the public.
- Levees that are poorly designed, constructed, operated or maintained can actually increase risks.
- National discussions have centered on the level of protection offered by levees, and often the risk of living in leveed areas is not articulated. Because of this dialogue on protection, little focus is placed on the measures that the public can take to mitigate their risks.
- Chance and likelihood of flooding remain misunderstood concepts by many. The 1%-annual-chance flood event (i.e., 100-year event) is believed by many to be a highly infrequent event; but in reality, has at least a 26% chance of occurring over the life of a 30-year mortgage for a residence behind a levee. Many Americans located behind 100-year levees do not hesitate to purchase fire insurance for their homes, but resist the purchase of flood insurance even though the chance of flooding is many times more likely than fire.

Figure 6: United States Levees at a Glance



The number, location, and condition of all the levees in the United States is currently unknown:

- Knowing the location, condition, owners, operators, and areas protected by levees is fundamental and absolutely necessary to help assure public safety--in fact an inventory of levees is the first step in realizing a national levee safety program. The utility of an accurate inventory also aligns with the concepts of asset management and portfolio management common to good industry practice. Prioritization of activities associated with levees of the highest hazard potential require an accurate inventory of assets.
- By latest count, the approximately 2,000 levee systems just within the Corps program authority account for roughly 14,000 miles of levee infrastructure--this is roughly the same quantity of infrastructure within the entire 84,000+ dams in the National (federal, state, local, private) Inventory of Dams (NID). Therefore, levees by their substantially larger social footprint demand attention exceeding that of dams.
- According to early estimates, non-federal levees may account for an additional 100,000 miles

or more of levees nation-wide and other federal agencies like the US Bureau of Reclamation (USBR) are responsible for another 8,000 miles of levee-like structures along canals. Ultimately, levees constitute much more infrastructure that is more integral to communities than do dam infrastructure; but, surprisingly lack the national awareness and safety program focus that benefit dam safety.

Effective flood risk management involves employment of a plethora of strategies, techniques and tools, but in too many instances, levees have been the primary or only tool:

- Evidence suggests that land development controls, building codes, emergency evacuation procedures, flood warning systems, robust levee safety programs, non-structural measures, public education and awareness programs, and flood insurance are all highly effective, but vastly underused tools in flood risk management in the United States.
- Although it is technologically feasible to adequately manage risk through structural means, it is often prohibitively expensive to do so. Consequently, the examples of levees providing high levels of protection—Mississippi River and Tributaries or the Netherlands Coastal Defense—are few.
- The misperception that levees are the single solution to our risk management needs has hindered our ability to achieve a more comprehensive vision of shared flood risk management from being realized and properly embraced by local, regional, and state governments and the individuals that live behind levees.
- Levee systems commonly share the same space as water supply conveyance and critical ecosystems and habitat. As a result, proper management of levee systems must interact and coordinate with these two other important interests. In many cases, this will either place restrictions or create opportunities in maintaining or improving levee systems.
- In general, flood risks cannot be effectively reduced without a significant understanding and employment of non-structural risk reduction techniques.

There is currently no national policy relating to the safety of levees:

- Federal and state agencies have varying policies and criteria concerning many aspects of levee design, construction, operation, and maintenance; but, there are no national policies, standards, or best practices that are comprehensive to the issues of levee safety and that can be adopted broadly by governments at all levels.
- Consequently, the level of protection and robustness of design and construction vary considerably across the country, helping to create a wide-ranging profile of risk exposure, risk understanding, risk levels, and consequently public safety.
- The lack of national standards for levees creates a scenario where licensed professional engineers, levee owners, and governments cannot rely on an accepted standard of care when performing

Levee "Truths"

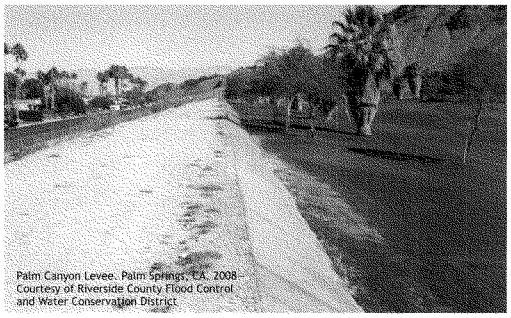
- Levees are now abundant in many communities in the United States;
- Levees have often inadvertently increased flood risks in the country by attracting development in the floodplain;
- Levees only reduce the risk -they do not eliminate the risk;
- The number and location of all the levees in the United States is currently unknown;
- Levees have too often been the primary tool in flood risk management;
- There is currently no national policy relating to the safety of levees;
- Government officials and the general public often have only a limited understanding of levees and the risks associated with them;
- Many levees were constructed without the benefit of modern engineering and provide only limited protection to communities;
- Many levees originally constructed to protect agricultural fields now protect large urban communities;
- Many urban areas protected by levees, particularly those in deep floodplains, place people who live behind them at an unacceptably high risk. Failure of such levees can result in high loss of life, property damage, and economic losses; and
- The reliability of many levees is commonly not known.

Photo: Chino Canyon Levee, Palm Springs, CA. 2008—Courtesy of Riverside County Flood Control and Water Conservation District

critical services in design, construction, and certification of levees. The legal environment—as evidenced in the post-Katrina lawsuits, appears to be making such work increasingly riskier business propositions in comparison to the fees generated. Together, these experiences are effectively reducing the private sector's interest and ability to provide these services.

Many government officials and the general public have only a limited understanding of levees and the risks associated with them:

- Even competent agencies with large levee inventories such as the Corps or the California Department of Water Resources recognize massive gaps in their knowledge regarding federal levees within their authorities. Such data gaps include subsurface conditions, hydrologic conditions, performance history, design and construction records, inspection data, potential failure modes, modifications, ownership, and the like. Without this information, there is great uncertainty in how reliably the levees will perform in the infrequent and dangerous events during which they are tested. With non-federal levees, anecdotal information suggests that the data gaps are larger and uncertainty is even more critical.
- Uncertainty is a major component of understanding risks—where uncertainty is large, risks are essentially unknown. Without this knowledge, risk awareness is low and risk communication and management is difficult, if not impossible.



Palm Canyon Levee. Palm Springs, CA. 2008—Courtesy of Riverside County Flood Control and Water Conservation District

- Good decision making relies on quality information. Therefore, major investments in the study and rehabilitation of levees in the United States must be justified by more and better quality information than currently exists.
- Better information on levees will enable more effective public education and awareness of risks. With this information, FEMA's concept of communicating "early, often, and continually" needs to be more thoroughly applied to communicating the risks associated with living in leveed areas.

Many levees were originally constructed without the benefit of modern engineering techniques and now provide only limited protection to communities:

- The average age of levees within federal levee safety programs is approximately 50 years, and the age of many non-federal levees can be much older—100 years or more. Levee infrastructure has the best practice (engineering codes) physically embedded in them at the time of construction, and in a sense, they become museums of the best practices of the past. In many instances, advancements in the state of the art for engineering and science have been considerable, leaving many levees with features that have serious design, construction, and operational inadequacies. The costs to repair these levees to the current state of the practice will be enormous.
- Modern engineering practices, such as the use of probabilistic hydrologic modeling, geophysical techniques, potential failure mode analysis, and risk and uncertainty assessments are effective in placing the past practices in context. Where these new techniques are applied to older levees, the results clearly indicate that better safety standards and practices are needed.

Many levees originally constructed to protect agricultural fields now protect large urban communities and the infrastructure they depend on:

- Risk is the product of the chance of the flood event, the likelihood that levees will perform as intended, and the consequences of poor performance. Development in leveed areas—residential, industrial, critical facilities, and civil infrastructure—has resulted in "risk creep"—the steady increase in risk levels over time.
- Federal policies limit the federal investment in levees to the amount that can be economically justified based on existing conditions. Consequently, even levees designed to the full capacity of federal principles and guidelines can soon become inadequate if significant development continues to occur.
- Many levees were planned, designed, and constructed with a specific use and purpose in mind. Other levees lack good engineering practice from inception. In general, protection of higher consequence areas requires more robust engineering standards and levels of protection. Therefore, changes to land development over time and advancements in engineering practices can change levels of public safety needed and required.

Many urban areas protected by levees, particularly those in deep floodplains, have an unacceptably low level of flood protection and an unacceptably high risk. Failure of such levees can result in high loss of life, property damage, and economic losses.

The reliability of many levees is commonly not known:

- Floods do not respect the political and ownership boundaries by which many levees are managed. Floods exploit system weaknesses across the entire line of protection or system, which may include multiple owners and even infrastructure such as railroad and highway embankments that were not designed for the purpose of flood protection.
- Systems approaches to levee safety demand greater collaboration between levee segment owners and communities.

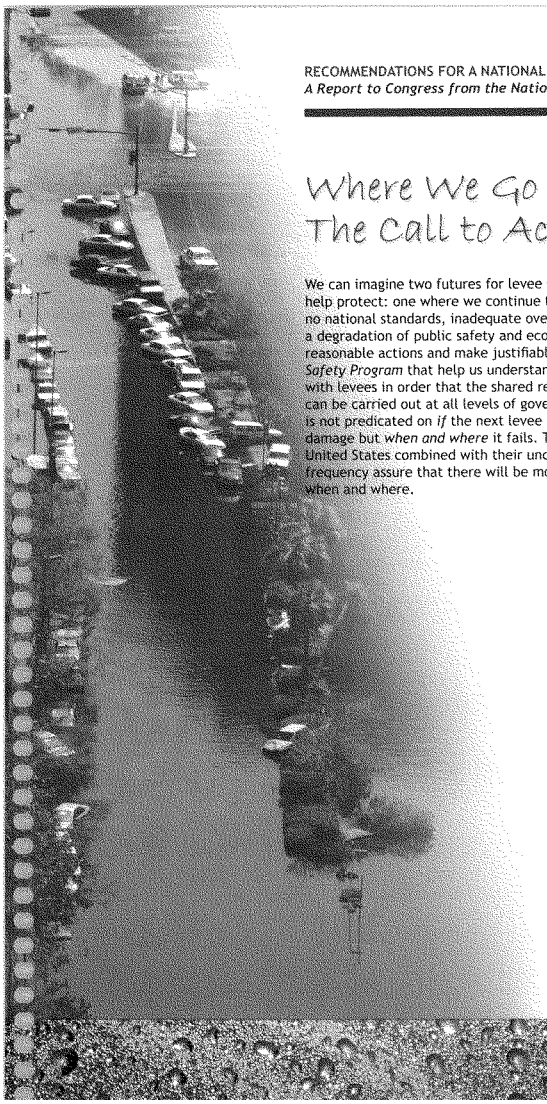
Safety programs can and should provide improved public safety through the close scrutiny of levee conditions and risks posed, and the communication of those findings to decision makers and affected populations:

- Based on a recent survey of states by the Association of State Dam Safety Officials, only 23 of 50 states had some limited authorities in regulating and overseeing levee safety. None of the states had comprehensive safety programs geared to all of the major components recommended in this report.
- A similar review of federal agencies with responsibilities for levee safety indicates either newly formed programs (US Army Corps of Engineers—2007) or a general lack of rigorous oversight exists (US Bureau of Reclamation, Natural Resource Conservation Service, International Boundary and Water Commission).

Figure 7: Survey of State Levee Safety Activities

Association of State Dam Safety Officials, February 8, 2006

- Does your agency have regulatory authority or responsibility over levees?
  - No: 24 states
  - Yes: 23 states
- If you do not, which agency in your state (if any) does?
  - Most common answer: unknown
  - Misperception that the Corps was responsible
- Describe what types of programs your state has for managing levee safety.
  - Highly varied responses: not regulated to regulated "like dams"
- From your general knowledge, are there levees in your state that cause concern from a safety standpoint?
  - No: 12 states
  - Yes: 25 states
  - Maybe: 10 states



Where We Go From Here—The Call to Action

We can imagine two futures for levee systems and the communities that they help protect: one where we continue the status quo of an uncertain inventory, no national standards, inadequate oversight, lack of risk management, and a degradation of public safety and economic security or; one where we take reasonable actions and make justifiable investments in a *National Levee Safety Program* that help us understand and communicate the risks associated with levees in order that the shared responsibilities of risk reduction activities can be carried out at all levels of government. As a nation, our **Call to Action** is not predicated on *if* the next levee system fails and causes catastrophic damage but *when and where* it fails. The vast numbers of levee systems in the United States combined with their uncertain condition and an increasing flood frequency assure that there will be more such events—it is just a matter of when and where.

Understanding the Future Through Risk Concepts

The sense of urgency is most compelling when viewed through the lens of risk:

Components of Risk

Our understanding of future risks associated with levees comes from how the three major components of risk combine: (1) the likelihood of experiencing floods, (2) the likelihood that levee infrastructure and other flood protection measures will perform as intended during these events, and (3) the consequences of poor performance or failure for the protected people, property, and the environment.

Likelihood of Experiencing Floods

Even considering the historical records of the last 100 years or so, engineers and scientists have limited abilities to predict analytically—or

accurately extrapolate--the likelihood and flood stage of storms in the future. What we can do with confidence is to show that continued development in the floodplain and within watersheds increases runoff and decreases flood carrying capacity of waterways, thus yielding more frequent and higher flood stages. We can also now conclude that effects of climate change are likely to increase the intensity of coastal and riverine storm events, and thus increase the chance of higher flood stages. In general, we can expect more frequent and higher flood stages in the future to increase the overall risk profile behind levees.

The Likelihood that Levee Infrastructure Will Perform Satisfactorily

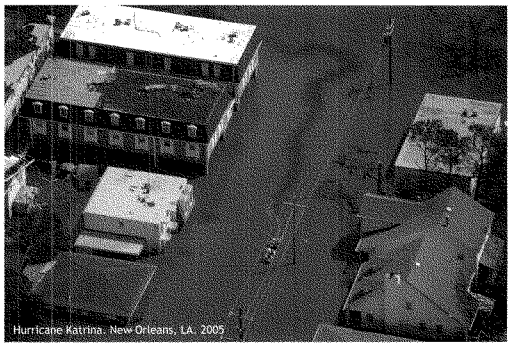
Another key element of risk with levees is how well the levee will hold back the anticipated higher and more frequent flood stages. In short, many levees were not built with modern engineering and tend to become less reliable with time. Imagine a 1950s vintage automobile, parked in a driveway since it came off the assembly line, with very limited operation (driving, fueling with leaded gas) and maintenance (oil changes, brake pads) during the intervening years, no improvements related to product recalls or advancements in design (anti-lock brakes, air bags, seat belts, safety glass), no consideration for how the driving environment has changed (speed limits, road surfaces, fuel efficiency) and individual components that have undergone the natural processes of degradation and normal wear-and-tear that come with exposure to the environment. This scenario is the reality within which levees exist--structures that, by and large, lack good maintenance, updates, repairs, and advancements with the state of the art, but that must protect communities from flooding on a moment's notice. So, the trend with the levee performance element of risk is toward lower reliability over time, and thus greater risks.

Consequences of Failure

This element of the risk profile is often both the most dynamic and the dominant factor in the escalation of risk for the protected public. Population growth, and the economic development that comes with it, is not only the fastest growing element of risk but the one that generally has had the least attention and management by governments. In cases where levees are certified for NFIP purposes, development is perversely incentivized through reduced or no requirement for flood insurance and by the potential for governments to build their tax base through development that would not otherwise have been acceptable. Similar to the likelihood of floods and the performance of levees, the growth of consequences is increasing risk over time.

Tolerable Risk Guidelines

The process that puts all of these components of risk in a societal context and in turn enables better decision making is the use of published tolerable risk guidelines. Although not yet common in levee safety, tolerable risk guidelines have advanced safety engineering and public safety in a number of fields including the airline industry, dam safety programs, transportation industry, and the environmental, food service and medical industries.



Hurricane Katrina. New Orleans, LA. 2005

What if We Don't Take This Opportunity to Act?

The other view of the future in regard to levee systems and communities is a continuation of the status quo—no national policies or standards, a lack of oversight and understanding, a lack of education and awareness, and escalating flood losses behind levees. If we are to understand our **Call to Action**, we must try to imagine the ramifications of this future possibility:

- Envision being surprised by a breaching of a levee system in a major urban area in the United States such as Sacramento, California; St. Louis, Missouri; Dallas, Texas; New Orleans, Louisiana; Hartford, Connecticut; Portland, Oregon; Washington, DC; or Kansas City, Kansas and Missouri. What would be the local and regional effects? What would be the national impacts? International? Where would the people go? How many lives would be lost? How many families would be impacted?
- Now envision these same levee systems as part of the larger systems in society—government, business, the environment, and the social fabric of communities. During, and long after these catastrophes, governments at all levels must operate in a crisis and emergency mode forgoing well-made plans in the process. Businesses—commerce, transportation, insurance, banking, manufacturing, energy—all feel the ripple effect and begin an absorption and redistribution of costs. Environmental effects of contaminated flood waters, destroyed habitat, and second and third order effects of recovery operations increase the stress on already taxed natural systems. And the epicenter of impact—the communities and individuals themselves—struggle to reshape, rebuild, and envision a future for individuals and families at just the time when long-term futures are least well-defined and have been most altered. In flooded areas, home values plummet, the single greatest source of personal wealth. One need look no further than the greater New Orleans today to see our future clearly and starkly.

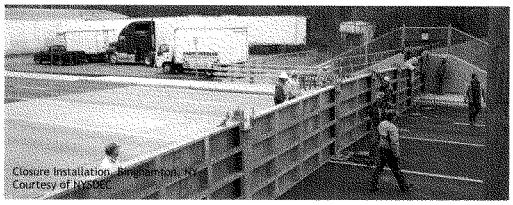
The national response to this all-too-real future will be "Not again! .... How can we be in this position again?" We have the social justification to keep from repeating such disasters—public safety—a key shared responsibility of individuals and all levels of government. We have the economic justifications in terms of flood damages prevented, healthy, striving communities, and the economic benefits/multipliers that come with fixing problems. We have the direction from our national government, and we have the support of our international allies that have already crossed this bridge in developing national safety programs.

Building a different, better future and preventing additional catastrophe and loss is our call to action. A *National Levee Safety Program* is not only a much better offer to the public than the status quo; it is what is expected of us. We must interrupt our patterns of high risk behavior, because it is not only good for "our neighbors" to engage, it is in our self interests to engage. Yes, flood risks are just one source of risks that we as a nation must grapple with; however, it is one for which there is a compelling case for action.

What We Can Do to Secure a Better Future

To have a meaningful chance of slowing and even reducing the levels of risk for communities behind levees it will take a concerted effort to manage all three aspects of the risk equation: likelihood of flooding, levee performance, and consequences of failure. The nation is experiencing a level of flood risk that was not arrived at overnight, but accumulated via a number of practices over the last 100 years or more. It is unreasonable to believe that we can successfully address the causes of our risks in simply a few years—it will take generations of changed behavior and substantial investment. A *National Levee Safety Program* is the first and best step in starting to secure a better future.

A *National Levee Safety Program* begins to address all three elements of risk associated with levees. A comprehensive program of national standards, improved communication, and periodic and continuing safety processes such as an inventory, inspections, and assessments, address the basic data needed to understand and communicate risks. Once this basic information begins to take form, the national program can leverage it to address and prioritize risk reduction activities across all levels of government:



Closure Installation, Binghamton, NY
Courtesy of NYSDEC

- **Immediate and Short-Term Measures:** consistent interim standards for levee design and construction; more rigorous oversight and review of levee infrastructure by government at all levels; increased public awareness and engagement; evacuation plans; risk-based flood insurance; basic risk mitigation measures in leveed areas; and better understanding and decisions in floodplain development. Results from immediate inventory and inspection activities would inform short-term assessments and rehabilitation of national priority levee systems. States need to assume responsibility for nonfederal levees within their jurisdictions.
- **Long-Term Structural Measures:** a national plan for major rehabilitation, repair, improvement, and/or decommissioning of deficient levee systems.
- **Long-Term Non-Structural Measures:** a national plan for how floodplains are managed that properly balances the desire to place communities near water with the need to better manage flood risks and public safety.
- **Comprehensive, Systems-Based Approaches:** new analytical and decision-making tools that utilize risk-informed applications to evaluate structural and non-structural measures in concert across entire basins.

Statistics from economic stimulus initiatives indicate that for every $1 billion in infrastructure investment, we create over 47,000 jobs in the economy. So, identifying and fixing the problems in our levee systems not only is a good return on initial investment but creates a multiplier effect in the overall economy.

The American Society of Civil Engineers (ASCE Infrastructure Scorecard) has estimated that the costs to address our nation's failing infrastructure is over $1.6 trillion and increasing. With recent collapses and failures, infrastructure has a national spotlight. Levees are not only part of this infrastructure but form a critical role as flood protection for other infrastructure including roads, railways, bridges, industries, utilities, and water/sewer treatment plants. For this reason, levees and levee safety programs must be an integral element and priority within the larger infrastructure actions.

Recommendations to Congress

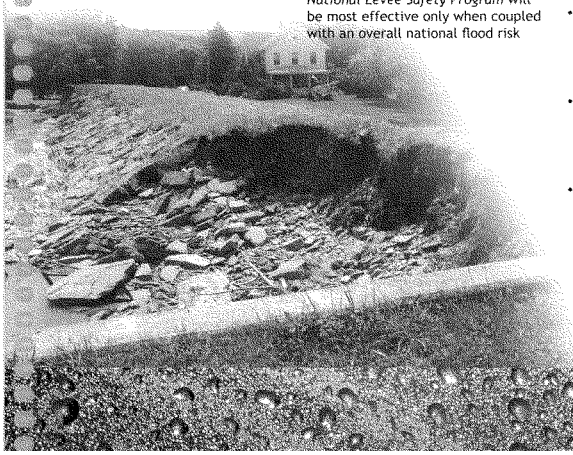
The flood risks that this Nation faces are many and varied. During the past twenty years, the recommendation has been made in a number of nationally-commissioned and peer-reviewed reports for a national strategy to address flood risk management. Even prior to Hurricane Katrina, consistency and collaboration among FEMA and the Corps on flood damage reduction, mitigation, and mapping programs were identified as critical components of a federal flood risk management strategy. Although that effort continues, the loss of life and property due to floods continues to rise and significant deficiencies remain for local and state flood risk management efforts.

While improving levee safety will enhance public safety, the effort will be most effective if it is conducted within the context of a broader national flood risk management program. Levee safety efforts will benefit from a national policy for flood risk management that recognizes the various federal, state, regional, and local responsibilities and functions, provides fiscal support for state and local flood risk management activities, and recognizes state and local governments as the nation's principal flood risk managers.

In presenting this plan, the Committee believes it is important for the reader to understand that while the safety of levees is a significant component of the Nation's approach to flood risk management, it is just that, a component. A *National Levee Safety Program* will be most effective only when coupled with an overall national flood risk management strategy. The Committee recommends that Congress give strong consideration to the development of an overall National Flood Risk Management Strategy, of which the *National Levee Safety Program* would be an integral part.

In addition to the above statement, placing levee safety in an appropriate and useful flood risk management context, the Committee considered the following principles while developing its recommendations:

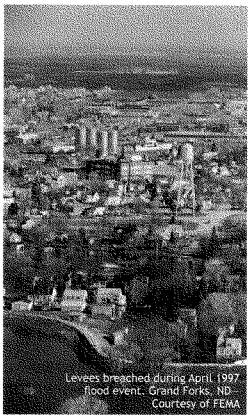
- Levee safety is a shared responsibility. Responsibilities lie at all levels of government and with persons whose lives and property are located behind levees.
- Our nation's levee problems took generations to build, so it will not be solved overnight. As such, the Committee is recommending a phased approach.
- While levees protect property, infrastructure and economic activity, the Committee has held paramount human health and safety.
- Levees are most effective when managed as physical and political systems, not as individual reaches. We are only as strong as our weakest point.
- Clear attention needs to be brought on issues like: "Who pays?", "Who benefits?", and "Who owns the risk?". If there is an imbalance in these, things will fall apart—the three must be kept in proper tension. Those dealing with land use and those responsible for levee performance must clearly share the risk, the costs and the benefits.



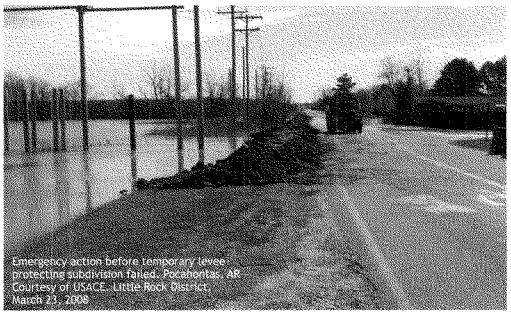
- Commonalities between levee safety and dam safety are many. In order to maximize efficiencies at all levels of government, build upon existing state expertise and provide consistent messages related to multi-hazard risk to the public, all opportunities to integrate the two should be explored; and
- Levees are not only critical public infrastructure, but in many communities protect other critical infrastructure (e.g. roads, bridges, hospitals, wastewater treatment, etc.). Investment in maintaining their reliability should be a national priority.

This recommendations section is organized along the lines of the three major components of what the Committee views as necessary for an effective *National Levee Safety Program*. Under each of these components are specific recommendations:

- **Providing Comprehensive and Consistent, National Leadership**—create a *National Levee Safety Commission* charged with understanding and communicating risks associated with levees, developing national safety standards, facilitating dialogue and research on important levee related topics (e.g. research and development, facilitating dialogue with environmental interests), providing technical materials and assistance to all levels of government, encouraging improved safety measures and programs through grants, and overseeing national and state levee safety program development and implementation activities.
- **Building and Sustaining Strong Levee Safety Programs in All States**—the cornerstone of an effective *National Levee Safety Program* are effective state programs following a consistent set of national safety standards and mitigation protocols. States are well positioned to provide assistance and oversight to local owner/operators, and coordinate activities in a systems approach among entities within and among states.
- **Aligning Existing Federal Programs**—in order to ensure that investment in our nation's levees and programs to protect the people who live behind them are effective, all federal programs that impact community and individual behavior in the leveed area should be aligned toward the same goals of risk reduction, developing resilient and reliable levees and protection of human life and property.



Levees breached during April 1997 flood event. Grand Forks, ND. Courtesy of FEMA



Emergency action before temporary levee protecting subdivision failed. Pocahontas, AR. Courtesy of USACE, Little Rock District. March 23, 2008

Summary of Recommendations for a *National Levee Safety Program*

The following is an overview of the 20 recommendations described in more detail in this section.

Providing Comprehensive and Consistent National Leadership

1. **Establish a National Levee Safety Commission** to provide national leadership and comprehensive and consistent approaches to levee safety including standards, research and development, technical materials and assistance, training, public involvement and education, facilitation of the alignment of federal programs and design, delegation and oversight of a delegated program to states.
2. **Expand and Maintain the National Levee Database** to include a one-time US Army Corps of Engineers inventory and inspection of all non-federal levees. Baseline information will be included and maintained in an expanded National Levee Database (NLD) in order that critical safety issues, true costs of good levee stewardship, and the state of individual levees can inform priorities and provide data for needed risk-informed assessments and decision-making.
3. **Adopt a Hazard Potential Classification System** as a first step in identifying and prioritizing hazard in leveed areas. Due to a lack of data regarding probability of failure, initial classifications should be based solely on consequences in order to assist in setting priorities, criteria, and requirements as the NSLP is being established.
4. **Develop and Adopt National Levee Safety Standards** that will assist in ensuring that the best engineering practices are available and implemented throughout the nation at all levels of government.
5. **Develop Tolerable Risk Guidelines** in order to facilitate an understanding of the options to reduce identified risks, how uncertainty affects this understanding, and to better inform levee construction/enhancement decisions and weigh non-structural alternatives to flood risk management in a risk-informed context.
6. **Change "Levee Certification" to "Compliance Determination"** to better articulate the intent that "certification" under the National Flood Insurance Program (NFIP) requirements does not constitute a safety guarantee or warranty. The purpose of this change is to more clearly communicate residual risks of living and working in leveed areas.
7. **Subject Levee Certifications (Compliance Determinations) under FEMA's National Flood Insurance Program to Peer Review** in order to increase confidence in technical determinations of compliance.
8. **Swiftly Address Growing Concerns Regarding Liability for Damages Resulting from Levee Failures** through exploration of a range of measures aimed at reducing the potential liability of engineering firms and/or government agencies that perform engineering services for levee systems (e.g. inspections, evaluations, design, construction administration, certification, or flood fighting). Congress should address this liability concern as a first priority in order to help ensure state and local interest in developing levee safety programs, and to prevent much needed levee repairs, rehabilitation and certification from coming to a halt.
9. **Develop a Comprehensive National Public Involvement and Education/Awareness Campaign to Communicate Risk and Change Behavior in Leveed Areas** as an essential element of levee safety by improving public understanding of the role of levees, associated risks, and individual responsibilities to empower people to make risk-informed choices.
10. **Provide Comprehensive Technical Materials and Direct Technical Assistance** crucial to the successful implementation of consistent national standards to states, local communities and owner/operators.
11. **Develop a National Levee Safety Training Program** including a combination of courses, materials, curricula, conferences, and direct assistance resulting in an increase in the level of expertise and knowledge in all aspects of levee safety. This would include the development of curricula and certification requirements for a *Certified Levee Professional* program.
12. **Develop and Implement Measures to More Closely Harmonize Levee Safety Activities with Environmental Protection Requirements** to ensure that critical levee operations and maintenance is not delayed and that, where possible without compromising human safety, environmentally-friendly practices and techniques are developed and used.
13. **Conduct a Research and Development Program** that will continually advance state-of-the-art technologies and practices for levee safety and conduct critical operations and maintenance activities in as cost-effective and environmentally-friendly manner as possible.

Building and Sustaining Strong Levee Safety Programs in All States

14. **Design and Delegate Program Responsibilities to States** to assist states and local governments develop effective levee safety programs focused on continual and periodic inspections, emergency evacuation, mitigation, public involvement and risk communication/awareness, etc.
15. **Establish a Levee Safety Grant Program** to assist states and local communities develop and maintain the institutional capacity, necessary expertise, and program framework to quickly initiate and maintain levee safety program activities and requirements.
16. **Establish the National Levee Rehabilitation, Improvement, and Flood Mitigation Fund** to aid in the rehabilitation, improvement or removal of aging or deficient national levee infrastructure. Investment (cost-shared) is recommended to be applied to the combination of activities, both structural and non-structural, that combined, would maximize overall risk reduction and initially be focused in areas with the greatest risk to human safety.

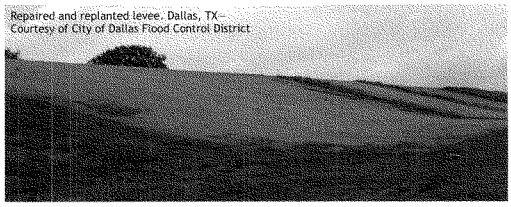
Aligning Existing Federal Programs (Incentives and Disincentives)

17. **Explore Potential Incentives and Disincentives** for good levee behavior through alignment of existing federal programs.
18. **Mandate Purchase of Risk-Based Flood Insurance in Leveed Areas** to reduce financial flood damages and increase understanding of communities and individuals that levees do not eliminate risk from flooding.
19. **Augment FEMA's Mapping Program** to improve risk identification and communication in leveed areas and consolidate critical information about flood risk.
20. **Align FEMA's Community Rating System (CRS) to Reward Development of State Levee Safety Programs** by providing further incentives to communities to exceed minimum program requirements and benefit from lower risk-based flood insurance rates to individuals who live in leveed areas.

Providing Comprehensive and Consistent National Leadership for Levee Safety

Currently, responsibility for levee safety is assigned in an often uncoordinated and incomplete manner—distributed across all levels of government (federal, state, regional, local) and housed in different agencies and functions within each level of government. This shared and diffuse responsibility impedes development of comprehensive safety policies and programs, impairs ongoing coordination, and prevents a sustained focus on this issue. Effectively addressing levee safety across the country requires a strong, independent, national program drawing on and integrating the diverse expertise from existing agencies at all levels of government and from the private sector.

Recommendation #1: Establish an independent National Levee Safety Commission (Commission) charged with understanding and communicating risks associated with levees, developing national safety standards, facilitating dialogue and research on important levee related topics (e.g. research and development, facilitating dialogue with environmental interests), and providing technical materials and assistance to all levels of government.



Repaired and replanted levee. Dallas, TX—Courtesy of City of Dallas Flood Control District

Developing Effective Governance for the *National Levee Safety Program*

The Committee analyzed at a conceptual level how best to govern the NLSP, first considering the "what" of the NLSP, and second "how" the program elements comprising the "what" could best be led and coordinated. The Committee defined the following guiding principles or characteristics as essential:

- Independence to address levee safety holistically, unconstrained by the momentum and priorities of existing programs, and the ability to make politically challenging and unpopular decisions when necessary.

Federal Agencies with Existing Programs and Expertise

The following federal agencies have been identified as having existing programs and/or expertise that would provide a direct benefit in the development and implementation of the *National Levee Safety Program*.

- US Army Corps of Engineers (Corps)
- Federal Emergency Management Agency (FEMA)
- US Bureau of Reclamation (USBR)
- US Fish and Wildlife Service (USFWS)
- Department of Homeland Security (DHS)
- US Geological Survey (USGS)
- US Environmental Protection Agency (USEPA)
- National Oceanic and Atmospheric Administration (NOAA)
- Federal Energy Regulatory Commission (FERC)
- Housing and Urban Development (HUD)
- International Boundary and Water Commission (IBWC)
- National Resource Conservation Service (NRCS)

- Leadership for the significant horizontal integration of effort across federal agencies and alignment of their programs, as well as for the vertical integration to achieve strong and balanced participation at all levels of government and in the private sector.
- Organizational capabilities spanning regulatory policy development, program implementation and oversight, grants management; and significant experience in technical, public communications and environmental areas.

Identifying the most effective governance model to provide for an effective NLSP is neither simple nor obvious. The governing body of the NLSP should have expertise in several areas such as levee engineering, risk mitigation in leveed areas, and administration of grants and incentives, among others. Considering the guiding principles, essential characteristics and desired expertise, the Committee developed a governance model dependent on the establishment of a *National Levee Safety Commission* to lead and coordinate the NLSP. Such a governance model provides the strongest organizational basis for the sustained focus and clear accountability needed for levee safety.

Organizational Structure and Duties of the National Levee Safety Commission

The Commission would consist of appointed Commissioners knowledgeable in the fields of water resources and risk management, representing the diversity of skills needed to successfully lead the NLSP including engineering, public communications, program development and oversight, and environment and public safety collaboration. The majority of Commissioners would be selected from state and local government or the private sector, with two of the Commissioners being federal employees, one each appointed by the head of FEMA and the Corps, respectively.

The Commissioners' primary duties and responsibilities could include the following:

- Establish and oversee the NLSP, including the program elements and standing advisory committees;
- Review and approve all key regulatory and programmatic changes to the NLSP once established;
- Review and approve delegation of the NLSP to a qualified state or other entity;
- Provide support for delegated programs in facing and overcoming challenges associated with the NLSP development and implementation;
- Review and approve rescission of a delegated program for non-performance;
- Provide periodic recommendations to the President of the United States on the effectiveness of the NLSP including needed authorities, budgets, and coordination with other federal programs;
- Develop and transmit reports to key oversight bodies;
- Conduct periodic evaluations of the NLSP to ensure effectiveness; and
- Understand and communicate risks associated with levees.

To effectively develop, implement, direct, and oversee the NLSP requires that the Commissioners be full-time employees, expected to serve three-year staggered terms, supported by staff consisting of both full-time professionals and additional staff resources drawn from various federal agencies on a temporary and an as-needed basis. This will ensure that the Commission will have sufficient staff resources and expertise as the program is initially developed and launched, and then administered over time. In addition, the Commission will be supported by four standing Advisory Committees comprised of volunteers from all levels of government and the private sector with specific responsibility to advise the Commission on matters related to the NLSP:

- **Delegated Programs Committee** to advise the Commission concerning development and implementation of delegated levee safety programs to qualified states, sustainment of qualified programs at the state level, revocation of delegated programs, management of incentives (including grant programs) and disincentives for state, local and regional programs.
- **Technical Committee** to advise the Commission on matters related to the management of the *National Levee Database*; development and maintenance of the *National Levee Safety Code*, processes for technical assistance to states and training programs; and research and development associated with levee safety.
- **Public Involvement, Education & Awareness Committee** to advise the Commission in the development and fielding of targeted public outreach programs to gather public input, provide education, raise risk awareness, communicate information on delegated programs and track public understanding and behavior changes.
- **Environment & Safety Committee** to advise the Commission on O&M permitting processes for existing projects, coordination of environmental and safety concerns on removal, rehabilitation and new levee projects, and efforts for environment and safety collaboration in leveed areas.

The Commission would establish the size, membership, and specific charter of each standing Advisory Committee, and, as needed, establish additional ad hoc Advisory Committees to address specific topics. Advisory Committee members are anticipated to be voluntary positions drawn from all sectors of government and the private and non-profit sectors.

Standing Up the National Levee Safety Program

The Committee considered two main concepts for governance of the NLSP:

Concept One: *Formation of a National Levee Safety Commission*

a. Commission established as a new independent federal agency with functional and operational responsibility, and the NLSP placed therein; **or**

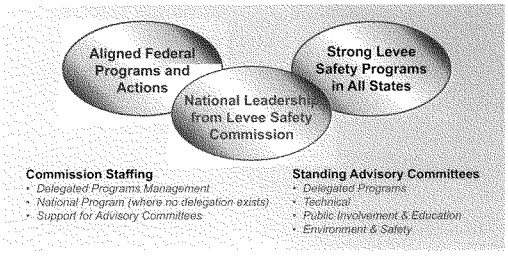
b. *National Levee Safety Program* placed in an existing federal agency and the Commission serving as an advisory body to that agency for NLSP duties.

Concept Two: *Distribution of the elements of the National Levee Safety Program among various federal agencies without the benefit of a Commission.*

Concept 1a: National Levee Safety Commission established as a new independent federal agency

The recommended governance model, a *National Levee Safety Commission*, is represented by Figure 8 *(on page 29)*. The Committee's judgement is that an independent entity, the *National Levee Safety Commission*, would best ensure a strong voice and participation of all key players and provide the appropriate concentrated focus on levee safety and commitment to sustain a comprehensive and robust levee safety program over time. As an independent agency, the Commission would be free from the constraints of many existing competing programs and would be able to provide the critical role of integrating and coordinating across the federal government while providing the single forum for all levels of government to come together to meet their shared responsibilities. For these reasons, the Committee believes that this is the best option and recommends the establishment of a *National Levee Safety Commission* as a new agency to provide leadership in the further development, implementation, and oversight of the NLSP. As work progresses in developing the NLSP, new information and insights will be gathered through expanded stakeholder input, development of the National Levee Database, and additional assessment of the current and potential capabilities of state levee safety programs.

Figure 8: Recommended Governance Structure for National Levee Safety Commission



This information will further refine the size and scale needed for the National Levee Safety Commission.

Concept 1b: *National Levee Safety Program* embedded in an existing agency with the Commission as an Advisory Body

The Committee also considered the possibility of embedding the Commission and program in a single existing federal agency, either the Corps or FEMA. While both FEMA and the Corps have strong programmatic involvement with levees and established organizational capabilities and resources, neither is a perfectly ideal home for the program. The governing body of the NLSP should have significant expertise in three important areas: (1) levee engineering, (2) risk mitigation in leveed areas, and (3) administering grants and incentives. While the Corps is expert at the first, FEMA is not, and it would likely take a significant change in culture and possibly organization to develop it there. The Corps and FEMA are both developing expertise in the relatively new field of risk mitigation, but neither has all the expertise needed in this area. FEMA is expert at the third area while the Corps is not, and it would seemingly take a significant institutional change to develop it there. Neither agency has all the expertise needed.

Rather than trying to force such changes and further stretch the resources of these agencies by expanding their already large missions, the Committee believes that it is preferable to utilize the existing expertise from both organizations to support a new, small independent organization that can effectively leverage the resources of both agencies.

In addition, the Committee believes that having the Commission limited to an advisory role within one of these agencies is counter to the realization that levee safety is a shared responsibility across all levels of government needing consensus-based solutions. The Commission, drawing its membership from across all levels of government and having decision-making responsibility on key policy and program activities shared by all affected parties, is critical to the success of the program. The Committee believes that it would be difficult to integrate an independent Commission with such important decision making and oversight authority into the existing operational and management structure of either agency.

Concept 2: *National Levee Safety Program* responsibilities dispersed among existing agencies without the benefit of a Commission

The Committee also considered whether the various elements of the *National Levee Safety Program* could be effectively distributed among various federal agencies leveraging existing programs and organizations. Such an approach would—if feasible—require the least new resources and potentially accelerate some program elements. The Committee believes that this is not a feasible option for three important reasons: (1) it would not lead to the necessary level of integration and coordination across federal programs; (2) without a Commission, charting and sustaining a long-term program would be difficult; and (3) a critical element to the long-term success of the program, and the primary means for ensuring strong state and local participation in the program is the involvement of state and local representation through the Commission and its standing advisory committees. Additionally, the issues surrounding levees are complex on many levels—addressing technical issues, property rights, liability, and communication of complex concepts of risk to the general public. Further, these issues are largely interdependent. To have an effective

levee safety program requires that they be addressed in a singular manner, not through the various lenses of existing agencies where their given authorities and practices differ. Finally, a national levee safety program—with its need for sustained programs over a long term to address the serious risk of relatively rare but catastrophic events—would run the risk of being lost among the numerous other important missions and programs run by these organizations.

Program Responsibilities of the *National Levee Safety Commission*

The following section includes thirteen additional recommendations describing the major program elements and responsibilities envisioned for the *National Levee Safety Commission* that will take place at the federal level. The recommendations reflect the Committees' strong belief that a consistent, national voice and approach to levees is needed, but that implementation will only be effective through shared responsibility from all levels of government, citizens who live and work behind levees and the private sector. Program responsibilities include:

- Expand and Maintain the National Levee Database
- Adapt Hazard Potential Classification System and Definitions
- Develop and Adopt National Levee Safety Standards
- Develop Tolerable Risk Guidelines
- Change Term "Levee Certification" to "Compliance Determination"
- Subject Levee Certifications (Compliance Determinations) Under FEMA's National Flood Insurance Program to Peer Review.
- Address Growing Concerns Regarding Liability for Damages Resulting from Levee Failures
- Lead Public Involvement and Education/Awareness Campaign to Understand Risk and Change Behavior in Leveed Areas
- Provide Technical Materials, Assistance and Training to States and Communities
- Develop and Implement Measures and Practices to More Closely Harmonize Levee Safety Activities with Environmental Protection Requirements and Principles
- Conduct Research and Development to Support Efficient and More Cost Effective Levee Safety Programs
- Design, Delegate and Oversee Program Responsibilities to States
- Coordinate Federal Agency Activites and Programs

Expand and Maintain the National Levee Database

In order to make good flood risk management investments, we must understand more fully the situation under which we are living—namely the location and condition of our nation's levees. Because watercourses do not respect political boundaries, and levees are best understood in systems, data collection must be conducted in a consistent and comprehensive manner across the nation.

One of the most reliable and inexpensive methods of predicting a levee or levee system performance during a flooding event is to document its past performance. To be meaningful and of greatest use, the NLD must contain all germane information needed to make informed decisions and assessments as to the status and reliability of the Nation's levees and levee systems. Any and all decisions that rely on information contained within the NLD are only as good as the data upon which they are based.

Performance Data That Should Be Collected During and After a Flood Event

- Incidents of seepage and/or boils
- Overtopping
- Stability problems
- Waterside and landside erosion
- Flood-fights
- Breaches
- Partial and near failures
- Evacuations
- Lives lost
- Property damage and estimated costs
- Lawsuits
- Findings regarding any levee incidents
- Weather conditions
- Flood stages
- Flood system operations
- Resources used during flood, including flood-fights and evacuations
- Federal Response

Performance Data That Should Be Collected for Routine O&M

- Burrowing animals
- Excessive vegetation
- Problems with encroachments
- Settlements
- Repairs or modifications
- Piezometric and other data

Until we have baseline information, gathered through inspections and post-flood performance data, we will not be able to efficiently or cost-effectively:

- Identify the most critical levee safety issues

- Quantify the nation's risk exposure and true costs of maintaining levees
- Focus priorities for future funding
- Provide data for risk-based assessments

Recommendation #2: Expand the existing federal National Levee Database (NLD) to include inventory and inspection of federal levees (e.g., federally constructed, non-federally operated and maintained levees) and conduct inventory and inspection of all levees (included in levee definitions) on a periodic cycle, not to exceed 10 years. Data should be incorporated into the NLD.

Specific aspects of this recommendation include:

- Gather levee performance data
- Provision for periodic inventory and inspection updates (initial inventory and inspection should be done by the Corps, but maintained by states on an ongoing basis).
- Development of guidelines related to both the open and limited dissemination of information related to levees.
- Have all state and local governments provide the minimum basic information set out in the National Levee Safety Act.
- Public and private organizations with interest and/or expertise in levee safety should be invited to peer review the NLD and the types of information used in the database.

Corps' National Levee Database Upon Which Expansion to Non-Federal Levees Could be Based

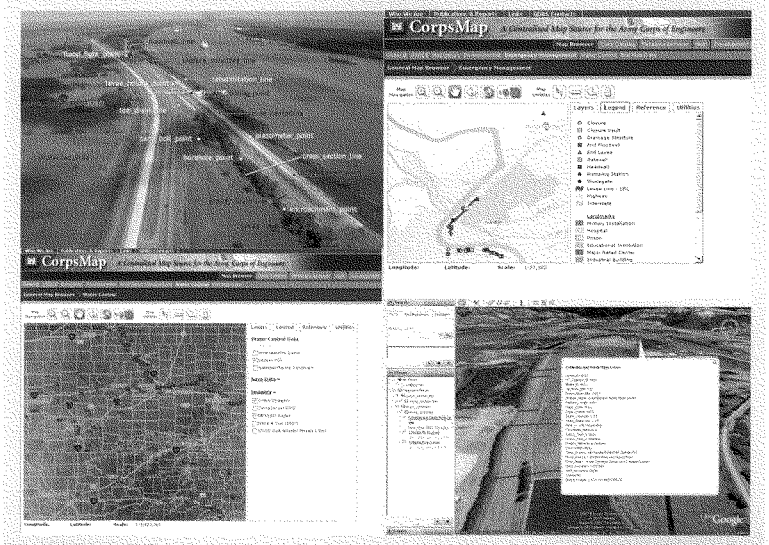


Figure 9: Hazard Potential Classification

Hazard Potential Classification	Number of People Potentially Inundated	Number of People Potentially Inundated to Depths ≥ 3 feet	Additional Considerations
High	≥ 10,000	≥ 10,000	Includes areas of consequence where critical life safety infrastructure is at risk (e.g. major hospitals, regional water treatment plants, and major power plants)
Significant	> 1,000	< 10,000	Includes areas of consequence where the number of people potentially inundated is low, but there may be significant potential for large economic impacts or losses
Low	< 1,000	0	-

- Section 9004 of the National Levee Safety Act should be amended to require all state and local agencies to provide data necessary to complete the NLD.

Due to the urgency of this undertaking, Congress should act now to expand current Corps authorities to conduct a one-time inventory and inspection of all the nation's levees (and expand the federal efforts to include performance data). Once the *National Levee Safety Commission* is created, responsibility for maintenance of the NLD and collection of state updates should be conducted by the Commission.

The Corps, in consultation with the Department of Homeland Security's Dam Sector, should establish guidelines to distinguish those portions of the NLD (if any) that, for national security concerns, should not be released to the public.

Develop Hazard Classification System and Definitions

It is expected that both the *National Levee Safety Commission* and delegated programs will need to classify levees by potential hazard, and later by risk, in order to set priorities, criteria, and requirements. The classifications proposed herein, and shown above, are intended for interim use over the next 5 years. During this time, knowledge and lessons learned will be used to develop improved definitions and classifications.

Due to a lack of data at this time regarding probability of failure, definitions and classifications should initially be based solely on consequences of levee failure. Consequences of levee failure include the following parameters related to the number of people at risk, ability to evacuate (depth of flooding), and property values at risk:

- Population and property at risk within levee flood protection zone
- Depth of flooding—three feet is a common reference where children and the elderly may drown, and evacuation by car or truck is prohibited
- Area and facilities within levee flood protection zone
- Height of levee

Classifications endeavor, to the extent practicable, to use parameters and definitions consistent with those in use by other agencies (e.g., State of California, FEMA).

- The State of California recently passed flood management legislation (Senate Bill 5) and a separate flood bond initiative (Proposition 1E) that define an urban area as having 10,000 people and subject to higher flood protection requirements, and also eligible for greater financial assistance from the state.
- NFIP maps identify shallow flooding in their Special Flood Hazard Areas having depths between one and three feet.

The proposed three-tier hazard potential classification system shown above is relatively simple, easily understood and quantifiable. It is intentionally set up to parallel the definitions established for the National Dam Safety Program.

Recommendation #3: The Committee recommends that the following levee definitions and preceeding Hazard Potential Classifications be adopted on an interim basis for use with both the national and state levee safety programs. It further recommends that they revised after five years.

Clarifications of Hazard Potential Classification

- Classifications are also intended to include areas of consequence where critical life safety infrastructure is at risk (e.g., major hospitals,

regional water treatment plants, and major power plants).

- Also includes areas of consequence where the number of people potentially inundated is low, but there may be significant potential for large economic impacts or losses.
- The area of consequence that establishes the limits for estimating potential hazards should correspond to the elevation of the top of a flood control levee. For canal structures, the area will initially need to be estimated by judgment taking into account the potential volume that could be discharged by the canal and looking at developed structures within the potential discharge area/drainage.

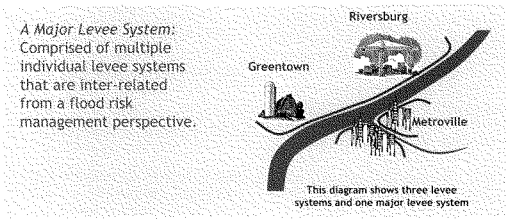
Levee and Canal Structure Definitions

Levee
A manmade barrier (embankment, floodwall, or structure) along a water course constructed for the primary purpose to provide hurricane, storm, and flood protection relating to seasonal high water, storm surges, precipitation, and other weather events; and that normally is subject to water loading for only a few days or weeks during a year.

Levees may also be embankments, floodwalls, and structures that provide flood protection to lands below sea level and other lowlands and that may be subject to water loading for much, if not all, portions of the year, but that do not constitute barriers across water courses or constrain water along canals.

This levee definition does not apply to shore line protection or river bank protection systems such as revetments, barrier islands, etc.

Figure 10: Definition of "System" and "Major System"



Levee Feature
A levee feature is a structure that is critical to the functioning of a levee. Examples include embankment sections, floodwall sections, closure structures, pumping stations, interior drainage works, and flood damage reduction channels.

Levee Segment
A levee segment is a discrete portion of a levee system that is owned, operated and maintained by a single entity, or discrete set of entities. A levee segment may have one or more levee features.

Levee System
A levee system comprises one or more levee segments and other features that collectively provide flood damage reduction to a defined area. Failure of one feature within a levee system may constitute failure of the entire system. The levee system is inclusive of all features that are interconnected and necessary to ensure protection of the associated separable floodplain. These levee features may consist of embankment sections, floodwall sections, closure structures, pumping stations, interior drainage works, and flood damage reduction channels. Levee systems include all flood, storm, and hurricane damage reduction systems with any of the major levee features listed above.

Highway and railroad embankments can be considered to be levees only if they are performing as part of a flood control system. While such structures should be considered as part of the levee system, similar to topography, they should be included only to the extent that such structures actually provide some level of flood protection.

Canal Structure
An embankment, wall, or structure along a manmade canal or watercourse that constrains water flows and is subject to frequent water loadings, but that does not constitute a barrier across a watercourse.

Note: Congress included in its direction under Section 9003(2) of the Levee Safety Act that canal structures be considered as levees by this Committee--"[t]he term [levee] includes structures along canals that constrain water flows and are subject to more frequent water loadings..." The Committee strongly agrees they be included for reasons of public

safety. Canal structures share with levees many risk and safety characteristics. When many canals were constructed, they were located generally in rural areas, where the major impact of canal failure was the loss of project benefits. With increased urbanization occurring on lands below many canals, significant loss of life and economic damage can now result from failure. To date, many canal operating entities and federal agencies that oversee canals have not independently addressed this problem, and will be important partners in efforts to identify and manage the risk of loss of life and property in canal and levee structure failures. Their inclusion will help assure that national efforts to manage this risk are comprehensive, coordinated and effective.

Unless otherwise stated herin, throughout this report the term "levee" refers to a levee system inclusive of canal structures as defined above.

National Levee Safety Program Levees

Levees and canal structures should be exempt from regulation under the NLSP if they meet the following conditions:

- A canal constructed completely within natural ground without any manmade structure such as an embankment or retaining wall to retain water and/or where water is retained only by natural ground.
- Highway and railroad embankments that are not functioning as part of a flood control system.
- The levee or canal structure meets ***all*** of the following criteria:

Not part of a federal flood control project,

and

Not an accredited levee by FEMA,

and

Not greater than 3 feet high,

and

Not protect a population greater than 50 people,

and

Not protect an area greater than 1,000 acres.

Further, in order to avoid duplicative regulations, the Committee considers canals already regulated by the federal government (e.g., power canal regulated by the Federal Energy Regulatory Commission that are subject to dam safety standards) to comply with the NLSP, provided that applied federal safety criteria meet or exceed the to-be-determined interim procedures and *National Levee Safety Code*.

Develop National Levee Safety Standards

There is currently no uniform set of national levee safety standards. Various agencies use different (or non specific) criteria, making it difficult to understand levee safety across jurisdictions and sometimes creating conflict. For example, the Corps' levee vegetation management memoranda have created major concerns across the nation, especially in California—a conflict that would not have surfaced if well-understood national standards existed and were enforced. Having a uniform set of policies, procedures, standards, and criteria for levee maintenance developed with input from all levels of government, together with input from academia and the private sector, will help establish a common set of expectations across the nation.

Develop Procedures for Three Types of Structures

- Levees that are embankments and floodwalls that have the primary purpose to provide hurricane, storm, and flood protection relating to seasonal high water and storm surges, and that normally are subject water loading for only a few days or weeks during a year.
- Embankments and floodwalls that provide flood protection to lands below sea level and other lowlands and that may be subject to water loading for much, if not all, portions of the year, but that do not constitute barriers across water courses, or constrain water along canals.
- Embankments and floodwalls that constrain water along canals, including water supply and power canals.

Engineering Activities Recommended for Inclusion in the Interim Procedures

- Levee Inspections
- Geotechnical explorations
- Site characterizations
- Geotechnical evaluations and analyses
- Hydrologic and hydraulic analyses
- Structural analyses
- Seismic evaluations
- Mechanical/Electrical components
- Levee penetrations (e.g., pipelines)
- Design guidelines and specifications
- Construction administration and inspection
- O&M (incl. vegetation management)
- Encroachments
- Security
- Risk analysis
- Levee fragility analysis
- Performance instrumentation
- Residual risk
- Emergency preparedness and response
- Emergency Action Plans
- Flood warning systems
- Flood fighting
- Performance documentation
- Interim risk reduction measures
- Evacuation
- Mapping and risk notification
- Surveys

Further, the development and use of national levee safety standards would provide the private sector with a nationally recognized set of standards that, if applied correctly with appropriate judgment, could help establish a standard of care and probably help reduce the exposure of public agencies and private engineering firms to litigation (see later section for a more in-depth discussion of this critical topic).

Currently, the best documented and available sets of engineering policies, procedures, standards, and criteria related to levees and canal structures are those developed and maintained by the Corps and the US Bureau of Reclamation. Using these as a basis upon which to develop both interim procedures, and eventually the *National Levee Safety Code*, together with the opportunity to update them with input from state, local, academic, and private sector entities, represents the most expedient way to establish well-crafted and accepted policies and procedures for levees and canal structures.

Recommendation #4: Develop and adopt a set of National Levee Safety Standards for common, uniform use by all federal, state and local agencies. The national standards should incorporate engineering policies, procedures, standards, and criteria for a range of levee types, canal structures, and related facilities and features. We recommend that interim products and procedures be adopted by all pertinent federal agencies and used as guidelines by non-federal entities until final standards are developed and adopted by both national and state levee safety programs.

Step One (within 1 year): Develop Interim Guidelines: Under the authority of the NLSP, the Commission should contract with the International Code Council (ICC) to develop *Interim National Levee Engineering Guidelines* (including policies, procedures, standards, and criteria) for levees, canal structures, and related facilities and features using the ICC code development process. This governmental consensus process meets the principles defined in OMB Circular A-119, Federal Participation on the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities and Public Law 104-113 National Technology Transfer and Advancement Act of 1995. This expert process is designed specifically to protect the health, safety and welfare of people. It is anticipated that interim guidelines would be based in part on on existing Corps policies, procedures, and criteria for levees and on USBR policies, procedures, and criteria for canal structures as modified through the ICC code development process.

Step Two (within five years): Develop and adopt *National Levee Safety Code*. The National Levee Safety Commission would again contract with the ICC to take the guidlines developed in step one and further develop them into a National Code.

- The best available practices from other countries should be considered in developing standards, along with lessons learned from using the interim procedures.
- Policies, procedures, standards, and criteria should be linked to *Levee Hazard Potential Classifications* for potential hazard and should incorporate concepts of tolerable risk.
- National procedures, standards, and criteria should be updated every 10 years, or more frequently.

Federal legislation should be passed requiring that all federal agencies and all state levee safety programs adopt the *National Levee Safety Code* once it becomes available. Local flood control agencies participating in either a state levee safety program or the NLSP should also be required to adopt the *National Levee Safety Code*.

Levee damaged due to overtopping. Hurricane Katrina. St. Bernard Parish, LA. August 2005

Develop Tolerable Risk Guidelines

In order for the nation to better understand the risks associated with living in a leveed area more sophisticated approaches are needed. Tolerable risk guidelines are needed to: 1) better enable us to prioritize our public investment at the areas where not only there is a possibility for high consequences, but also where the probability of failure is high; 2) improve citizen and government knowledge and understanding regarding the benefits of mitigation activities; and 3) enhance the public debate regarding the true benefits and costs of flood risk mitigation alternatives.

Because people derive benefits from living in places with high flood risk and demographic trends predict additional influx into the floodplain and coastal areas, we must have tools to help us weigh those risks. We must ask ourselves the following question. *How much protection is reasonable to provide populations against the risk of property damage or personal injury due to flooding?* We can approach this question using a variety of methods:

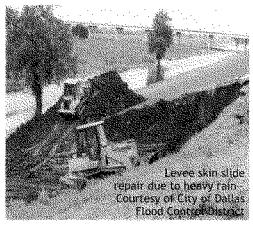
- Economic calculations on the value of a statistical life saved;
- People's willingness-to-pay to reduce risk;
- State preferences; and
- Risks that people willingly accept.

Tolerable risk methodology can help us better tailor our approaches to investments made and benefits accrued in the levee context. A tolerable risk is one that "society can live with so as to secure certain net benefits." It is a risk that may not be broadly acceptable, and is not necessarily negligible; it is a risk that should be kept under review and reduced if and as possible, but it can be tolerated because of the concomitant benefits. In contrast, intolerable risks are those "so large that nobody should be exposed to [them] and thus risk reduction should be undertaken without regard to cost." *(Reducing Risks, Protecting People: HSE's Decision Making Process (2001), UK Health and Safety Executive, London: HMSO, p. 27)*

Recommendation #5: The National Levee Safety Commission should work with its Standing Technical Committee to develop National Tolerable Risk Guidelines for levees and structures along canals.

Because tolerable risk expertise is so specific, the Commission should:

- Assemble a panel of international renowned experts knowledgeable of tolerable risk concepts to develop *National Tolerable Risk Guidelines for Levees and Structures Along Canals.*



Levee skin slide repair due to heavy rain. Courtesy of City of Dallas Flood Control District.

- Conduct a peer review of the panel's recommendations by an equally renowned group of experts.
- Enact new federal legislation with requirements for incorporating *National Tolerable Risk Guidelines for Levees and Structures Along Canals.*

Levee reconstruction post Hurricane Katrina. St. Bernard Parish, LA. August 2005.

A Primer on Tolerable Risk Guidelines and their Application to our Nation's Levees

What Are Tolerable Risk Guidelines?

Tolerable Risk Guidelines (TRG) are an improved methodology for decision making that enables investors to understand how the infrastructure-related risks for a specific system or portfolio of systems compares to what society and engineering practice deem to be tolerable. The use of TRG not only enables one to put risk in this broader context, but facilitates an understanding of the options to reduce that risk, how uncertainty effects this understanding, and how well justified are the ultimate decisions in order to gain broad stakeholder support. Two common misconceptions about TRG that should be recognized up front:

- TRG do not replace traditional engineering standards, they compliment them by putting considerations such as factors of safety, design approaches, and construction techniques into a consistent context in which to evaluate.
- TRG are not a simple numerical solution, they require the judgment of experienced engineers and scientists to have meaning and support confident, well-justified decisions.
- TRG inform decisions on both structual and non-structural remediation alternatives.

Definition of Tolerable Risk

- Risks society is willing to live with so as to secure certain benefits,
- Risks society does not regard as negligible or something it might ignore,
- Risks that society is confident that are being properly controlled by the owner, and
- Risks the owner keeps under review and reduces still further if and as practicable.

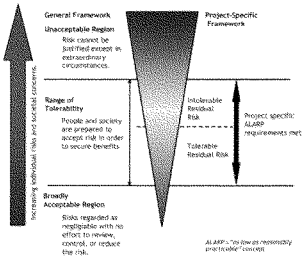
Citation: ANCOLD, 2003

"As Low As Reasonably Practical"

- The "as-low-as-reasonably-practicable" (ALARP) considerations include a way to address efficiency aspects in both individual and societal tolerable risk guidelines.
- The ALARP consideration states that risks lower than the tolerable risk limit are tolerable only if further risk reduction is impracticable or if the cost is grossly disproportional to the risk reduction. (Adapted from ICOLD)
- Determining that ALARP is satisfied is a matter of judgment.

TRG methodology considers how the (1) probability of failure for an element of infrastructure or political system combines with the (2) consequences of failure to create an (3) "annualized consequence risk". Often, the risk is expressed in a loss of life per year metric. All three elements of risk are key metrics that help put the options available to reduce risk into a more logical and organized context. Some call this process "optioneering"--how engineering options are considered to gain the most cost effective risk reduction. The recognition of the level of knowledge or confidence in the information being evaluated--also known as an uncertainty analysis--is an important aspect of each measure.

Generalized and Project Specific Tolerability of Risk Framework



A common international graphical representation of tolerable risk guidelines

A Primer on Tolerable Risk Guidelines and their Application to our Nation's Levees

How does tolerable risk differ from other ways of measuring/looking at risk?

By itself, the estimation of risk is significant in determining the priority and relative urgency within a set of conditions and potential actions for remediation, including both structural and non-structural. TRG advances the utility of these risk estimations several significant steps by answering the following questions: (1) what are the limits of tolerability for probability of failure and annualized risk?, (2) how close are the estimated risks to these limits of tolerability? and (3) are there any limitations posed by economic factors or options that further define what is "practicable and achievable" if risks are above a limit of tolerability? For example, it is not just important to know the order (priority) and speed (urgency) at which to take action, it is even more important to know if your suggested actions are understood in a larger context, if they are the best options for reducing risks, if they are well justified, and if they bring conditions to a state of tolerability.

Tolerable Risk: Begin with the End in Mind

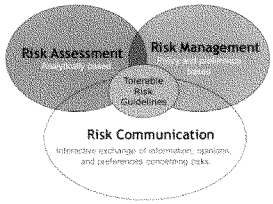
- Identify levees that pose greatest risk
- To what extent do they need to be modified or risks mitigated? (tolerability)
- Which actions should be taken first? (priority/sequence)
- How do we balance the desire to reduce risk with the availability of resources? (urgency)

TRG also offer substantially better decision making than traditional standards based decision making as it allows a fair determination of the "worst first" concept, thus facilitating a smart "staged" buy down of risks across a large portfolio.

Why is tolerable risk a preferred way of looking at levees?

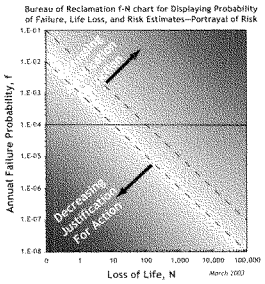
TRG are particularly important when dealing with a massive national portfolio of (on average) 50 year old levees that do not meet most engineering standards. The sheer size and costs of the infrastructure challenges regarding levees will take billions of dollars and decades to realize. Therefore, the order, urgency, method, and justification for rehabilitation action is critical to maintaining credibility and investment support, and for addressing public safety issues in an appropriate manner.

Levee Safety Risk Framework



Central role of TRG in the inter-relationship between risk communication, risk management, and risk assessment

Concept of Equity & Efficiency



- **Equity**—The principle, which holds that the interests of all are to be treated with fairness and that individuals and society have the right to be protected (ICOLD);
- **Efficiency**—In relation to society's use of resources, that principle, which seeks to gain greatest benefit from the availabl resources; and
- This leads to the notion that tolerable risk should consider both **societal** and **individual** risks as an integral part of the framework for managing risks.

Removing Barriers Associated with Liability

Under current law, liability could be incurred by state and local government agencies and engineering firms that provide services for levees and other flood control structures and systems. Parties harmed due to levee failures may bring suit against agencies, companies, and individuals involved in levee design, construction and inspection.

The Corps and other federal agencies are afforded immunity from liability of any kind for damage from floods through provisions of the Flood Control Act of 1928. The primary purpose of the immunity provision was to avoid having flood damages added to the very substantial costs of flood control projects that were contemplated. Recently published draft policy states that the Corps will likely no longer certify levees that are not designed, constructed, owned or operated by the Corps. This leaves other government agencies and private engineering firms as the only entities left available to perform this service. These entities are reluctant to provide these services due to a liability potential that, in the case of private engineering firms, far exceeds the fee for services and/or the entity's financial value. While this issue has been most urgent in the certification realm, some private engineering firms are also no longer willing to provide design and construction services.

Actions should be initiated as soon as possible due to the urgent need for levee engineering services, including certification, across the nation. Many communities and leveed areas have received FEMA notifications that they must recertify their levees within a two year timeframe. In most cases the Corps is not providing this service and have drafted policy that they will not certify non-Corps levees. In reaction to this policy, those seeking certification are looking elsewhere for those services, such as to private engineering firms, and state or local agencies that do not have federal immunity from liability. If this issue is not addressed expediently, it is likely that more private engineering firms and agencies will not offer service where it is most needed.

States, cities, counties, and local districts that begin inspecting levees for which they currently have no responsibility, such as privately owned levees, could be concerned about bringing new liability upon themselves. Inspection of all levees within a state is a key requirement for a state to have a delegated program under the NLSP. To the extent that delegated state programs exceed minimum requirements and take on responsibility for levee permitting, levee construction approval, and operation and maintenance of neglected levees, additional liability concerns may arise to the state and local government entities that undertake these responsibilities. Unless special protections are provided, the liability concerns may be serious enough so as to lead states and local governmental agencies to decline to participate in these actions, or even in the activities necessary to qualify for a delegated levee safety program.

Recommendation #6: Federal agencies should change the term "certification" (such as used in the NFIP) to "compliance determination" to better communicate to policy makers and the public that the determination does not imply a guarantee or warrantee.

Recommendation #7: Levee designs and levee certifications (compliance determinations) for the NFIP should undergo independent peer review.

Recommendation #8: Congress should swiftly address growing concerns regarding liability for damages resulting from levee failures through exploration of a range of measures aimed at reducing the potential liability of engineering firms and/or government agencies that perform engineering services for levee systems (e.g., inspections, evaluations, design, construction administration, certification, or flood fighting). Congress should address this liability concern as a first priority in order to help ensure state and local interest in developing levee safety programs, and to prevent much needed levee repairs, rehabilitation and certification from coming to a halt.

Examples of measures discussed by this Committee include:

a. Limitations on third-party liability for engineering firms providing engineering services for a levee system that might result from a levee failure during a flood event:
   i) Establish that liability following a flood event would only be present if the flood event was equal to or less than the design or rated level of flood protection provided by the levee system;
   ii) Establish that the engineering firm would not be liable for decisions (e.g. level of flood protection provided) that are

made by other parties (e.g. levee owner or maintaining agencies); and

iii) An engineering firm would be liable only to the extent caused by negligence, recklessness or willful misconduct of the firm.

b. Provisions to limit liability for state and local agencies that sponsor, and then accept, federal flood control projects due to design and construction deficiencies. State and local agencies would benefit from protection against suits alleging damages to persons or property resulting from the construction of the federal flood control facilities.

c. Provisions to limit liability for state and local agencies that, by implementing levee safety programs, provide oversight, funding, or other levee-related services for non-federal levees.

California Flood Litigation

In the 2003 Paterno decision, the California Court of Appeals found the state liable, by inverse condemnation, for damages incurred by flooded residents as a result of a levee failure along the Yuba River. The *Paterno* decision and others give rise to growing concern of the possible emergence of a strict liability standard being broadly applied in cases of levee failure that result in widespread harm.

In addition, the State of California is now being sued by a railroad for the 2004 levee failure at Jones Tract. The state's role was to provide financial assistance to the local levee owner for operation and maintenance and to inspect the resulting work performed by the levee owner, verifying that the funds were spent for their authorized purposes. This experience demonstrates how having any involvement with a levee can create uncertainty about liability.

Lead Public Involvement and Education/Awareness Campaign to Understand Risk and Change Behavior in Leveed Areas

Improving the safety of people who live behind the nation's levees is the top priority of this Committee and should be one of our country's highest priorities. In recent years, thousands of citizens have lost their homes, their livelihood, and in some cases even their lives due to flooding caused by levee failures. Loss of life due to flooding from levee failure can often be attributed to an individual's lack of understanding of the limitations of levee systems and an unrealistic assessment of personal risk. This ultimately results in a failure to take necessary safety measures such as evacuation.

There is an urgent need to raise public awareness of issues related to levees. The public must be educated on the true risks associated with living in leveed areas and how to effectively deal with them. But experience has shown that simply informing individuals rarely affects positive changes in behavior. Success requires both public awareness and public involvement.

Opportunities for public education and public engagement must be provided at all levels of government. Public input is vital to insure that the elements included in a safety program reflect public values. An involved, informed public will be empowered to not only drive their governments to reduce flood risk, but will also take more personal responsibility in buying down that risk. As individuals, they will be better prepared to take risk reduction measures such as purchasing flood insurance, making structural changes to businesses and residences, providing adequate revenue (taxes) for proper levee operations and maintenance and evacuating when required. These measures not only increase public safety and reduce personal loss, but also reduce overall economic loss to the nation thereby lessening a reliance on post-disaster relief.

There are multiple federal state and local agencies (e.g., FEMA, Corps, USBR, local levee owners, etc.) that communicate information about levees and levee safety. Each agency has developed its own message and terminology, resulting in inconsistent and sometimes conflicting messages related to levee safety. This has caused public confusion and frustration. There is no single entity charged with the responsibility of coordinating terminology and message across all the various agencies.

Traditionally, engineers have communicated flood risk by using terms such as "100-year level of protection." Such terminology has served to confuse the public and in some cases has led to a false sense of security. Consequences of levee failures are rarely clearly identified. Effective risk communication can only occur when both probability and consequences are included. Numerous governmental and private sector experts have articulated the need to develop a consistent and effective way of communicating flood risk in leveed areas, but to date, no one has developed an effective way of doing so. While levee standards and other technical requirements are most appropriately developed by engineers, a very different set of skills is required to develop effective public education and risk communication programs.

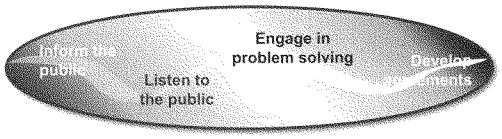
Each individual living in a leveed area is responsible for mitigating flood risk, particularly when it comes to preserving personal safety and the safety of family members. Levee safety is a shared responsibility and relies on involved, informed, motivated citizens, owner/operators, and governments.

Recommendation #9: Develop a comprehensive national public involvement and awareness/ education program to increase public understanding of the role and limitations of levees, raise awareness of national and state levee safety programs, and effectively communicate risks associated with living in leveed areas.

While the program may be developed at the national level, much of the actual communication will be accomplished at the state and local levels. Public outreach and risk communication activities should be guided by the following general principles:

- ***Assess the needs and gather input from the public, states, levee owners/operators, local governments and other stakeholders with an interest in public safety in leveed areas.*** Participation must be actively sought and the program must allow participants to define how they participate. Input must be obtained through realistic and meaningful opportunities. In order to advance shared responsibility, it must be evident to all that contributions from the various groups are being used to influence decisions made by program administrators.

Figure 11: Major Public Involvement Steps



- ***Ensure consistency of messages across government agencies.*** A significant benefit of a NLSP is the ability to develop and coordinate consistent terminology and messages across all agencies, enabling the public to better understand levee system-related issues.
- ***Provide opportunities to educate the public and interested stakeholders on matters pertaining to levee systems and levee safety programs.*** A national levee safety program is a new concept. The public and interested stakeholders will need to know how the program works, the anticipated benefits of the program, and how they can get involved.
- ***Ensure that risk communication is clear and consistent.*** The public involvement and awareness/ education program must emphasize the concept of "risk" and move away from the old terms of "level of protection." The program must include elements to communicate these concepts without technical jargon in a way that people can understand and use to make informed decisions about their lives and property. As conditions in leveed areas change, the level of risk changes. Therefore, risk information must be updated and communicated on a regular basis.
- ***Seek to change behavior.*** Many existing education/awareness efforts only seek to make individuals and governments aware of risk. Merely understanding the risk of living or building in a leveed area is not sufficient to protect human life and property. The focus of the NLSP risk communication effort, and the measurement of its success, must be aimed at increasing involvement of individuals, businesses, and governments and persuading them to change their individual and collective behaviors in a manner consistent with increased safety and protection of property.
- ***Ensure that adequate expertise is available and utilized.*** We must draw upon the appropriate experts to design, implement and oversee the public involvement and education/awareness program. By involving experts in fields as social marketing, behavioral economics, risk communication, etc., we can better design programs and products to achieve the behavior change we are seeking: an involved public that understands the risks and takes appropriate actions to mitigate them. A high priority element critical for the success of this program is the vocabulary and graphics to describe risk and experts must be engaged

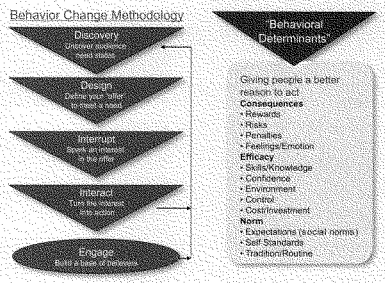
to accomplish this. Adequate dedicated funding for this purpose must be provided to ensure success.

- ***Develop the major components of the public involvement and awareness/education program at the national level for implementation primarily at the state and local levels.*** Development of the components at the national level will insure a consistent message that can be tailored to meet local needs and serve local audiences. The most effective way to deliver that message is at the local level. The national program should leverage existing best practices in developing its awareness/education program.

Step One (immediately): Lead agencies such as the Corps and FEMA shall establish an ad hoc committee of communication experts from agencies who are currently involved in public education and awareness programs, communicating risks to the public and/or working with the safety of levees. This *Coordinating Council for Communication for Levees* should be housed in FEMA, and work should immediately begin to identify existing programs, link relevant websites, provide public forums to discuss the *National Levee Safety Program* and identify potential Advisory Committee members and experts. The Council will promote consistency of terminology, messages and approaches across the federal agencies.

Step Two: Establish a *Public Involvement and Education/ Awareness Standing Committee* of the National Levee Safety Commission

Figure 12: Beyond Risk: you have more than one tool



Mitchell, P & Martin, T. "Common Behavioral Determinants" Salter>Mitchell. 2007.

Figure 13: Risk Equation Definitions

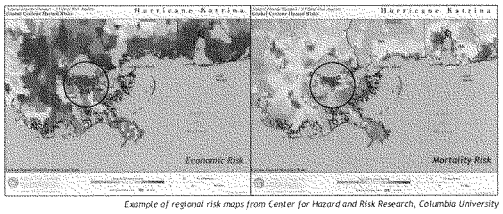
Risk = Probability X Consequence

(1) Loading Event Probability
(2) Potential Failure Mode Probability of Failure
Release Severity Probability

(3) Loss of Life
Economic Damage
Other Consequences

Example of Regional Risk Maps

These maps are part of a global examination of risk from natural hazards



Example of regional risk maps from Center for Hazard and Risk Research, Columbia University

- The standing committees should include federal, state, local and private sector communication experts who will be responsible for the development and implementation of the public involvement and awareness/ education program (9-13 members, ideally). The standing committees should have adequate resources to reach out for specialized expertise as needed for consultation, material generation, peer review, etc.
- The standing committees should work to ensure better cooperation and consistency between agencies by taking over from the *Coordinating Council for Communication for Levees.*
- The standing committees should establish ***national leadership*** in all aspects of a comprehensive public involvement and education/ awareness program (e.g. target audiences, messages, tools, materials) as well as develop a rollout/train the trainer implementation. The work of the standing committees will include, but is not limited to, the following elements:

1. An assessment of public understanding and needs that has been developed through professional research and surveys and input from the public. This assessment will tie directly to the goals and measurements established for the program. This element of the program can and should include "listening sessions" across the United States that will increase the profile of the issue of levee safety and get the public interested in the effort. The sessions will also provide an excellent database of interested groups and individuals who can later be contacted with additional information.
2. Risk communication vocabulary and components that consistently and clearly explains to the public the risk of living behind levees.
3. Messages, materials and goals aligned with information derived from the assessment and public input, technical recommendations, levee safety policies, and local and state incentives and disincentives.
4. A robust virtual dialogue component including a dynamic, interactive website linked to state and local agencies that can be used for numerous purposes, including continuing the dialogue on levee safety, collaborating, asking questions and getting answers from experts, public discussions, computer simulations, keeping audiences aware of the status of the program in their area, providing communication templates and programs, and housing best communication practices and training tools. This component should also include opportunities for people to interact with the data and to see things in ways that make sense to them such as maps that show inundation levels, videos of homes that have been flooded and other images that will command respect for the damage potential and safety hazard.
5. Materials for use by trainers, government officials, organized by target audience.
6. Training program to teach communication skills and effective use of materials and a program to "train the trainer" to ensure proficiency at the state and local levels.
7. Technical assistance to state and local agencies and private owners.
8. An educational program for school-age children.
9. An annual report to Congress and the public on the state of levee infrastructure, the outcomes of the program that reflect positive changes to our citizens' lives, and the overall efforts and status of the NLSP.
10. Measurement of the effectiveness of public involvement and education and awareness efforts.

Examples of Recommended Materials

- Topical discussion guides (e.g., flood risk management, dam safety, infrastructure)
- Background papers
- *National Levee Safety Program* basics
  - Need for the program
  - Anticipated changes
  - Mechanics/timeline
- Templates
  - How to hold a public workshop, charette, focus group, coffee klatch and advisory group
  - Basics of risk communication
  - Road signage
  - Developing an evacuation plan
  - How to talk to your community about mitigation
  - Setting up a "Citizen Levee Watch"
- List of potentially interested parties (e.g., civic clubs, COGs, Chambers of Commerce, professional associations)

The following table represents major target audiences, possible sought-after behavior change, and information and tools needed to achieve behavior change. The Committee should consider these, but not be limited by them.

Provide Technical Materials, Assistance and Training to States and Communities

Crucial to the successful adoption and consistent implementation of a *National Levee Safety Code* is a comprehensive and informative set of technical materials and direct technical assistance. This is particularly critical in the levee context since a majority of the levees in the country are outside the purview of the federal government. States and local agencies need to be provided the knowledge and the tools necessary to have an approvable levee safety program, particularly in the start-up phase.

The level of expertise with regard to the design, analysis and inspection of levees varies greatly across the country. The success of a national program depends upon common and highly sophisticated understanding of levee design and performance. The success of a NLSP is dependent on increasing the expertise and number of levee professionals across the country—hence a comprehensive training program.

The design, operation, and maintenance of levees are constantly evolving. With that evolution is the need to facilitate the flow of new and updated technical information. While conferences, technical assistance, and training are all proven methods to accomplish this, all three

Figure 14: Example Target Audiences and Desired Behavior Changes

Target Audience	Behavior Change Desired (examples only)	Information & tools (examples only)
Homeowners	Buy flood insurance elevate/ floodproof home	NFIP information; height of potential flooding; information on FEMA assistance with floodproofing; calculator of household damage at various depths of flooding
	Elevate/floodproof home	Information on FEMA assistance, technical specifications, articulation of financial benefits, calculator of estimated damage with X feet of water
Individuals living in a "leveed area"	Develop emergency plan	Examples of emergency plans; height of potential flooding; evacuation routes; checklists for what to take and timeline
	Evacuate when requested	Marked evacuation routes, e-mail alerts, checklists for what to take, articulation of consequences of staying
	Observe levee for problems	"Levee Watch" program
	Support Levee Safety Programs through resources (taxes) for operations and maintenance	Inspection reports, levee system assessments, stating consequences associated with deficiencies
Levee owner	Maintain reliable levees (e.g., O&M, rehabilitation) Inform public if levee is in danger of failing or overtopping	Inspection reports and assessments, make deficiencies public, better understanding of liability, state program enforcement
State and local governments	Develop and maintain robust levee safety programs	Information regarding number of people at risk, estimates of damage to critical infrastructure, economic impacts, need for compliance with *National Levee Safety Program*
Technical societies	Explain how levees are designed to work and limits of their use	Current standards and where problems with those standards are occurring; review of proposed new standards
	Advocate for funding required for levee infrastructure upgrades	Existing "lobbying" programs within societies; existing education and public awareness programs sponsored by societies
Developers, realtors, homebuilders	Promote floodproofing in new construction and renovation	Long term benefits to clients and customers and the sustainability of the community as whole
Media	Reporting on NLSP creation and progress Educate public about levee issues Develop a cadre of levee experts	Information about compliance, educate public about potential consequences of levee failure, statistics on what is protected by levees
School children	Increase geographical understanding of students protected by levees, awareness of benefits and risks, encourage parents to know how to evacuate and practice (similar to fire)	Education programs, field trips, incorporate into history and geography curriculum
Insurance	Provide financial breaks to those who take steps to mitigate damage through raising buildings, floodproofing, emergency plans	Mitigation measures that can be provided to customers

approaches in concert are more valuable.

The Corps is arguably the Nation's preeminent expert in levee design, analysis and inspection. A program that builds on that expertise (and lessons learned from the Dam Safety Program) will be the most effective and efficient. The Commission should work with the Corps to develop this three-pronged effort in developing and implementing: 1) technical materials; 2) training program; and 3) direct technical assistance. Specific recommendations can be found below.

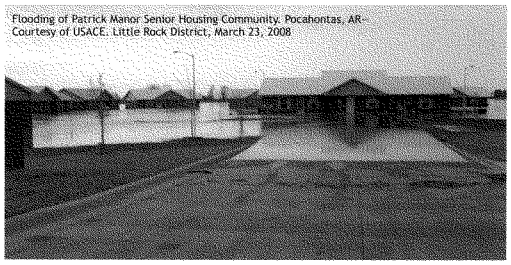
Recommendation #10: The National Levee Safety Commission should contract with the Corps to take the lead responsibility and be provided the necessary funding to develop, maintain, and periodically update technical assistance materials dealing with state and national levee safety programs and the physical integrity of levees.

- The Corps has numerous technical publications that cover a broad array of technical information to include levees and related materials. The Corps should consolidate its published information pertaining to all aspect of levees (planning, design, construction, O&M, etc.) and make available on the NLSP web site and periodically update.
- The USBR should provide materials, expertise, and resources in developing technical assistance materials with respect to canal structures.
- The Corps' Engineering and Research Development Center (ERDC) should initially conduct a literature search for best practices pertaining to all aspects of levees and publish on the NLSP web site and periodically update. The materials should be organized in a manner that is easily accessible and usable. Over time, the responsibility for the content of the technical assistance materials should be led by the standing Technical Committee of the Commission.
- Advertise, promote and educate the public, state and local agencies, owners and operators on the material available, how to access, and how to utilize the information to establish a state levee safety program and address the physical integrity of levees.

This recommendation is dependent to some degree on developing the *National Levee Safety Code*. To begin to energize the states and for local governments and others to take a more active interest in levee safety, state and local entities have to be provided some tools with which to work.

Recommendation #11: Develop a national levee safety training program that includes the following minimum elements:

- A specific curriculum, the successful completion of which would result in the certification of the graduate as a "Certified Levee Professional";
- Under contract with the Commission, the Corps should expand its current training program at either the Huntsville Center or Davis (HEC) to add classes in levee design, analysis and inspection. These classes should be made available to public and private sector. Consideration should also be given for the Corps to contract some of the training out to the private sector;
- National training opportunities--host recognized authorities in the engineering field to present and discuss analysis techniques, construction methods and other issues that can increase the expertise and information available to all engineers in the levee safety community;



Flooding of Patrick Manor Senior Housing Community, Pocahontas, AR--Courtesy of USACE, Little Rock District, March 23, 2008

- Local training through direct assistance to the states;
- Self-paced training; and
- Annual National Levee Safety Conference sponsored jointly by pertinent federal agencies (e.g. Corps, FEMA, and USBR) and/or national flood management professional organizations (e.g. ASDSO, USSD, NAFSMA, ASFPM). This could be based on *The National Flood Risk Management: Levee Safety Summit* which was held in St. Louis, MO, in February 2008 (co-sponsored by the Corps and FEMA and jointly hosted by ASFPM and NAFSMA)—a combination of information sharing and training opportunities.

Develop and Implement Measures and Practices to More Closely Harmonize Levee Safety Activities with Environmental Protection Requirements and Principles

For levees to perform adequately and reliably, it is essential to perform maintenance and rehabilitation activities before a project becomes functionally impaired or failures begin. Non-federal partners have had difficulties in the past obtaining the necessary permits to perform needed operations and maintenance activities on existing federally-partnered levees, many of which have operations and maintenance activities outlined in manuals developed and issued to sponsors before the passage of current environmental protection laws such as the Clean Water Act and the Endangered Species Act. In order to better harmonize these perspectives and ensure that the protection of human life is not compromised, the Committee recommends a series of actions to better understand and remove barriers to effective levee operations and maintenance.

Recommendation #12: Develop and implement measures and practices to more closely harmonize levee safety activities with environmental protection requirements and principles.

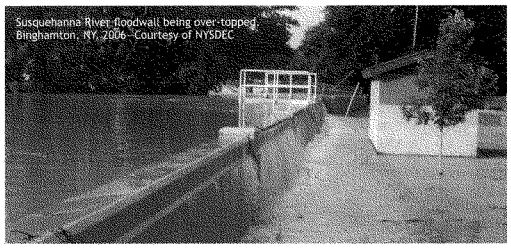
- The Commission should direct Research and Development efforts to evaluate O&M practices for existing projects and to develop cost-effective measures to make O&M practices more compatible with present-day natural resource management principles. Development should be by an interdisciplinary team, comprising technical and environmental expertise, addressing the need to protect public safety and the need to protect natural resources.
- The Commission should establish a standing committee to address O&M for existing projects and to address how to better coordinate environment and safety issues on rehabilitation and new construction.
- The Commission should require states to establish an approach to facilitate operations and maintenance permits among each of the state resource agencies as part of a qualified program.

Conduct Research and Development to Support Efficient and More Cost Effective Levee Safety Programs

A major challenge facing those responsible for levees is conducting appropriate and rapid geotechnical assessments of levee integrity. These assessments are critical to providing assurances of levee safety. However, such assessments, depending on the nature of the material and the cross section of the levee, are commonly very costly. The bulk of the costs are related to the number and depth of soil borings. While some research is underway in Japan and the Netherlands on use of remote electro-magnetic sensors, no reliable methods or technologies are currently available in the United States to replace soil borings, with the principal exception being cone penetrometer soundings. Currently, very little effort is underway in the Research and Development (R&D) community to deal with this challenge. Early R&D efforts should focus on improvement of rapid assessment of levee geotechnical

Creating a Cadre of National Levee Experts: Certified Levee Professionals

In order to ensure a high level of professional training and experience and significantly expand the levee expertise needed to accomplish our national and local goals, delegation of the *National Levee Safety Program* (or parts thereof) to state and/or local entities should occur only if that entity has at least one "Certified Levee Professional" (CLP) on staff (or under contract) that is significantly responsible for the program. Such certification will only be granted to Licensed Professional Engineers with applicable expertise, experience, education, knowledge skill and ability in levee safety and who successfully complete this certification program. In addition, a provision for continuing education will be mandatory to maintain the certificate. Names and professional information regarding CLPs will be kept on file at the National Levee Safety Commission.


Susquehanna River floodwall being over-topped, Binghamton, NY, 2006--Courtesy of NYSDEC

characteristics and integrity, and should consider research initiatives that would look at improved use of helicopter electromagnetic (HEM) and ground-based electrical resistivity surveys.

Conducting a dialogue with the most preeminent and influential members of the R&D community will bring together the best minds to help assure that an integrated, collaborative and comprehensive R&D program is developed and implemented. This will also provide potential sources of funding for the program.

There currently exists a large body of R&D knowledge both nationally and internationally that would be helpful to owners, operators, regulators, etc. Consolidating the body of knowledge and making the information easily accessible would be of great benefit and something that could be provided relatively early on. Assembling a working group to further develop a prioritized list of future R&D needs will help assure that the appropriate R&D is being conducted that meets the needs of all interested parties.

Recommendation #13: Develop a Research and Development (R&D) program funded at the federal level, and guided by a Standing Committee of the National Levee Safety Commission, that includes as a minimum:

- Innovative technology for repairs and improved engineering methods that would lead to more reliable levees and more cost-effective approaches.
- Technical and archival research-- The Corps' ERDC should conduct a search of current technology for repairs and improved engineering methods, tools and products for dissemination.
- Assistance by the National Science Foundation to focus some of its research on improving rapid assessment of levee geotechnical performance.
- Dissemination of research products (e.g. technical manuals and guidelines, workshop and conference proceedings, training manuals, executive summary documents, brochures) to the levee safety community.
- Technology and tools to enhance the security of levees at the operation level.
- Establish guidelines and a program for the forensic investigations of levee failures and/or severe levee distress.

A standing Technical Committee of the Commission should provide advice on program direction and priorities. The Committee should include representatives from academia, National Science Foundation, National Research Council, White House Office of Science and Technology, National Science and Technology Council, and the Corps' ERDC.

Design and Delegate Program Responsibilities to States

The foundation of a strong *National Levee Safety Program* is effective state and local programs. *As discussed in more detail in the next section, Building and Sustaining Strong Levee Safety Programs in All States*, states are best positioned to organize, implement and oversee levee safety programs within local communitees across the country. They have a combination of necessary legal and taxing authorities, statewide reach and relationships to make programs successful. As with other national regulatory programs that require consistency and adherence to national standards (e.g., National Pollutant Discharge Elimination System, National Dam Safety Program), states need clear, rational standards, helpful guidance, training and implementation assistance, funding assistance and

an open dialogue with the federal government. It is one of the most important roles of the Commission to develop an effective and efficient delegated program to states.

Major steps needed to develop and sustain a delegated program to states are:

Development of Standards
- Design & construction
- Rehabilitation
- Operations & maintenance

Development of Processes
- Inventory and inspection
- Risk assessment
- Improvements
- Oversight
- Enforcement

Program Elements
- Technical
- Legal
- Financial
- Administrative
- Institutional

Major Delegation Steps
- Develop guidance
- Provide technical assistance
- Communicate with and involve stakeholders
- Provide financial support/grants
- Review delegation plans and packages
- Negotiate
- Approve/disapprove
- Oversee
- Rescind state program (if necessary)
- Operate federal (regional) program for non-delegated states

Building and Sustaining Strong Levee Safety Programs in All States: *The Cornerstone of a National Levee Safety Program*

The National Levee Safety Act clearly indicates Congress' intent that state levee safety programs be created through delegation to better manage the critical life safety infrastructure associated with non-federal levees. The benefits of building and sustaining strong state levee safety programs are multiple:

- States are uniquely positioned to oversee, coordinate, and regulate local and regional levee systems as they already have such roles with regard to other elements of infrastructure and the environment. It is not appropriate or realistic to approach the management and oversight of local and regional levee systems from a single, national level. Allowing for a degree of variation and tailoring to meet local needs and circumstances rather than a national, one-size-fits-all approach is desirable.
- Coordinating and leveraging existing and complementary programs are already underway in some states.
- The authority for creating and implementing state levee safety programs rests with individual states, not the federal government.
- States are best suited to compel standards and good practices of local levee owners and operators.

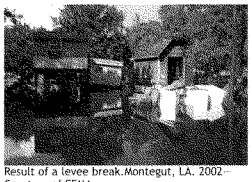
Complimentary State and Federal Levee Safety Programs. In establishing and sustaining state levee safety programs, there are distinct roles for both the Commission (addressed earlier in recommendations) and for the states with delegated levee safety programs. States would operate such programs in conformance with national standards and requirements and provide timely and regular notification of their performance to the Commission. The Commission would, in turn, provide grants, training, technical assistance and guidance, clear national standards, and monitoring to ensure the success of the delegated programs. States with levee safety programs that exceed the minimum qualifications would receive additional incentives.

Promoting Tribal Levee Safety Programs

Congress intended to include the participation of Indian Tribes in the development of a *National Levee Safety Program*. This is evidenced by the specification to have tribal representation on the National Committee on Levee Safety. Unfortunately, no tribal representatives were able to fully participate at the Committee level during the very short time period when the Committee was convened to develop this report. However, the Committee was able to benefit from review comments provided by tribal representatives. The Committee recognizes that tribes represent sovereign entities and that there are commonly many jurisdictional issues between tribes and other agencies. The Committee also recognizes that different tribes, as with different states, will have different capabilities in implementing levee safety programs. Nevertheless, it is essential that efforts be made to ensure that people living on tribal lands will also benefit from levee safety programs. The Committee believes that states and the National Levee Safety Commission will work collaboratively with tribes in developing levee safety programs, and that different approaches and arrangements will be developed on a case by case basis. The Committee looks forward to the participation of tribal interests in the further refinement of the recommendations encompassed in this report and in the development of a *National Levee Safety Program*.

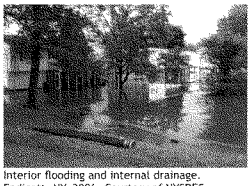
Physical Systems Approaches
Multi-jurisdictional programs are potentially a more effective basis for overall management of levee systems that do not lie entirely within any one political jurisdiction. States should be encouraged to cooperate with other state, local or federal entities to implement levee safety program elements for levee systems that cross jurisdictional boundaries. Such systems approaches are desirable because floods respond to physical systems—basins, protected areas, and major basin areas—not political or jurisdictional systems. The Commission would encourage systems approaches by providing additional incentives to states that implement NLSP elements through inter-jurisdictional cooperation agreements.

Principles of Delegation
States have primary authority for implementation of a levee safety program within their borders and it is the primary goal of the NLSP to delegate to and have strong state levee safety programs. The Committee recognizes that there likely will be instances where other approaches and delegation are necessary: (1) in the event that a state does not qualify for a delegated program, the Commission may consider designating local governments within the state to implement elements of the NLSP if the Commission judges such designation to be in the best interest of levee safety and/or conduct certain minimal levee safety activities via the Commission; (2) states may further delegate responsibilities for levee safety actions within their state; and (3) there are operations and maintenance requirements that belong at the owner/operator level and should not be assumed at the state or federal organizational level.


Result of a levee break.Montegut, LA. 2002—Courtesy of FEMA


Flood damaged levee. Bainbridge, NY—Courtesy of NYSDEC

Susquehanna River at top of Floodwall. Binghamton, NY. 2006—Courtesy of NYSDEC


Interior flooding and internal drainage. Endicott, NY. 2006—Courtesy of NYSDEC


Mississippi River Levee. Midwest Flood. 1993—Courtesy of FEMA

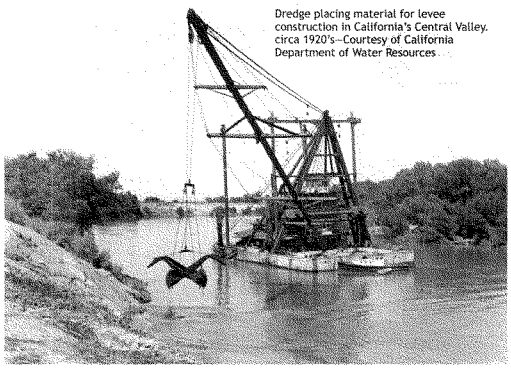
Key Elements of a State Levee Safety Program

Recommendation #14: Delegate implementation of *National Levee Safety Program* activities to qualified states.

Delegation should be highly encouraged, and therefore obtainable with qualifications necessary to perform the basic functions of the NLSP. The requirements of a State Levee Safety Program include three primary elements: legislating statutory authorities; implementing rules, regulations, and procedures; and securing resources for these activities.

Statutory Authorities

1. To participate in the NLSP as established by the federal government.
2. To receive such funds as the federal government may make available for program implementation, and to distribute some portion of those funds to local government entities, consistent with the national program requirements.
3. To adopt or establish standards for levee classification, inspection, construction, operation, maintenance and emergency preparedness.
4. To perform or require performance of inspection of levees, and to prepare or require preparation and submittal of inspection reports and records.
5. To require or perform development and implementation of emergency action planning procedures.
6. To prepare reports of levees within the state, including location, condition, maintenance, areas protected, and risks posed thereby and to publish and distribute such reports to public or private entities.
7. To communicate with and educate local government and the public at large about the risks and benefits associated with levees and other flood-risk reduction measures, and to promote prudent practice with regard to levees.
8. To require that local government develop and implement emergency action planning procedures and evacuation plans for imminent or actual levee failure.
9. To enter public or private property for safety inspections or to perform emergency action.
10. To promulgate rules, regulations and procedures to implement these statutory authorities.



Dredge placing material for levee construction in California's Central Valley. circa 1920's--Courtesy of California Department of Water Resources.

Rules, Regulations & Procedures

1. To coordinate levee safety activities among entities within the states owning, operating, regulating or using levees and between those entities and the NLSP.
2. To receive and review application packages from entities within the state for grants from the NLSP, to submit acceptable applications to the NLSP, and to receive and disburse grant funding from the NLSP.
3. To request an initial inspection by the Corps of the levees within the state's jurisdiction.
4. To inspect or require the inspection of the levees within the state's jurisdiction at least annually and after all significant high water events. The inspections should be performed under the supervision of a registered engineer who possesses a levee training certificate from the NLSP.
5. To provide information to the national levee database for the levees within the state and to provide updates at least annually, following the standards for the database, including identifying the hazard potential classification of levees.
6. To implement a levee risk communication and public outreach/education program, including publication of an

annual report on the State Levee Safety program, and on the results of levee inspections, and providing public notification of the maintenance ratings and risk behind levees.

7. Adopt the *Interim National Levee Engineering Guidelines*, and when available, the *National Levee Safety Code*, for all levee projects under state jurisdiction or involving state funds.
8. To require that all communities protected by *Significant* and *High Hazard Potential* levees develop emergency action and evacuation plans in accordance with NLSP guidance.
9. Adopt measures as needed to require consideration of non-structural measures associated with any levee related activities.
10. To have a FEMA approved *Hazard Mitigation Plan*. Updates of plans should specifically reflect current condition and activities associated with levees.
11. To require that states provide liaison and coordination on environmental permitting actions.

Resources

Funding, qualified personnel, equipment and vehicles to conduct elements of a state program are the responsibility of states, local governments, and owners and would be principally provided by the states.

Absence of Delegation to Qualified State

In the absence of delegation to a qualified state program, the Commission should implement the following program measures:

- After an initial federal inspection and assessment, conduct or cause to be conducted an inspection of high or significant hazard potential levees after significant flood events, and at least every five years, and update the National Levee Database.
- Provide inspection reports and findings to local emergency management officials.
- Conduct a program of public information concerning the presence of levees, their condition and their associated risks, including notification of the state legislature and governor.
- Other and further action as the Commission deems appropriate to encourage, publicize the benefits of and foster support for a qualified state program.

Philosophy of Incentives and Disincentives

The Committee recommends that the start-up period of the NLSP and delegated state programs be highly encouraged through both direct support (e.g. program start-up grants, technical assistance, training) with no penalties for non-participation. After the start-up period is complete and states have been afforded ample opportunity and assistance to ensure the safety of their populations through strong levee-related mitigation activities and the maintenance of reliable and resilient levees, an increasingly substantial set of disincentives should be applied.

Over time, increasingly stringent disincentives (e.g. lower priority for flood control funds) should be applied, making it more difficult for states and local governments to secure federal investment (e.g. public housing, schools) in areas located behind uncertain or unreliable levees. The Committee believes that this phased approach toward application of incentives and disincentives recognizes two strongly held and equally important beliefs:

- Significant time and assistance is needed for state/local governments and owner/operators to understand and address their levee situation (this problem took years to develop and will not be fixed quickly); and

National Levee Safety Program Requirements for Owners and Operators

It is the opinion of the Committee that it is most effective and efficient for owner/operators to continue to be the primary responsible parties for crucial day-to-day activities. Recommendations to create a national program and delegated state programs do not take the place of the following key responsibilities of owner/operators (in some cases owners/operators are federal and state government agencies):

- Perform routine O&M including
  - routine inspection
  - routine maintenance
  - appurtenant works maintenance
- Perform on-site specific training
- Fulfill specific role in Floodplain Management Plans (in coordination with state and local governments)
- Local communication and education of risks
- Provide flood fighting and notification of distress
- Coordinate with local/regional flood fighting
- Participate in shared/new construction
- Perform repair, rehabilitation, replacement with sufficient property rights
- Develop and communicate emergency action plans (in coordination with state and local governments)

- Continued federal investment in leveed areas that do not invest in protecting the people and property located behind them (e.g., participate in a minimum state program) is both fiscally irresponsible and places citizens at unacceptable risk.

It is also the philosophy of this Committee that there are many additional levee related activities and responsibilities beyond minimum program requirements that should be performed at the state and local levels. Incentives should be offered to perform them. Because there is such a wide array of potential activities that may be utilized to increase the robustness of a state or local levee safety program, delegated programs that exceed the minimum requirements should be rewarded in proportion to the public safety benefits provided by the particular combination of activities they are performing. This could be addressed using a system of rewards like the Community Rating System, wherein a point-based system is applied to measure many different floodplain management activities and reward communities, through discounted insurance premiums, in proportion to the strength of the community's floodplain management program.

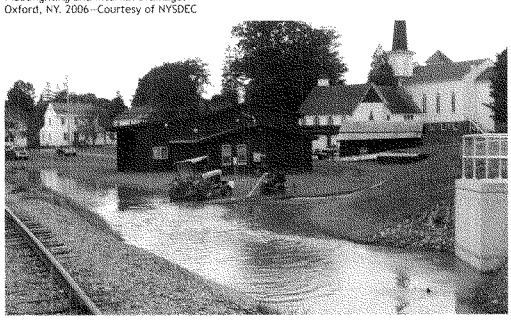
This document addresses incentives and disincentives in two main sections of this report. In the section *Financial Assistance Needed to Address Our Nation's Levee Problem*, the Committee describes two funding sources required to make state and local programs successful. The section entitled *Aligning Existing Federal Programs to Promote Effective Mitigation in Leveed Areas* recommends specific adjustments to three FEMA programs to limit federal financial exposure and reward good levee behavior. This section also suggests potential other areas of exploration as incentives/disincentives for investing in levee safety programs.

Please note that many of the incentives/benefits for state delegation as described in *Aligning Existing Federal Programs to Promote Effective Mitigation in Leveed Areas* can also be used as disincentives down the road. For example, eligibility and preference for P.L. 84-99 rehabilitation funds could be afforded to communities in states where there are qualified state levee safety programs. Conversely, lack of eligibility, lower priority or lower federal cost share should be afforded to projects in states that (at some point down the road) fail to create a qualified state levee safety program.

Financial Assistance Needed to Address Our Nation's Levee Problem

Considering the lack of understanding we have of the location and condition of our nation's levee infrastructure, the potential for catastrophic failure in some urban areas and the need for a coordinated, common approach to assessment, prioritization and risk reduction activities, the Committee proposes to Congress the need for two separate, but equally important sources of federal assistance. First, in order that the degree to which your levee safety is not dependant upon where you live, the Committee believes that federal funds should be expended to stand up levee programs in all 50 states with the degree of funding related to the hazard and complexity of levee safety in that entity. Second, the Committee proposes to Congress the

Floodfighting and Internal Drainage.
Oxford, NY. 2006--Courtesy of NYSDEC



Commission Should Reward States and Local Communities Who Display Superior Performance

Experience with the NFIP and other federal programs suggest that states and communities benefit from availability of specific incentives to encourage best practices to exceed minimum program requirements. In the absence of such recognition, states and local governments operating within significant budget constraints often rely solely on minimum standards to comply with a federal program. Unfortunately, experience also teaches that reliance on minimum standards in the natural hazards risk management realm can have catastrophic results, such as to increase loss of life and property in disasters. This recommendation would provide for incentives and disincentives for hazard reduction and mitigation. These hazard reduction and mitigation activities can be far more effective at managing risk than rehabilitating or improving the levees themselves and are of enormous benefit both to the community and to the nation. Where feasible, they should be implemented as alternatives to levee work. Where levee work is occurring, these activities can be key elements of an overall flood risk management strategy for the leveed area.

State levee safety programs that exceed minimum requirements by permitting levee work and regulating new/enhanced levee construction will help to manage flood risk in the state and benefit the state and the Nation.

As part of the recommendation to support strong state programs, the Commission should identify, support, and incentivize best practices for states and communities to exceed minimum requirements for delegated levee safety programs and for managing risk in leveed areas. The National Levee Safety Commission, FEMA, the Corps, and other agencies should identify opportunities within their programs to reward states and communities for superior performance. A system of incremental rewards, through various incentives, should be developed to provide rewards to states and communities that are doing the most to manage their levee systems and their flood risk in leveed areas. The Community Rating System is a good example of such a system of incremental incentives/rewards linked to desired behavior or best practices.

States with successfully operating levee safety programs should be rewarded to the extent that their safety programs exceed minimum requirements, such as by:

- Requiring permitting or registration of all levee systems.
- Requiring compliance with the National Levee Code for all levee construction in the state.
- Requiring approval of design and construction of new levees and levee alterations.
- Performing levee construction inspections.
- Ordering procedural or operating changes, maintenance, repair, degrading, removal of encroachments, or removal of levees, where identified as the best measure for risk management.
- Performing or contracting for maintenance, repairs, emergency actions, degrading, removal of encroachments, or removal of levees.
- Taking over maintenance responsibilities of levees not being adequately maintained by a local owner/operator.
- Acquiring property rights (e.g., eminent domain) for levee safety, where necessary to prevent harm.
- Encouraging community participation in the NFIP and even exceedance of the minimum NFIP requirements (especially floodplain management in leveed areas).

States and communities should be rewarded when they exceed minimum requirements for managing flood risk in leveed areas. These include both nonstructural and structural alternatives, such as:

- Enhanced public involvement, outreach and notification regarding flood risk associated with levees.
- Enhanced involvement of levee owners/operators to provide for opportunity for review, comment, and approval of proposed development in leveed areas.
- Notification to prospective buyers in leveed areas of flood risk, state's status in the NLSP, and community's status in the NFIP impacting availability of federal flood insurance.
- Public notice of state's status in NLSP.
- Public notice of community's status in NFIP and availability of federal flood insurance.
- Promotion or requirement of flood insurance purchase.
- Requiring community participation in the NFIP.
- Contribution of locally generated data regarding levees to floodplain mapping.
- Levee hazard mitigation activities as part of an enhanced community or state levee safety or hazard management plan, which may include:
  - Buyouts/relocation of structures
  - Elevation of buildings
  - Floodproofing of structures
  - Enhanced building codes
  - Enhanced land use, zoning, and local community planning to prevent intensification of development in leveed areas contrary to tolerable risk guidelines
  - Preservation of open space to allow for flooding, and to prevent harm in the event of levee overtopping or failure
  - Requirement of flood water retention/detention areas, constructed wetlands, and similar nonstructural flood risk reduction measures
- Reservoir reoperation.
- Channel enlargement.

development of an additional federal cost share program whose intent is to make more reliable and resilient existing levees as well as assess whether a structural solution is the most appropriate.

Grants to Create Levee Safety Programs in All States

Many states and communities have difficulty raising funds for levee safety activities. Levee safety program activities that assist individuals and local governments in better measuring and understanding risk to human health and safety and better cost estimates of potential flooding damages will make this easier over time. However, in the interim, to make the NLSP achievable, states will need funding to get the program up and running and to keep it sustainable.

The consideration for grant prioritization for *National Levee Rehabilitation, Improvement, and Flood Mitigation Fund* described in the next section will provide a great deal of incentive for most states and local governments. This, in combination with these start-up grants, will likely incentivize states to implement a levee safety program sooner.

Upholding the adage that an *ounce of prevention is worth a pound of cure*, the Committee believes that federal investment in setting up state safety programs will reap a many fold reduction in the need for federal disaster assistance, reducing the overall federal investment.

Recommendation #15: Establish a new levee safety grant program to assist states, local governments and owners and operators to achieve strong levee safety programs.

The Committee envisions that state levee safety programs will include state and local levels of government working cooperatively to accomplish the program goals, with a division of responsibilities as each state and local government is able to decide. Federal funds to assist state levee safety programs would therefore flow to the agency that is actually performing the federally funded work. It is intended that much of the funding would be delivered through state programs to the responsible agency performing functions such as inspections, preparation of reports and emergency action planning. Thus, it is envisioned that much of these funds would end up flowing to levee owners/operators and to the local agencies. Consequently, one of the requirements for a delegated state program is the ability to manage and disburse federal grant funds. Further, the administration of grants by the Commission to carry out this work must help verify that grant funds are used to reimburse the actual agencies that are completing the tasks associated with state levee safety programs.

- *Note: While the Commission is being created, FEMA should administer the grant programs on their behalf. Once the necessary processes and resources are in place to properly administer this activity, the Commission would assume responsibility.*

Additional support/funding could be provided to states to support to multi-jurisdictional or levee system-specific programs.

Raising Funds to Support Strong Levee Safety Programs

While federal grants will be critical for establishing and maintaining strong levee safety programs within states and local communities, it will continue to be necessary for states, communities and levee owners to raise funds to conduct necessary state, local, and owner/operator activities in perpetuity. The people that live, work, and own property in leveed areas are the most direct beneficiaries of levee program safety activities and should be the primary source of funds for upkeep and mitigation activities. Further, funds generated at the state/local level are critical for healthy safety programs and can often serve as the nonfederal match for federal cost sharing opportunities. The examples below describe two existing state approaches to funding levee safety activities:

State of Texas: Texas State statute provides for collection of fees on flood insurance premiums, generating $6.2 million biannually to support floodplain management throughout the state.

State of California: The State of California passed two major bond initiatives in 2006, authorizing $4.9 billion for flood management activities. Most of the bond funding is for repair and improvement of levees, with requirements for local cost sharing to match the state funds. Approximately $15 million per year supports maintenance of certain levees in the Sacramento-San Joaquin Delta.

Like the Texas approach, states could require a fee on flood insurance premiums sold in leveed areas (e.g., AL and XL zones) and use the generated funds for the levee safety program. Caution would need to be exercised in establishing such fees in areas behind accredited levees (e.g., XL zones) prior to implementation of mandatory flood insurance in these areas, because doing so may reduce the number of voluntarily purchased flood insurance policies.

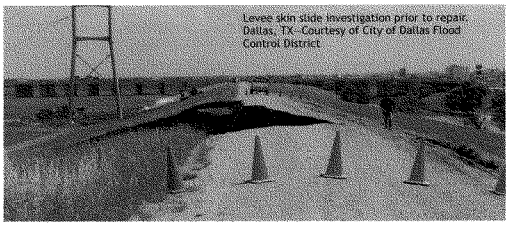
National Levee Rehabilitation, Improvement, and Flood Mitigation Fund

The *National Levee Safety Program* legislation being proposed will help enhance public safety by:

- Creating a National Inventory of Levees with Inspection Information
- Establishing National Levee Safety Standards
- Requiring Levee Safety Programs in All States
- Requiring Inspections and Providing for Assessments of Levees
- Funding Research to Enhance Technical Expertise for Levees
- Establishing Training Programs for Levee Safety
- Educating the Public, Levee Owners and Others About Risk and the Need for Strong Levee Safety Programs.

While the NLSP will contribute to reducing the risk to life and property and help improve the safety of our nation's levees, the safety of levees demands much more attention from national policymakers. This program basically establishes only the minimum effective management program for the nation's levees and related infrastructure. By itself, the NLSP does not provide funding to address the many levee deficiencies that are expected to be discovered and documented.

Failures and devastation will continue to occur and threaten this nation as levees continue to age and deteriorate and as urban populations grow and development behind levees increases. Because of increasing population and development behind levees, the risks are expected to actually increase over time even if modest levee improvements are made. Failures affect large populations, flood into neighboring states and cost millions of dollars in federal disaster relief spending. There are likely many thousands of miles of unreliable levees throughout the United States. Events over the past two years illustrate the catastrophic results that can occur. The eyes of the nation were focused on the catastrophic consequences of Hurricane Katrina in New Orleans.



Levee skin slide investigation prior to repair. Dallas, TX—Courtesy of City of Dallas Flood Control District

The management processes contained in levee safety programs, in and of themselves, do not solve problems that continue to grow as levees deteriorate and needed rehabilitation to bring them up to current safety standards is deferred. The priority on rehabilitating our aging and deteriorating national infrastructure must include levees. In 2006, the State of California passed two bond measures that would provide $4.9 billion for levee and other flood protection repairs and improvements. However, this figure pales in comparison with the $30 billion experts say may be needed across the state. A review by Scripps Howard News Service of levee oversight and funding at the state and national level suggests the new focus still may not be sufficient to overcome decades of neglect.

The expansion of a *National Levee Inventory* will further enhance the recognition and realization of the deteriorating condition of many of the nation's levee structures and of the lack of a focused public policy to address the problem. Federal, state and local levee owners will then need a funding source to assist with rehabilitating our aging and deteriorating levee infrastructure and correcting decades of neglect. It is difficult for many levee owners to find the funding necessary to undertake rehabilitation work when necessary. Often, vital repairs are neglected, and these levees are subject to further deterioration due to lack of funds and neglect. Deterioration can lead to levee failure. These types of disasters can cause great destruction and loss of life, with no respect for state boundaries. A few states across the country, such as the State of California, have established innovative funding programs but there is currently no comprehensive federal funding mechanism to assist

levee owners. Levee districts, like many levee owners, are strapped for cash, especially the large sums needed to finance costly levee repairs. The challenge at federal, state and local levels continues to be securing adequate funding countrywide for levee rehabilitation.

Key questions before the American people are:

- Will the federal government find a way to assist levee owners or will future catastrophic levee failures with resulting property damage and loss of life continue to occur?
- Will the nation learn from the experience of Katrina that it is far better to invest in levee rehabilitation rather than disaster relief and recovery? (i.e. pay me now or pay me more later)

It is a reasonable expectation of every US resident to be protected from preventable disasters such as levee failures. There is a critical need to create a federally administered levee rehabilitation and flood mitigation program in order to repair our nation's unsafe levees. Additionally, paralleling such a federal initiative should be similar efforts for state and local governments to create their own loan or grant programs for levee rehabilitation. There is a great need to begin an assistance program at both federal and state levels to help levee owners with their rehabilitation needs. This is a public safety issue.

Recommendation #16: Authorize the National Levee Rehabilitation, Improvement, and Flood Mitigation Fund

A federally authorized program should be developed and cost-shared (65% federal and 35% state/local) for non-federal publicly-owned levees. Funds would be available to address both structural and non-structural measures so long as the combination of measures maximizes overall risk reduction. Provisions could be made where a percentage of the non-federal cost share could be met through implementation of non-structural measures. This program would only be authorized for pre-disaster declaration and would not replace or substitute FEMA Mitigation Program funding. The legislation would provide funds directly to states based on a screening level risk-informed priority system that would be based in part on information taken from the NLD. Such federal assistance would initially be limited to only levee systems that protect existing urban areas that have a high damage potential.

Eligibility for this funding would have several requirements to assure that owners/operators maintain a high level of upkeep of their levees and engage in responsible activities related to the public protected by those levees. In order to be eligible to receive federal assistance a grant applicant must:

- Provide the minimum data to populate the National Levee Database;
- Demonstrate the financial means to provide their cost share contribution for the initial rehabilitation and the financial assistance to operate and maintain the levee system in accordance with the *National Levee Safety Code*;
- Evaluate an array of non-structural alternatives/activities, and where applicable identify a nonstructural/structural blend of flood risk management approaches, and demonstrate that the appropriate combination of measures are being implemented to best reduce flood risk;
- Engage in public outreach/notification;
- Provide buyer notification of flood risk;
- Promote purchase of flood insurance;
- Develop an emergency response plan;
- Develop and implement an *Inspection of Completed Works* program;
- Provide a flood risk management plan as part of a public safety element of a general/master land use plan that demonstrates the local community plan to manage land use over time to move substantially towards the established national tolerable risk guidelines; and
- Participate in the NFIP or be located entirely within one or more participating communities. Although the 1%-annual-chance (100-year) flood insurance standard required by the NFIP does not embody a levee safety standard for protection of life and property, participation in the NFIP demonstrates the community's commitment to review development and enforce at least the minimum standards of the NFIP to prevent harm in and around its floodplains, including areas of residual risk associated with levees.

The federally sponsored levee safety program would be established through legislation that would be enacted at the same time as the Commission. Early funding could be used to assist states and local interests in

conducting levee evaluations that will help inform the condition of levee systems and further facilitate funding priorities. It is anticipated that it will take two years for states to populate the NLD and develop a risk-based tool that would be used to assist in prioritizing the allocation of funds. The authorizing language would, at a minimum, spell out the 65/35 cost-sharing provision; minimum requirements for a state to be eligible for assistance; and further specify that Congress rely on the recommendations of the Commission on the priority of allocation of funds based on the NLD and risk-based assessment performed and the level of appropriations over the next five years.

Aligning Existing Federal Programs to Promote Effective Mitigation in Leveed Areas (incentives and disincentives)

All Federal Agencies Should Adopt the Letter and the Spirit of National Levee Safety Program

First and foremost, all federal agencies should adopt the *National Levee Safety Code* and comply with all other requirements of the NLSP for levees under their jurisdictional control. Federal agencies with expertise may be called upon to provide technical or programmatic guidance, assistance, support, and applicable training in the development and implementation of the NLSP. Federal agency adherence to NLSP requirements is important in that it promotes nationwide consistency in important technical standards, common approaches and messages related to risk communication/public education and improved coordination and harmonization of federal levee-related programs and requirements. Except for a few cases where new authorities might be called for, federal agencies could use their existing authorities to perform these activities.

Aligning Existing Programs

As mentioned in the previous section, *Financial Assistance Needed to Address Our Nation's Levee Problem*, grants should be provided to encourage states to support the set-up and maintenance of levee safety programs and to perform basic activities such as: update and maintenance of basic inventory, inspection, reporting, notification/public outreach, and coordination. Additional support should be provided for the costlier task of rehabilitating and improving levees, as well as the critical assessment of whether levees are the best flood risk mitigation option in a given situation.

In order to ensure that these investments have the greatest possible impact, all federal programs that significantly impact governmental and individual decision-making in leveed areas must be aligned toward the goal of reliable levees, an informed, involved public and shared responsibility for protection of human life and mitigation of public and private economic damages. Federal programs should not only be aligned with each other, but can be used as an enticement (benefits to be accrued upon the development of a

Levee damaged due to overtopping, Hurricane Katrina, St. Bernard Parish, LA, August 2005

state safety program) to responsible levee stewardship. Alignment incentives fall in the following broad categories:

1. Savings/funding to community
2. Eligibility for federal funding
3. Priority for federal funding
4. Cost sharing requirements

In addition to the two funding programs mentioned in the previous section, and three specific FEMA alignment recommendations detailed in this section the Committee recommends the following action.

Recommendation #17: Existing federal programs should be considered for use as possible additional incentives or disincentives to governments and their citizenry that have delegated state levee safety programs, per the requirements set forth by the Commission. For most of the examples below, incentives or the inverse (disincentives) can take the form of the four broad categories noted above (e.g., savings, eligibility, priority or cost share). Benefits from any given incentive may accrue at numerous levels, but it is possible to identify the targeted beneficiaries of the identified potential incentives, as shown below.

Figure 15: Exploring the Need for Potential Incentives and Disincentives Through Existing Federal Programs

Incentives/Disincentives	Property Owners in Leveed Areas	Levee Owners and Operators	Local/ Regional Government	States
FEMA Disaster Assistance (non-emergency) Funds (e.g. Individual Assistance, Public Assistance Sections C-G, Mitigation Grants)	X	X	X	X
Corps P.L. 84-99 Rehabilitation Projects		X	X	X
Federal funds for infrastructure behind levees (e.g. Highway Funds, HUD grants)			X	X
Small Business Administration loans for disaster recovery behind levees	X			
Federal Loan Guarantees for disaster recovery behind levees	X	X	X	X
Federal flood controls projects from the Corps (General Investigations for new authorities & Section 216 for continuing authorities)		X	X	X

Note: Proposals to make changes in existing programs are intended to be revenue neutral. In the absence of new requirements, the intent of the Committee is that the funding for programs in this table remain largely the same, but that distribution of funds, preferences, etc. change as a result of beneficial levee safety practices. This approach is fiscally responsible in that it increases federal investment in communities whose levee safety programs (e.g., evacuation, land use, insurance) are more protective of human health and safety. Conversely, it reduces investment in the communities who forgo good levee safety practices.

The Committee developed the existing recommendations under consideration of the following principles:

- *Immediate disaster response functions should not be included as incentives and disincentives.* Namely FEMA's Public Assistance Program Categories A and B and the Corps Flood Fighting function under P.L. 84-99 should be available to all communities in the face of a natural disaster. To withhold such immediate funds is inhumane, flies in the face of public safety, and does little to promote levee safety behavior.
- *Ensuring that promoting synergies between the National Levee Safety Program and the NFIP do not result in unintended consequences.* Links that are too strong between NLSP and the NFIP may further solidify the dangerous untrue belief by some that the 1%-annual-chance event (100-year) is a "safety standard" (see page 10 for a more in-depth discussion of this challenge). Further, any recommendations that include the NFIP must consider how all program components (hazard identification, insurance, and other mitigation actions) will work together. If they are not considered together there may be serious unintended consequences.

There are three specific recommendations related to the alignment of federal programs: 1) require risk-based flood insurance in leveed areas; 2) enhance FEMA's

mapping program to communicate levee risk; and 3) align FEMA's Community Rating System (CRS) to reward good levee safety behavior.

Mandatory Risk-Based Flood Insurance in Leveed Areas

Flood insurance is one of the most effective ways to limit financial damages in the case of flooding and speed recovery of flood damaged communities. Currently, many people who live in leveed areas do not believe they need flood insurance as they are protected by a levee structure. This recommendation aims at increasing the understanding that living behind even well-engineered levees has some risk (sometimes referred to as residual risk). Implementing this recommendation will result in a greater number of home and business owners being protected from catastrophic financial loss. Further, this recommendation will increase risk awareness and preparedness of the public residing behind well-engineered levees. The Committee believes that implementing this recommendation will incentivize communities to exceed the 1%-annual-chance (100-year) protection standard that has mistakenly become a target minimum. Because premiums would be risk-based, greater protection, through better, more reliable levees or better floodproofing programs would result in more favorable premiums. A similar proposal is contained in legislation proposed in Congress (H.R. 3121, Section 107. Mandatory Coverage Areas).

Recommendation #18: Require mandatory purchase of flood insurance for structures in areas protected by levees with risk based premiums.

Legislation would be needed to authorize mapping of residual risk areas behind levees and to enact mandatory purchase requirements in these areas.

- FEMA would be required to develop appropriate risk-based premiums.
- FEMA would likely publish revisions to the FEMA Mapping Programs requirements and NFIP regulations on a schedule that may be set by Congress.

Please note: Due to the differences in potential failure consequences, function and ownership, the Committee recommends that mandatory flood insurance not be required behind canal structures that do not have a significant role in providing hurricane, storm, or flood protection.

Enhance FEMA Mapping Program to Communicate Levee Risk to Communities

Identification of levee system consequence zones associated with levee failure will aid in determining hazard classifications, properties targeted for public outreach, funding, evacuation planning, mitigation, and other program components. The zones will set the boundaries for application of the NLSP.

FEMA is well-positioned to assist in levee risk communications because the NFIP flood maps (FIRMs/DFIRMs) are a primary source that local/regional/state entities access to assist in making local land use decisions. The likelihood of a community implementing requirements associated with additional FEMA data is increased by use and access to FIRM/DFIRM maps. These maps consolidate much of the information into the place where decision makers already go to find related data. FEMA's website and resources are also frequently accessed by state professionals, mortgage lenders, prospective buyers, and property owners in reviewing property purchases.

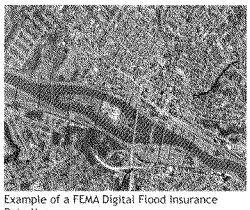
Recommendation #19: FEMA's flood hazard mapping program should be augmented to include the following activities to further support *National Levee Safety Program* activities, especially those associated with risk identification and communication in levee system impacted areas.

- Identify levee systems, including structures along canals, and associated levee system failure consequence zones. This should be carried out in accordance with the development of the NLD, which will provide additional information on consequence areas behind levees. The completion of this step is dependent on and should be informed by the recommended inventory and inspection of non-federal levees.
- Re-designate on DFIRMs existing Zone A/AE or Zone X areas impacted by levees as either AL or XL, respectively, to better communicate the greater flood risks in levee system impacted areas.
- Depict on FEMA's website additional flood hazard information (e.g. 200-year and 500-year floodplain maps) that may be provided by local/regional/state entities.

Align FEMA's Community Rating System (CRS) to Reward Development of State Levee Safety Programs

The intent of FEMA's Community Rating System (CRS) is to reward communities that do more than meet the minimum NFIP requirements to help their citizens prevent or reduce flood losses. Through CRS Activity 620, the CRS also provides an incentive for communities to initiate new flood protection activities. By increasing the credit for levee safety activities, this recommendation would provide additional incentives to operate compliant levee safety programs. It would also reduce flood insurance premiums as they are based on risk, providing benefits directly to property owners and throughout participating communities and more importantly, reduce the overall hazard/damage potential. In order for this recommendation to be most effective, FEMA may also have to make the application process more user friendly and consider removing the construction date requirement.

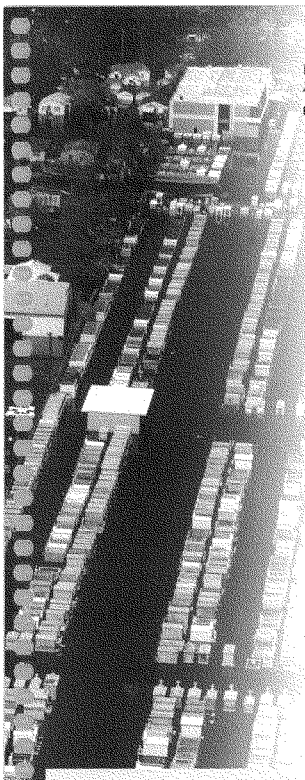
Recommendation #20: The National Flood Insurance Program (NFIP) Community Rating System (CRS) Program should be revised to credit a community based on its state levee safety program and augmented to increase/decrease maximum credits allowed for certain CRS activities, including but not limited to Activity 620. The



Example of a FEMA Digital Flood Insurance Rate Map

NFIP CRS Taskforce should revise CRS Activity 620 "Levee Safety" to:

- Provide credit for any community or communities within a state with a nationally compliant state levee safety program that has submitted the necessary documentation of its program to FEMA.
- Eliminate the requirement that CRS credit can only be provided to levees built before January 1, 1991.
- Eliminate the requirement that CRS credit can only be provided to levees that provide protection between the 4%-1%-annual-chance flood elevation.
- Increase the overall maximum allowable CRS credit that can be provided to any community for this activity, specifically for the operation, maintenance, and emergency/evacuation plan elements.
- Provide CRS credit to a community or communities within a state if the local/state hazard mitigation plan includes a list of all high hazard levees in the community/state and mitigation measures for the hazards they pose to the community or state.
- Revise method for calculating each of the elements of Activity 620.
- The CRS Taskforce should consider revisions to other CRS activities as necessary to provide credit for certain levee safety program activities/elements, such as:
  - Series 300—Public Information
    - 330—Outreach Projects
    - 340—Hazard Disclosure
    - 350—Flood Protection Information
    - 360—Flood Protection Assistance
  - Series 400—Higher Regulatory Standards
  - Series 600—Flood Preparedness
    - 610—Flood Warning Program



Investing in a National Levee Safety Program

Introduction

One of the dichotomies of levees is that, while these structures have afforded the country economic prosperity, they have also had the unintended consequence of obligating the US taxpayer to pay disaster damages and repairs when these same levees fail. The average yearly national cost can run in the billions as evidenced by the recovery efforts still underway today in New Orleans. The potential risk exposure in the future is even greater. A *National Levee Safety Program* (NLSP) is not just a cost; it is a long term investment in public safety and continued economic prosperity. With growing development and consequences in almost all areas behind levees, the benefits of a strong safety program will only increase.

Public Safety

The primary benefit of a NLSP is the protection of public health and safety. Some would argue that the protection of human life is fundamentally an economic issue while others would suggest that you can not put a value on human life and the loss of even one life is unacceptable. Hurricane Katrina and the estimated 1,800 fatalities associated with both the storm and the levee failures is the best and most compelling example in support of a NLSP.

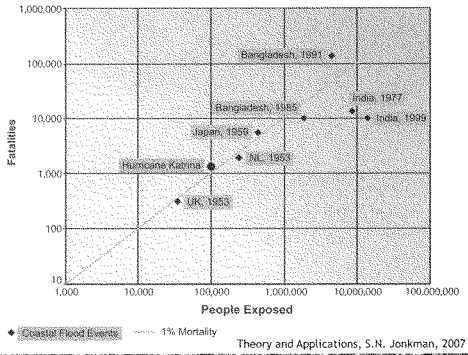
Although the National Levee Safety Program comes with a cost, the overall proposition is: "Pay me now, or pay me even more later."

Donald Basham,
Committee Member

"and later could be tomorrow"

Craig Kennedy,
Committee Member

Figure 16: Loss of Life Estimation in Flood Risk Assessment



Theory and Applications, S.N. Jonkman, 2007

As the events in New Orleans bore true, fatality rates for major urban areas due to flooding have historically been in the 1% range worldwide. The exposure in some of the larger cities of the United States has the potential to match or exceed the catastrophic loss of life experienced in the Gulf Coast area in 2005. The very large events that would cause this type of loss of life have yet to be fully experienced in the United States simply because we have such an abbreviated history in comparison to some of the international communities. The table below shows lives lost due to major flood events that included levee failures in this country.

At the individual level, a robust levee safety program will not only inform people living behind levees of their risks but will engage and involve them in the process of risk communication, education, and awareness. An informed and involved public can participate in the shared responsibilities of risk management at both the individual level and the community level. Recent examples demonstrating the benefits of an informed and involved public include the effective evacuations of more than 2 million people from the greater New Orleans area in advance of Hurricane Gustav, and nearly 1.1 million people from the Texas Gulf Coast ahead of Hurricane Ike, both during the 2008 hurricane season.

Financial Exposure in Leveed Areas—Bracketing the Cost

While preservation of human life is the most compelling reason for levee safety, a responsible public must also consider the benefits and costs of the NLSP. One of the challenges in trying to quantify the nation's flood risk with respect to property damage and economic loss is the lack of comprehensive information, particularly given the unknown number of levees across the nation and the unknown risks associated with them. Much of the available information on past flood damage and economic loss has been only partially captured, is often tracked differently by different agencies, and does not distinguish between flood damages in leveed areas and non-leveed areas. Nevertheless, some insight can be obtained by reviewing some of the available flood damage information associated with recent flood disaster events.

Corps Data

The Corps has compiled flood damage data associated with federal flood control facilities between 1998 and 2007 (Annual Flood Damage Reduction Report, provided by CECW-CE, 2007). During this ten-year period, flood damages associated with federal flood control facilities averaged $4.2 billion per year, excluding those associated with Hurricanes Katrina and Rita. Based on current information, it is reasonable to assume that about half of this was related to the 14,000 miles of federal levees, or about $2.1 billion per year. If this amount was then extrapolated to the estimated 100,000 miles of non-federal levees in the nation, the annual expected damage would be approximately $15 billion per year. However, Corps levees generally protect areas of more concentrated population, commerce, and infrastructure than the average non-federal levee. On the other hand, this compilation excluded the costs associated with Hurricanes Katrina and Rita. A

Figure 17: Major Flood Events That Included Levee Failures and/or Loss of Life

Failure	Loss of Life*
Okeechobee Hurricane, September 1928	2,500
The Great Flood, 1929	246
Vanport, Oregon, 1948	16
Kansas-Missouri Floods, 1951	28
Yuba City, Yuba County, California, 1955	38
Northern CA & Northwestern Nevada, 1986	13
The Great Flood, 1993	47
Arboga, Yuba County, California, 1997	3
Hurricane Katrina, 2005	1,810
Midwest Flood, 2008	24

** Not known to be attributable entirely to levee failures*

reasonable upper bound limit for expected damage may be on the order of $10 billion per year.

State of California Data

The State of California has compiled flood damage data associated with state-federal project levees in California's Central Valley for flood events between 1955 and 2005 (California Department of Water Resources, Division of Flood Management). The average flood damage associated with these 1,600 miles of levees was found to be $70 million per year (in 2005 dollars). If this amount was extrapolated to the estimated 100,000 miles of non-federal levees in the nation, the annual expected damage would be approximately $4.4 billion per year. While these Central Valley levees are typically major levees, the flooding was generally associated with agricultural areas and/or small rural communities. No major urban flooding was associated with these events. So, perhaps this extrapolation might be on the low side. A reasonable lower bound limit for expected damage may be on the order of $5 billion per year.

It is recognized that the above examples and extrapolations are not comprehensive and that they employ only simple calculations that do not tell the whole story. Nevertheless, they indicate that the annual financial loss associated with the nation's levees may be on the order of roughly $5 to $10 billion per year.

Insurance as a Basis for Exposure

While this Committee believes that a national levee safety program is a necessary investment and will provide significant reductions in the nation's flood risk behind levees, flood insurance will remain the most certain individual economic risk mitigation/reduction avenue available to citizens living and working within leveed areas (data shows that individuals with flood insurance are more easily and quickly able to recover from the devastating financial effects of flood disasters). Insurance data can also be used as a basis to roughly estimate the national financial exposure due to flooding.

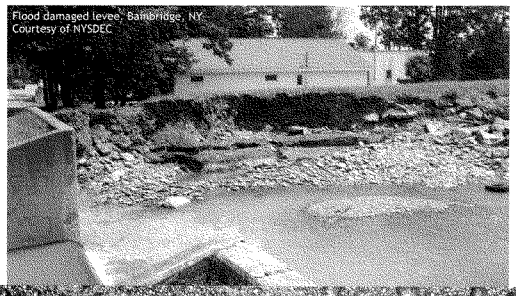
Less than 6 million people currently hold flood insurance policies in more than 20,000+ communities across the United States. More importantly, it is estimated that only 10% of structures behind levees have flood insurance, and of those, most are not covered to the complete value of the property (both structure and contents). This demonstrates that the remaining 90% of the structures behind levees without insurance represent a significant exposure to the federal government in potential disaster assistance and recovery cost. Based on best available data, the current value of residential and commercial properties (structures and contents) located in all leveed areas alone constitute a total national cost exposure of more than $375 billion. An annual loss of $5 to $10 billion corresponds to about 1½% to 3% of the total exposure.

Losses Incurred from Past Events

Another means available for understanding costs both in terms of human life and dollars is to examine the data available from past documented flood disasters. The following synopses highlight some of those events.

The Great Flood of 1993

During the spring and summer (April–September) of 1993, extremely high rainfall occurred on the upper Mississippi River Basin causing major and/or record flooding for nine states in the upper Midwest. This event came to be known as "The Great Flood of 1993." The magnitude, severity, and longevity of this flood were extreme. It was wide spread, covering nine states and 400,000 square miles. Also, the flood was



Flood damaged levee, Bainbridge, NY.
Courtesy of NYSDEC

of extremely long duration, lasting nearly 200 days at some locations. In terms of rainfall amounts, record river stages, extent of flooding, persons displaced, crop and property damage, and flood duration, the Great Flood was the worst hydro-meteorological event to occur since the United States started to document weather events in the late 1800s.

Damage caused by these record flood stages was massive. More than 200 counties were declared federal disaster areas, including all 99 counties in Iowa. More than 31,000 square miles of land were inundated by flood waters. An estimated 72,000 private homes were washed away or suffered major damage. Between 35,000 and 45,000 commercial structures were damaged. Along the length of the Mississippi River that forms the western boundary of Illinois, more than 1,000 miles of roads were closed and nine of the 25 non-railroad bridges were shut down and 12 commercial airports were closed by the flood. Additionally, the Corps reported that 40 of 229 federal levees and 1,043 of 1,347 non-federal levees were overtopped or damaged during the flood. There were also 15 flash floods triggered from these storms that caused dam breaks, the majority of which were in Wisconsin. Even in light of this, federal flood control efforts in the Mississippi basin prevented nearly $20 billion in potential damages. Estimates set the losses from this flood at $15.6 billion (1994 dollars) and this cost does not include all of the economic losses or the non-quantifiable, human impacts of this disaster. Agriculture accounted for over half of these damages. Flood response and recovery operations cost more than $6 billion. Also, because flood insurance was not extensively used, it was estimated that 15% to 25% of the flood disaster costs were borne by state and local governments, not to mention the costs to uninsured homeowners who were forced to rebuild using their own resources. This natural disaster killed 47 people and forced 74,000 people from their homes.

Hurricanes Katrina and Rita, 2005

Hurricanes Katrina and Rita devastated the New Orleans area and wrought approximately $200 billion in damage and economic losses. Prior to these hurricanes, different parts of New Orleans probably had different levels of flood protection. However, for discussion purposes, the overall level of flood protection was probably on the order of about a 2%-annual-chance, or about a 50-year level of flood protection. At face value, this could be interpreted to mean that the New Orleans area would have had an annual damage exposure of about $4 billion per year prior to Hurricane Katrina. However, this is too high since Katrina was a larger storm than a 50-year event. So, for discussion purposes, let us assume that the pre-Katrina annual damage exposure was on the order of $1 to $2 billion per year. Following these two hurricanes and the resulting devastation, the Corps is in the process of spending approximately $15 billion to repair and improve the area's levees and floodwalls. This investment is expected to lead to a 1%-annual-chance (100-year) rated level of flood protection, and a 0.2%-annual-chance (500-year) level of flood resiliency (i.e. floodwalls and levees expected to remain intact even if overtopped to this level of flooding). Using the same set of consequences, this higher level of flood protection would roughly correspond to about a $400 million per year annual damage exposure—a significant reduction in future costs for this major urban area. The lessons from these events include:

- The roughly estimated $1 to $2 billion per year annual damage exposure prior to Hurricane Katrina is a tremendous exposure, and was only for one metropolitan area. There may be other metropolitan areas that have exposures on the same order of magnitude.
- The $15 billion being expended by the Corps to upgrade the flood protection system is a wise investment that will be repaid many times in avoided costs.
- Even after this investment and improvement in flood protection, there will remain a significant annual damage exposure of approximately $400 million per year. Again, this is still a relatively high number for just one metropolitan area and further supports the rough estimate of $5 to $10 billion per year for the nation as a whole.

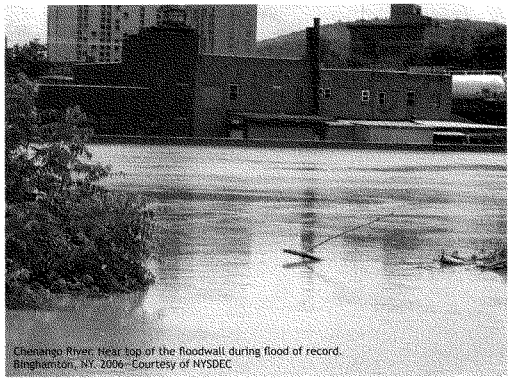
Midwest Flood 2008

Midwesterners who experienced the Great Flood of 1993—estimated to have been a 500-year flood at the time—may have believed that they would not see another flood of that magnitude in their lifetimes. Following the devastating hurricanes along the Gulf of Mexico in 2005, most Americans probably believed the country to be "in the clear" from flooding for at least a few years, if not longer, but unfortunately that assumption did not hold true.

During the summer of 2008, the Midwest once again experienced significant flooding following months of heavy precipitation. A number of rivers overflowed their banks for several weeks at a time and broke through levees at numerous locations. States affected by the flooding included Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, and Wisconsin. Approximately 35,000–40,000 people were evacuated from homes. Flood warnings covered a span of about 325 miles from Dubuque, Iowa to St. Louis, Missouri. The Mississippi River crested at 37 feet in the St. Louis area, seven feet above flood stage.

Flooding continued for as long as two weeks with central Iowa, Cedar Rapids being hardest hit. In Iowa alone, nine rivers crested at record levels, 83 of 99 counties were declared disaster areas, and Iowa's agricultural economic losses are estimated to exceed $2 billion. In Cedar Rapids, Iowa, flood waters covered 1,300 city blocks, inundating city hall, the county jail, the fire department, police communication equipment, most of the public library's collection, and 3,900 homes. The Cedar River flood crested at over 32 feet, exceeding the historic 1929 record, and nearly six feet above the so-called 500-year flood level. Only 777 of the 4,000 homes damaged or destroyed by flooding were covered by any flood insurance.

The flood left two dozen people dead and damage region-wide was estimated to be in the tens of billions of dollars. To date, $2.7 billion in federal flood relief has been approved, but does not include the federal investment of low-interest loans or the value of crop insurance and private insurance payouts.



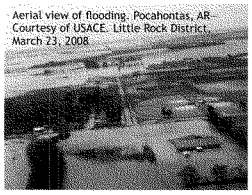
Chenango River. Near top of the floodwall during flood of record. Binghamton, NY. 2006—Courtesy of NYSDEC

The above examples do not provide data for hard analysis of annualized loss of life or rate-of-return on levee project investments; however, they do underscore recent examples of the type of events that support the bracketed estimate of $5–$10 billion dollars per year in flood damages.

Need for Future Data Coordination and Management and Analyses

As noted previously, because there is great uncertainty in the scope of the national levee portfolio, there can only be marginal confidence in an estimate of costs associated with this portfolio until such time as a comprehensive inventory and assessment of levees is completed. The Committee fully believes that a comprehensive national inventory can be used to enable the development of a more detailed estimate of how much annual savings could be realized through the implementation of a national levee safety program. As stated above, much of the available information on past flood damage and economic loss information has been only partially captured, is often spread out and tracked differently by various agencies, and does not distinguish between flood damages in leveed areas and unleveed areas.

The Committee spent significant time collecting and examining various available data in its existing formats relative to flood disasters, but they are by no means comprehensive, or all focused on levee-related specific flood disasters. At some point in the future, when a comprehensive inventory of levees has been completed nationwide and other



Aerial view of flooding, Pocahontas, AR. Courtesy of USACE, Little Rock District, March 23, 2008

data becomes available, specifically including costs of levee failures, it will be possible to perform detailed loss of life and economic analyses that would further thoroughly justify the budgets of the NLSP.

The Committee recommends that the Commission:

- Coordinate with all federal, state, and local agencies and other organizations to make sure all existing data has been analyzed;
- Coordinate, transfer, and manage important levee-related flood disaster data within the National Levee Database (NLD); and
- Require that the state and national levee safety programs develop improved methods for tracking damages and avoided costs, and to find improved ways of documenting and disseminating this information.

The Committee also recommends measures to require all federal, state, and local agencies and other organizations to coordinate with and provide any available levee-related flood disaster data available to the Commission.

Improved Information Leads to Better Investments

As we look at the historical cost we must also evaluate how risks evolve and compound over time and in turn, impact future costs. The evaluation of risks for the future has various dimensions: (1) the changing landscape due to climate change and subsidence; (2) the changing likelihood of natural hazards such as floods; (3) the degradation of infrastructure due to normal environmental factors; and (4) other evolving factors such as state and regional population, local land use, economic activity, and ecosystem affected by levee failures. A separate, yet constant factor contributing to risk is the fact that risk accumulates with time. Even if the annual chance of occurrence is low, sooner or later, it will happen. At the same time, the probability of adverse consequences also increases as the economy and the population continues to grow.

This view is reiterated in the "Status and Trends" document (URS 2007) prepared for California Delta Vision. This document identifies the following "drivers of future change" for the Sacramento-San Joaquin Delta: Subsidence; Global Climate Change--Sea-Level Rise; Regional Climate Change--More Winter Floods; Seismic Activity; Introduced Species; and Population Growth and Urbanization. These broadly stated drivers of change can be expanded and characterized in various ways but many can generally be applied to most others areas of the country. A full range of reliable information is generally not available or adequate to conduct a detailed, quantitative analysis of each of these drivers of future change. However, based on current prevailing thinking there is every reason to believe that disaster assistance and recovery cost will only continue to increase unless the country significantly changes its floodplain management practices at all levels of government.

Investment in a *National Levee Safety Program*

Key assumptions and approaches used to develop a cost for a NLSP include the following:

- The governance structure of a NLSP includes the Commissioners, the Commission staff, and the travel and per diem expenses of the four advisory committees.
- Estimates for levee inventory and inspection costs were based upon an assumed scope of an additional estimated 100,000 miles of non-federal levees (federal levees budgeted for separately).
- Cost-sharing was based on the assumption that setting up the NLSP at the federal level and establishing the Commission would be funded exclusively at the federal level. Similarly, in order to complete the initial inventory and inspection of non-federal levees as soon as possible, it is recommended that this activity also be funded exclusively at the federal level. All other activities, including establishing and maintaining state levee safety programs and the *National Levee Rehabilitation, Improvement, and Flood Risk Mitigation Fund* would be cost-shared.

- Authorities, appropriations, and staffing for existing federal agencies are leveraged to the maximum extent possible and supplemented where required.
- Estimates of costs for a state levee safety program are derived from a comparison of some similar costs and activities within California.
- Professional judgment was used in the many instances where data did not exist.

The Committee believes that investments from the NLSP to include the *Levee Rehabilitation, Improvement, and Flood Risk Mitigation Fund* will return several dollars in benefits for every dollar spent. This is supported by the Corps estimates that for every dollar invested in flood damage reduction projects there is a 6:1 return on that investment in flood damages prevented.

The Committee further recognizes that there may be instances where the return is marginal when only looking at property damage and economic loss, but when taking into consideration risk to loss of life, the investment can still be well justified.

Figure 18: Estimated Annual Costs of a *National Levee Safety Program*

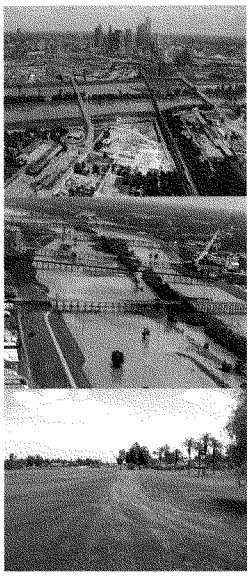
Major Recommended Elements of a *National Levee Safety Program*	Annual Costs by Implementation Phase	
	Phase I and II (Years 1-5)	Phase III (Steady State)
National Levee Safety Commission	$40 M (100% Federal) (0% Non-Fed)	$41 M (100% Federal) (0% Non-Fed)
State Levee Safety Programs	$113 M (75% Federal) $37 M (25% Non-Fed)	$85 M (50% Federal) $85 M (50% Non-Fed)
SUBTOTAL	$153 M (Federal) $37 M (Non-Fed) $190 M	$126 M (Federal) $85 M (Non-Fed) $211 M
Complete Initial Non-Federal Levee Inventory and Inspection - Inventory - Initial Inspection - Continuing Management of National Levee Inventory and Database	$25 M (100% Federal) $100 M (100% Federal) N/A	N/A N/A $3 M (100% Federal)
TOTAL	$278 M (Federal) $37 M (Non-Fed) $315 M	$129 M (Federal) $85 M (Non-Fed) $214 M
Levee Rehabilitation, Improvement, and Flood Risk Mitigation Fund	$600 M (65% Federal) $323 M (35% Non-Fed) $923 M	$1000 M (65% Federal) $538 M (35% Non-Fed) $1538 M

Note: Non-federal entities sharing costs include States, Regional Agencies, Local Communities, and Levee Owners and Operators

Putting the *National Levee Safety Program* in Context

The committee found no existing federal programs for which a direct line item comparison was appropriate due to differences in scope and maturity of existing programs. However, a cursory review of fiscal year 2008 budgets published by the Office of Management and Budget (http://www.whitehouse.gov/omb/budget/fy2008) indicates that the national program administration elements of the recommendation for a NLSP were similar to or lower than budget line items in agencies such as the Nuclear Regulatory Commission, the National Transportation Safety Board and the Consumer Products Safety Commission. The overall annual estimated costs of the NLSP were roughly comparable to the combined program totals for such federal activities as the Nuclear Regulatory Commission and EPA's Clean Water and Drinking Water programs. The majority of the estimated costs for a NLSP pertain to the rehabilitation of deficient levees (to include non-structural measures) and these estimates represent but a small fraction of the nation's infrastructure needs.

Phased Strategic Plan for Implementation



Top Two Photos:
Trinity River in flood stage protecting Dallas, TX--Courtesy of City of Dallas Flood Control District

Bottom Photo:
Golf course levee. Tahquitz Creek Golf Resort. Palm Springs, CA. 2008--Courtesy of Riverside County Flood Control and Water Conservation District

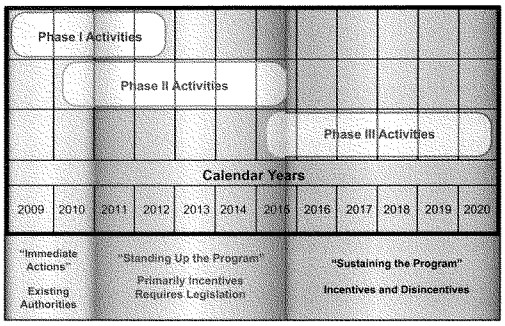
It has taken more than a century of neglect and indifference for our current levee safety challenges to develop and the solutions that are needed cannot simply be put into place overnight. Due to the massive amount of effort in data collection, assessment, education, policies, procedures and management that is now required, it is essential to roll out the NLSP in well-planned phases.

Each phase is intended to build from the data and experience collected in previous phases. In broad terms, the phases recommended below are designed to help the nation act on critical immediate recommendations, begin steps to implement near term recommendations for a NLSP primarily through incentives, while building the foundational strategies for a sustainable program into the future through both incentives and disincentives. These phased actions are expected to overlap.

Phase I: Immediate Actions--actions that are time critical and can begin prior to the development of the Commission. Current authorities exist, but funding is needed. Major components include:

1. Congress should pass legislation creating the *National Levee Safety Commission* (or give authority to existing federal agency).
   a. Appoint Commissioners/Staff Standing Committees
   b. Develop operational plan including legal, technical, financial administrative and institutional procedures

Figure 19: Strategic Implementation of Recommendations on a *National Levee Safety Program*



2. Congress should grant authority and appropriations to the Corps to expand the National Levee Database (NLD) and conduct a one-time inventory and inspection program for all levees (federal and non-federal) in the United States.
   a. The Corps should adopt the *Interim Hazard Potential Classification System* and definitions
3. Congress should fund FEMA to organize a *Coordinating Council on Communications for Levees* to conduct a needs assessment and begin to develop a public involvement and education/ awareness plan for levee safety.
   a. Congress should fund FEMA to develop a Levee Safety website to communicate need for the program, initial risk communication messages and interim technical documents and standards
4. Congress should begin research and implement options to address liability barriers.
5. The International Code Council (ICC) should be employed to develop *Interim National Levee Engineering Guidelines*.
6. Congress should fund the Corps to begin the *Levee Research and Development Program*.
7. Congress should mandate risk-based flood insurance behind levees and augment FEMA's mapping program to better communicate risk in living and working behind levees.
8. Change term "levee certification" to "compliance determination."
9. Subject FEMA levee certifications (compliance determinations) to peer review.
10. FEMA and the NFIP Taskforce should explore and implement revisions to CRS Activity 620 to incentivize good levee behavior.

Timing: this phase should begin immediately and run until the Commission is created and fully operational (approximately 2-3 years).

Phase II: Standing Up the *National Levee Safety Program*—activities designed to create the National Levee Safety Commission, a delegated state program, start-up grant funding and initial incentives. Major components include:

1. Commission should finalize *Public Involvement and Education/ Awareness Strategy and Implementation Plan.*
2. Operationalize the *National Levee Safety Commission* (e.g. organization, personnel, guidance, etc.):
   a. Develop policies, procedures and guidance for delegated state program;
   b. Develop technical materials, direct assistance and training programs including Certified Levee Professional curricula and certification requirements;
   c. Administer *National Levee Safety Grant Program* to states;
   d. Negotiate with and grant delegation to qualified states; and
   e. Begin federal oversight of delegated program.
3. Commission should develop and oversee adoption of the *National Levee Safety Code* through the ICC.
4. Commission should work closely with FEMA and the *NFIP Community Rating System Task Force* to further explore alignment of FEMA's mitigation grants programs to reward and incentivize good behavior in leveed areas.
5. Congress/Commission should authorize and fund the *National Levee Rehabilitation, Improvement and Flood Mitigation Fund.*
6. Commission should develop and implement measures to harmonize levee safety activities with environmental protection requirements.

Timing: this phase should begin as soon as Congress passes legislation to create the National Levee Safety Commission (5-7 years).

Phase III: Sustaining the *National Levee Safety Program*—activities that result in a mature program, with all needed tools and materials developed. Once this phase is reached, the mix of incentives and disincentives should weigh more heavily towards rewarding superior performers and penalizing states that have not taken action.

1. Commission should finalize the *National Tolerable Risk Guidelines for Levees and Canals.*
2. Commission should begin to phase in disincentives (e.g. withholding funding for federal programs with a nexus to levee safety) for states that have not developed a state levee safety program.

Timing: this phase should be in place after about 5-10 years.

Figure 20: Implementation Steps by Actor

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Standing up the National Levee Safety Program											
Legislation Creating the National Levee Safety Commission											
	Appoint Commissioners and Create Standing Committees										
	Develop and Implement Operational Plan (legal, technical, financial, administrative, institutional)										
		Develop state program guidance, technical materials, standards, direct technical assistance									
		Develop measures and practices to harmonize levee safety with environmental protection requirements									
		Implement *National Levee Safety Grants to States*									
			States apply for and receive delegation (adopt *Interim National Levee Engineering Guidelines, Potential Hazard Classification System* and definitions, public involvement and other program guidance and responsibilities)								
			Negotiate, approve/disapprove state programs								
			Implement *National Levee Rehabilitation, Improvement and Flood Mitigation Fund*								
			Program oversight, enforcement								
Standing up Levee Safety Programs in States											
States adopt *Hazard Potential Classification System* and definitions and encourage its use with owners and operators and municipalities to prioritize levee safety activities											
	States begin to develop necessary authorities and funding sources to develop State Levee Safety Program										
			States apply for and receive delegation (adopt *National Levee Engineering Policies, Potential Hazard Classification System* and definitions, public involvement and other program guidance and responsibilities)								
			States work with local governments and owner/operators to implement requirements of states levee safety program								
Inventory, Inspection and National Levee Database											
Corps to conduct one-time national inventory and inspection using *Hazard Potential Classification* System to guide prioritization of risk											
		States maintain inventory and conduct (or require) periodic inspection of levees, provide data to National Levee Database									
		Commission assume management and maintenance of National Levee Database									
Public Involvement, Education and Awareness											
FEMA sets up *Coordinating Council on Communications for Levees* (conduct needs assessment, set up website)		Finalize Public Involvement and Education Plan		Implement National Public Involvement and Education Plan (assist with rollout, provide technical assistance, conduct efficacy evaluation, collection national-level awareness data							
			States tailor and implement public involvement and risk communication programs								
	Status Report to Congress	Status Report to Congress	Status Report to Congress	Status Report to Congress	Status Report to Congress	Status Report to Congress	Status Report to Congress	Status Report to Congress	Status Report to Congress	Status Report to Congress	Status Report to Congress
Develop Standards, Technical Materials and Training											
ICC to develop *National Levee Engineering Guidelines*		Employ International Code Commission to develop *National Levee Safety Code*			Finalize *National Tolerable Risk Guidelines* for Levees and Canals						
				States, locals and federal government agencies adopt *National Levee Safety Code*							
			Develop and implement a *National Levee Safety Training Program*, including curricula and requirements for a Certified Levee Professional								
Corps to begin R&D program		National R&D program									
Align Federal Programs to Promote Effective Mitigation in Leveed Areas											
Legislate mandatory risk-based flood insurance behind levees											
	FEMA should explore and implement revisions to CRS Activity 610 to incentivize good levee behavior, augment mapping program to better communicate risk, change "certification" to "compliance determination" and conduct peer review for certification (compliance determinations)										
	Explore alignment with other federal agency programs and assessment of incentives and disincentives for state delegated program										
Address Barriers to Liability											
Congress to develop and implement options for reducing liability for engineers and communities in levee design, construction and certification											

Legend

= Congress = National Levee Safety Commission = Federal Government Agencies = States

Closing

We are at a critical juncture in our nation's history—a burgeoning growth of risk to people and infrastructure as a result of more than 100 years of inattention to levee infrastructure combined with an economy and social fabric that are vulnerable to catastrophes. The current levee safety reality for the United States is stark—an uncertainty in location, performance and condition of levees and a lack of oversight, technical standards, and effective communication of risks. A *National Levee Safety Program* is a reasonable and prudent investment that turns the tide on risk growth.

We recognize the need for actions outside of the scope of this report: a broader national flood risk management approach; the benefits of integrating national dam safety and levee safety programs; and leveraging levee safety as a critical first step in a national infrastructure investment strategy. The specific recommendations for a *National Levee Safety Program* embrace three main concepts:

(1) The need for leadership via a National Levee Safety Commission that provides for state delegated programs, national technical standards, risk communication, and collaboration on environmental and safety concerns;

(2) The building of strong levee safety programs in all states that in turn provide oversight, regulation, and critical levee safety processes; and

(3) A foundation of well-aligned federal agency programs and processes including an initial inventory and inspection of all levees, resolution of liability concerns, and robust incentives and disincentives to stand-up state programs and remediate levee risks.

The Committee recommends a phased strategic implementation with a critical first step to immediately implement Congressional and federal agency actions including legislation establishing a *National Levee Safety Program*, completion of an inventory and initial inspection of all levees, establishing a *Coordinating Council on Communication for Levees*, requiring mandatory risk-based flood insurance purchase behind levees, and addressing barriers associated with levee liability. Other phases of implementation will necessarily take years of focused effort to counter the century of inattention.

Now is the time to move the country away from a reactive disaster assistance environment to a proactive, safety oriented culture where the general public and governments are informed and able to participate in shared responsibilities of risk management and where levees are reliable. In the post-Katrina environment, we have a clear call to action justified by both improved public safety and smart investment returns. Levee safety deserves a priority focus within national infrastructure needs as levees protect much of the other infrastructure—such as roads, bridges, schools, and water and sewer treatment plants—from frequent flooding.

We view the report as a beginning, not an end, to addressing the issue of levee safety and eagerly anticipate the continued dialogue and action regarding the recommendations in the report. Our vision—an involved public and reliable levee systems—finds its refuge in a *National Levee Safety Program*.

Floodwall at Industrial Canal, Lower Ninth Ward, New Orleans, LA, 2008—Courtesy of FEMA

Appendix A— National Committee on Levee Safety Membership and Charter

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

SEP 16 2008

MEMORANDUM FOR DIRECTOR OF CIVIL WORKS

SUBJECT: Implementation of Section 9003, Committee on Levee Safety, of the Water Resources Development Act of 2007

1. The purpose of this memorandum is to provide implementation guidance for Section 9003, titled Committee on Levee Safety, of the Water Resources Development Act (WRDA) of 2007.

2. Section 9003 provides authority to establish a sixteen member "Committee on Levee Safety," with the Chairperson named as the Secretary of the Army. The Committee on Levee Safety (Committee) is to develop recommendations for a national levee safety program, including a strategic implementation plan. Recommendations shall address the nine program goals named in Section 9003. The final report shall be submitted to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Environment and Public Works of the Senate not later than 15 January 2009.

3. I have delegated the Chairmanship of the Committee to the U.S. Army Corps of Engineers (USACE) Director of Civil Works, currently Mr. Steven L. Stockton. Remaining membership include the Administrator of the Federal Emergency Management Agency (FEMA) or the Administrator's designee; eight State representatives, one from each USACE division's area of responsibility; two private sector representatives; two local or regional representatives; and two Indian tribe representatives. Recommended Committee members shall be solicited and selected based on criteria established by the Committee Chairperson. I will review these recommendations and appoint the final Committee members.

4. Concomitant with this implementation guidance, I approve the attached charter thereby establishing the Committee on Levee Safety.

John Paul Woodley, Jr.

Encl

John Paul Woodley, Jr.
Assistant Secretary of the Army
(Civil Works)

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COMMITTEE ON LEVEE SAFETY

CHARTER

Purpose:

To develop recommendations for a national levee safety program, including a strategic plan for implementation of the program, within 180 days from the date of the initial appropriations for the Committee on Levee Safety (Committee) meeting. Since the technical correction to Title IX, the National Levee Safety Act of 2007 (Act), dated 15 July 2008 permits use of existing appropriations where available, the submission date to Congress is 15 January 2008. Recommendations shall address the nine program goals named in Section 9003 of the Water Resources Development Act (WRDA) of 2007.

Convening Authority:

The Committee is convened under the authority of Section 9003 of WRDA 2007.

Section 9003 Goals:

1. Ensuring the protection of human life and property by levees through the development of technologically, economically, socially, and environmentally feasible programs and procedures for hazard reduction and mitigation relating to levees.

2. Encouraging use of the best available engineering policies and procedures for levee site investigation, design, construction, operation and maintenance, and emergency preparedness.

3. Encouraging the establishment and implementation of an effective national levee safety program that may be delegated to qualified States for implementation, including identification of incentives and disincentives for State levee safety programs.

4. Ensuring that levees are operated and maintained in accordance with appropriate and protective standards by conducting an inventory and inspection of levees.

5. Developing and supporting public education and awareness projects to increase public acceptance and support of State and national levee safety programs.

6. Building public awareness of the residual risks associated with living in levee protected areas.

7. Developing technical assistance materials for State and national levee safety programs.

8. Developing methods to provide technical assistance relating to levee safety to non-Federal entities.

9. Developing technical assistance materials, seminars, and guidelines relating to the physical integrity of levees in the United States.

Definitions:

1. Levee: The term "levee" is defined as "an embankment, including floodwalls" in which,

   - the primary purpose is to provide hurricane, storm, or flood damage reduction relating to seasonal high water, storm surges, precipitation, and other weather events;
   - normally is subject to water loading for only a few days or weeks during a year; and,
   - does not constitute a barrier across a watercourse, such as a dam.

2. Regulatory Authority over Levee Safety: The regulatory authority refers to the ability to promulgate and enforce regulations for the,

   - design and construction of levees or;
   - inspection of levees or;
   - operation and maintenance of levees or;
   - emergency response associated with levees or;
   - management/analysis of the risk and consequences associated with levees or;
   - repair and rehabilitation of levees or;
   - planning and policy development for flood damage reduction projects.

3. Expertise in Levee Safety: Demonstrates experience in the,

   - design and construction of levees or;
   - inspection of levees or;
   - operation and maintenance of levees or;
   - emergency response associated with levees or;
   - management/analysis of the risk and consequences associated with levees or;
   - repair and rehabilitation of levees or;
   - planning and policy development for flood damage reduction projects.

4. State Representative:

- Employee of a State agency with regulatory authority over the safety of any non-Federal levee in the State.
- Has experience with and responsibility for levee safety public policy development.
- Has expertise in levee safety as described in this Charter.

5. Private Sector Representative: Defined as a person who is not an employee of a Federal, State, local, regional government or Indian tribe, with experience in levee safety.

6. Local or Regional Government Representative: Local or regional government is defined as any local or regional entity that can collect taxes or assessments. This could be a city, county, reclamation district, water district, levee district, etc. that has responsibility for levees.

   - Employee of a local or regional agency, which can collect taxes or assessments, such as, a city, county, reclamation district, water district, or levee district.
   - Has expertise in levee safety as described in this Charter.

7. Indian Tribe Representative:

   - Member or employee of an Indian tribe.
   - Has expertise in levee safety as described in this Charter.

Committee Implementation Groups:

Implementation of Committee work will involve the following groups,

1. Committee Voting Membership is to be to be comprised of the 16 Committee members specified in Section 9003 and appointed by ASA(CW):

   - Chairperson: Secretary of the Army or the Secretary's designee (pursuant to 10 USC 3016(b)(3), the Assistant Secretary of the Army for Civil Works (ASA(CW)) shall act for the Secretary of the Army for the purposes of Section 9003)
   - FEMA Representative: Administrator of FEMA or the Administrator's designee
   - Eight State Representatives (one from each USACE Division's Area of Responsibility)
   - Two Private Sector Representatives
   - Two Local/Regional Representatives
   - Two Indian Tribe Representatives

2. Committee Nonvoting Membership to be comprised of subject matter experts selected by the Chairperson.

3. USACE Support Team to be provided by USACE and will be comprised of a project manager, a facilitator, administrative assistants, and other staff deemed necessary by the Chairperson.

4. Review Team to be comprised of members selected from nominees not selected to be a voting or nonvoting member and other organizations. Final review team members shall be selected by the Chairperson.

Roles and Responsibilities:

1. Chairperson: Presides over the Committee and ensures purpose and goals of the Committee are accomplished. Has the ability to appoint a vice chair of his/her choosing to assume the duties of Chairperson in his/her absence.

2. Voting Member: Attend and participate in all Committee meetings. Is responsible for representing the interests and concerns of the organizations or institutions they represent. If a voting member cannot attend a Committee meeting, that member may send an alternate member in their place; however, the alternate member cannot vote. Voting members and alternates are free to abstain from a determination of consensus for whatever reasons and shall adhere to the Committee's charter and operating procedures.

3. Nonvoting Member: Attend and participate in all Committee meetings as subject matter experts. Provide input into Committee and/or work group products. May not send an alternate member in their place during Committee meetings. Nonvoting members shall adhere to the Committee's charter and operating procedures.

4. Review Team Member: Review and provide comments on Committee products when requested and within the timeframe established by the Chairperson.

5. Project Manager: Member of USACE Support Team to serve as lead project manager for the Committee. Responsible for coordinating all activities related to accomplishing the final strategic implementation plan, such as serving as USACE point-of-contact for Committee members, coordinating with others (internal and external to USACE) as needed to support Committee work, managing the facilitation contract, creating communication process to include central location of strategic plan documents, coordinating the review team, attending all Committee meetings, managing project funding and participating in the formulation of the final strategic plan.

6. Facilitator: Member of USACE Support Team to provide meeting planning, facilitation, and note taking services to ensure productive and useful meetings, which successfully engage Committee members and other attendees to accomplish meeting objectives. In addition, provide technical writing services to capture work completed by the Committee in the format of a quality document

presenting the final recommended strategic plan for a national levee safety program.

7. Administrative Support: Member of USACE Support Team to provide administrative support associated with the Committee, which may include processing travel reimbursement, coordinating logistics, and other duties.

Operating Procedures and Guidelines

1. Procedures: The Committee will develop a set of operating procedures and guidelines to set forth in detail how it shall conduct meetings and accomplish the requirements of this charter. These procedures shall also include a communication plan, both internal and external to the Committee.

2. Initial Meeting: The first Committee meeting will be convened in October 2008.

3. Work Groups and Subcommittees: The Committee may create special work groups or subcommittees as necessary to accomplish its purpose. These may include voting and nonvoting members.

4. Meeting Guests: Additional subject matter experts may be invited to attend certain Committee meetings. All guests shall be approved prior to the meeting by the Chairperson.

5. Decision-making: To all extent possible, the Committee's goal is to reach consensus on all substantive issues. Final recommendations of the Committee may be arrived at through consensus among Committee voting members present at a meeting. In cases in which consensus cannot be reached, the Chairperson retains the right to render the recommendations of the Committee at any time. The Chairperson may, at his/her discretion, choose to take a vote from the voting members to inform his/her decision.

6. Charter Amendment: The Committee may propose amendments to the Charter for approval by the ASA(CW).

7. Funding: Voting and nonvoting members will be reimbursed for travel and per diem expenses at rates authorized for an employee of a Federal agency under subchapter I of chapter 57 of title 5, United States Code to accomplish Committee work. USACE will provide resources for the USACE Support Team. The Chairperson can at any time decide to reimburse travel expenses of other participants based on the availability of funds.

8. Term of Appointment: Voting and nonvoting members shall serve an appointment not to exceed two years beginning 1 October 2008. If a voting member notifies the Chairperson he or she is no longer able to serve, the Chairperson may make a recommendation for a replacement in-kind to the ASA(CW) for approval. If a nonvoting member notifies the Chairperson he or she is no longer able to serve, the Chairperson may replace the nonvoting member.

Appendix B— National Levee Safety Act of 2007

121 STAT. 1288 PUBLIC LAW 110-114—NOV. 8, 2007

National Levee Safety Act of 2007.

TITLE IX—NATIONAL LEVEE SAFETY PROGRAM

33 USC 3301 note. SEC. 9001. SHORT TITLE.

This title may be cited as the "National Levee Safety Act of 2007".

33 USC 3301. SEC. 9002. DEFINITIONS.

In this title, the following definitions apply:

(1) COMMITTEE.—The term "committee" means the Committee on Levee Safety established by section 9003(a).

(2) INSPECTION.—The term "inspection" means an actual inspection of a levee—
(A) to establish the global information system location of the levee;
(B) to determine the general condition of the levee; and
(C) to estimate the number of structures and population at risk and protected by the levee that would be adversely impacted if the levee fails or water levels exceed the height of the levee.

(3) LEVEE.—
(A) IN GENERAL.—The term "levee" means an embankment, including floodwalls—
(i) the primary purpose of which is to provide hurricane, storm, and flood protection relating to seasonal high water, storm surges, precipitation, and other weather events; and
(ii) that normally is subject to water loading for only a few days or weeks during a year.
(B) INCLUSION.—The term includes structures along canals that constrain water flows and are subject to more frequent water loadings but that do not constitute a barrier across a watercourse.

(4) STATE.—The term "State" means—
(A) a State;
(B) the District of Columbia;
(C) the Commonwealth of Puerto Rico; and
(D) any other territory or possession of the United States.

(5) STATE LEVEE SAFETY AGENCY.—The term "State levee safety agency" means the agency of a State that has regulatory authority over the safety of any non-Federal levee in the State.

(6) UNITED STATES.—The term "United States", when used in a geographical sense, means all of the States.

33 USC 3302. SEC. 9003. COMMITTEE ON LEVEE SAFETY.

(a) ESTABLISHMENT.—There is established a committee to be known as the "Committee on Levee Safety".

(b) MEMBERSHIP.—The committee shall be composed of 16 members as follows:
(1) The Secretary (or the Secretary's designee), who shall serve as the chairperson of the Committee.
(2) The Administrator of the Federal Emergency Management Agency (or the Administrator's designee).
(3) The following 14 members appointed by the Secretary:
(A) Eight representatives of State levee safety agencies, one from each of the eight civil works divisions of the Corps of Engineers.
(B) Two representatives of the private sector who have expertise in levee safety.
(C) Two representatives of local and regional governmental agencies who have expertise in levee safety.
(D) Two representatives of Indian tribes who have expertise in levee safety.

(c) DUTIES.—
(1) DEVELOPMENT OF RECOMMENDATIONS FOR NATIONAL LEVEE SAFETY PROGRAM.—The committee shall develop recomendations for a national levee safety program, including a strategic plan for implementation of the program.
(2) REPORT.—Not later than 180 days after the date of enactment of this Act, the committee shall submit to the Secretary, the Committee on Transportation and Infrastructure of the House of Representatives, and the Committee on Environment and Public Works of the Senate a report containing the recommendations developed under paragraph (1).

(d) PURPOSES.—In developing recommendations under subsection (c)(1), the committee shall ensure that the national levee safety program meets the following goals:
(1) Ensuring the protection of human life and property by levees through the development of technologically, economically, socially, and environmentally feasible programs and procedures for hazard reduction and mitigation relating to levees.
(2) Encouraging use of the best available engineering policies and procedures for levee site investigation, design, construction, operation and maintenance, and emergency preparedness.
(3) Encouraging the establishment and implementation of an effective national levee safety program that may be delegated to qualified States for implementation, including identification of incentives and disincentives for State levee safety programs.
(4) Ensuring that levees are operated and maintained in accordance with appropriate and protective standards by conducting an inventory and inspection of levees.

(5) Developing and supporting public education and awareness projects to increase public acceptance and support of State and national levee safety programs.
(6) Building public awareness of the residual risks associated with living in levee protected areas.
(7) Developing technical assistance materials for State and national levee safety programs.
(8) Developing methods to provide technical assistance relating to levee safety to non-Federal entities.
(9) Developing technical assistance materials, seminars, and guidelines relating to the physical integrity of levees in the United States.

(e) COMPENSATION OF MEMBERS.—A member of the committee shall serve without compensation.

(f) TRAVEL EXPENSES.—To the extent amounts are made available in advance in appropriations Acts, the Secretary shall reimburse a member of the committee for travel expenses, including per diem in lieu of subsistence, at rates authorized for an employee of a Federal agency under subchapter I of chapter 57 of title 5, United States Code, while away from the home or regular place of business of the member in performance of services for the committee.

(g) APPLICABILITY OF FEDERAL ADVISORY COMMITTEE ACT.— The Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to the committee.

33 USC 3303. SEC. 9004. INVENTORY AND INSPECTION OF LEVEES.

(a) LEVEE DATABASE.—

(1) IN GENERAL.—Not later than one year after the date of enactment of this Act, the Secretary shall establish and maintain a database with an inventory of the Nation's levees.

(2) CONTENTS.—The database shall include—
(A) location information of all Federal levees in the Nation (including global information system information) and, for non-Federal levees, such information on levee location as is provided to the Secretary by State and local governmental agencies;
(B) utilizing such information as is available, the general condition of each levee; and
(C) an estimate of the number of structures and population at risk and protected by each levee that would be adversely impacted if the levee fails or water levels exceed the height of the levee.

(3) AVAILABILITY OF INFORMATION.—
(A) AVAILABILITY TO FEDERAL, STATE, AND LOCAL GOVERNMENTAL AGENCIES.—The Secretary shall make all of the information in the database available to appropriate Federal, State, and local governmental agencies.
(B) AVAILABILITY TO THE PUBLIC.—The Secretary shall make the information in the database described in paragraph (2)(A), and such other information in the database as the Secretary determines appropriate, available to the public.

(b) INVENTORY AND INSPECTION OF LEVEES.—

(1) FEDERAL LEVEES.—The Secretary, at Federal expense, shall establish an inventory and conduct an inspection of all federally owned and operated levees.

(2) FEDERALLY CONSTRUCTED, NONFEDERALLY OPERATED AND MAINTAINED LEVEES.—The Secretary shall establish an inventory and conduct an inspection of all federally constructed, non-federally operated and maintained levees, at the original cost share for the project.

(3) PARTICIPATING LEVEES.—For non-Federal levees the owners of which are participating in the emergency response to natural disasters program established under section 5 of the Act entitled "An Act authorizing the construction of certain public works on rivers and harbors for flood control, and for other purposes", approved August 18, 1941 (33 U.S.C. 701n), the Secretary shall establish an inventory and conduct an inspection of each such levee if the owner of the levee requests such inspection. The Federal share of the cost of an inspection under this paragraph shall be 65 percent.

33 USC 3304. SEC. 9005. LIMITATIONS ON STATUTORY CONSTRUCTION.

Nothing in this title shall be construed as— employees for the recovery of damages caused by an action or failure to act; or
(1) creating any liability of the United States or its officers or employees for the recovery of damages caused by an action or failure to act; or
(2) relieving an owner or operator of a levee of a legal duty, obligation, or liability incident to the ownership or operation of a levee.

33 USC 3305. SEC. 9006. AUTHORIZATION OF APPROPRIATIONS.

There is authorized to be appropriated to the Secretary to carry out this title $20,000,000 for each of fiscal years 2008 through 2013.

Nancy Pelosi
Speaker of the House of Representatives.
Robert C. Byrd
President of the Senate pro tempore.

IN THE HOUSE OF REPRESENTATIVES, U.S.

November 6, 2007.

The House of Representatives having proceeded to reconsider the bill (H.R. 1495) entitled "An Act to provide for the conservation and development of water and related resources, to authorize the Secretary of the Army to construct various projects for improvements to rivers and harbors of the United States, and for other purposes", returned by the President of the United States with his objections, to the House of Representatives, in which it originated, it was Resolved, That the said bill pass, two-thirds of the House of Representatives agreeing to pass the same.

Lorraine C. Miller
Clerk.

I certify that this Act originated in the House of Representatives.

Lorraine C. Miller

Clerk.

IN THE SENATE OF THE UNITED STATES,

November 8, 2007.

The Senate having proceeded to reconsider the bill (H.R. 1495) entitled "An Act to provide for the conservation and development of water and related resources, to authorize the Secretary of the Army to construct various projects for improvements to rivers and harbors of the United States, and for other purposes", returned by the President of the United States with his objections, to the House of Representatives, in which it originated, and passed by the House of Representatives on reconsideration of the same, it was Resolved, That the said bill pass, two-thirds of the Senators present having voted in the affirmative.

Nancy Erickson

Secretary.

LEGISLATIVE HISTORY—H.R. 1495 (S. 1248):

HOUSE REPORTS: Nos. 110-80 (Comm. on Transportation and Infrastructure) and 110-280 (Comm. of Conference).

SENATE REPORTS: No. 110-58 accompanying S. 1248 (Comm. on Environment and Public Works).

CONGRESSIONAL RECORD, Vol. 153 (2007):
Apr. 19, considered and passed House.
May 14-16, considered and passed Senate, amended.
Aug. 1, House agreed to conference report.
Sept. 24, Senate agreed to conference report.

WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 43 (2007):
Nov. 2, Presidential veto message.

CONGRESSIONAL RECORD, Vol. 153 (2007):
Nov. 6, House overrode veto.
Nov. 8, Senate overrode veto.

Appendix C— Abbreviations and Acronyms

AAA	Army Audit Agency
ALARP	"As Low As Reasonably Practicable"
ANCOLD	Australian National Committee on Large Dams
ASCE	American Society of Civil Engineers
ASDSO	Association of State Dam Safety Officials
ASFPM	Association of State Floodplain Managers
BIA	Bureau of Indian Affairs
CFR	Code of Federal Regulation
CLP	Certified Levee Professional
COG	Councils of Government
Corps	US Army Corps of Engineers
CRS	Community Rating System
DFIRM	Digital Flood Insurance Rate Map
DHS	Department of Homeland Security
EC	Engineer Circular
ECB	Engineering and Construction Bulletin
ER	Engineer Regulation
ERDC	Engineer Research and Development Center (USACE)
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIRM	Flood Insurance Rate Map
FY	Fiscal Year
HEC	Hydrologic Engineering Center (USACE)
HEM	Helicopter Electromagnetic
HMGP	Hazard Mitigation Grant Program
HR	House Resolution
HUD	US Department of Housing and Urban Development
IA	Individual Assistance
IBWC	International Boundary and Water Commission
ICOLD	International Commission on Large Dams
MT	Mitigation
NAFSMA	National Association of Flood and Stormwater Management Agencies
NCLS	National Committee on Levee Safety
NFIP	National Flood Insurance Program
NLD	National Levee Database
NLSA	National Levee Safety Act
NLSB	National Levee Safety Board
NLSP	*National Levee Safety Program*
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
O&M	Operations and Maintenance
PE	Professional Engineer
PG	Professional Geologist
PL	Public Law
PSA	Public Service Announcement
R&D	Research and Development
RiskMAP	Risk Mapping, Assessment, and Planning (FEMA)
SES	Senior Executive Staff
TRG	Tolerable Risk Guidelines
US	United States
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USSD	United States Society on Dams
WRDA	Water Resources Development Act

Appendix D— National Committee on Levee Safety Recommendation Development and Public Review Process

The purpose of this appendix is to describe the process the National Committee on Levee Safety (Committee) followed to formulate the recommendations and solicit feedback from a broad group of organizations and stakeholders.

Committee Member Selection:

The Chairmanship of the Committee was delegated to the US Army Corps of Engineers (USACE) Director of Civil Works by the Assistant Secretary of the Army for Civil Works (ASA(CW)). The ASA(CW) selected and appointed final Committee members based on recommendations presented by USACE. Selections were based on criteria, which focused on professional expertise, technical background, leadership and communication experience.

Committee members were charged to bring forth their individual expertise and judgment, and not the views of their organizations. The final recommendations comprise a collaborative Committee product that focuses on national solutions and may not represent the positions of individual members or their organizations.

Committee Operating Framework:

The Committee worked intensely from October 2008 to mid-January 2009 through a combination of full Committee meetings, smaller working group meetings, review team meetings, and conference calls. See the Committee charter, Appendix A, for more details on the operating procedures for the Committee. The following was the schedule:

- Initial committee meeting 6 Oct - 10 Oct 08
- 2nd Committee Meeting 20 Oct - 24 Oct 08
- Review Team Meeting 30 Oct 08
- 3rd Committee Meeting 4 Nov - 8 Nov 08
- 4th Committee Meeting 17 Nov - 21 Nov 08
- 5th Committee Meeting 8 Dec - 12 Dec 08
- Review Team Meeting 12 Dec 08
- Public Webinar 16 Dec 08
- 6th Committee Meeting 5 Jan - 9 Jan 09
- Submit Report 15 Jan 09

Committee members were divided into four work focus groups divided by the goals identified in the National Levee Safety Act. To ensure progress, individual workgroups met regularly at the discretion and organization of workgroup leaders. The following are the workgroups:

Workgroup 1: Technical Assistance (Goals 2, 7, 8, 9)

Workgroup 2: Public Awareness (Goals 5, 6)

Workgroup 3: Levee Safety Program Development (Goals 1, 4)

Workgroup 4: Implementation (Goal 3 and linking all other goals)

The Committee followed the following basic steps in its deliberations from October 6, 2008 through January 9, 2009. Because of the compressed timeframe, at times, some of these steps were being conducted in parallel.

Step One: Workgroups developed scoping and clarifying questions for each of the nine goals. Committee presented scoping and clarifying questions for Review Team input.

Step Two: Workgroups identified available data, input and advice needed for formulation of recommendations.

Step Three: Committee conducted field trips to flood damaged areas, levees and appurtenant works in New Orleans, solicited presentations from a variety of experts and consulted technical, scientific and policy documents (for a list of major presenters and documents consulted, see Appendix G).

Step Four: Workgroups developed recommendations for discussion at the plenary that included main steps, rationale, timing, funding, governance, authorities and leverage/impacts on other programs.

Step Five: Committee created a table that mapped recommendations by goal to ensure each goal had been addressed adequately.

Step Six: Committee analyzed, discussed, amended and finalized recommendation content and overall implementation steps.

Review and Feedback Process

Within the constraints of the schedule, the Committee gathered information and feedback from a diverse group of experts and stakeholders throughout the development of the recommendations. Specific activities included the continuous posting of products as they were developed on the Committee website (www.leveesafety.org); forming a review team and conducting two review team meetings; and hosting a web-based open stakeholder meeting. Committee members reviewed and considered all comments submitted.

The review team was composed of numerous representatives from a range of organizations and interests to serve on the review team. Organizations nominated and/or invited to participate are listed on the following page. Most of the review team members participated in the review meetings in person. Web-based technology was provided for those who chose to participate virtually. Review team members provided verbal and written feedback. Approximately 500 comments were received from the October meeting and approximately 600 comments were received from the December meeting.

The Committee also conducted a two-hour virtual stakeholder meeting on December 16, 2008, to share preliminary recommendations and engage a broader group in a dialogue about the recommendations. This meeting was announced through a media roundtable, all US Army Corps of Engineers public affairs offices and existing professional networks. Approximately 320 individuals participated. Within the time allowed, 22 questions were submitted electronically. A feedback form was sent to all stakeholders to solicit additional comments.

Invited Review Organizations:

- American Council of Engineering Companies
- American Public Works Association
- American Rivers
- American Society of Civil Engineers
- American Water Resources Association
- Association of State Dam Safety Officials
- Association of State Floodplain Managers
- Central Valley Flood Protection Board
- Commonwealth of Pennsylvania
- Confederated Salish and Kootenai Tribes
- Department of Transportation
- Federal Emergency Management Agency
- Federal Energy Regulatory Commission
- Federal Highway Administration
- Flood Control District of Maricopa County
- GEI Consultants
- HDR, Inc.
- Hidalgo County Drainage District (TX)
- Institute for Business and Home Safety
- International Boundary and Water Commission
- Klinger and Associates, P.C.
- Middle Rio Grande Conservancy District
- Mississippi River Commission
- National Association of Flood and Stormwater Management Agencies
- National Emergency Management Association
- National Ocean Service
- National Park Service
- National Weather Service
- National Wildlife Federation
- Natural Resource Conservation Service
- Office of Management and Budget, Water and Power Branch
- Ohio Department of Natural Resources, Division of Water
- Pennsylvania Department of Conservation and Natural Resources
- Sacramento Area Flood Control Agency
- Seminole Tribe of Florida
- Small Business Administration
- State of Kansas
- State of Louisiana
- Tennessee Valley Authority
- Terracon Consultants, Inc.
- The Nature Conservancy
- US Army Corps of Engineers
- US Bureau of Indian Affairs
- US Bureau of Reclamation
- US Department of Interior
- US Department of Transportation
- US Environmental Protection Agency
- US Fish and Wildlife Service
- US Forest Service
- US Geological Society
- US Housing and Urban Development
- US Small Business Administration
- US Society of Dams

Appendix E— Applicable Related US Army Corps of Engineers and Federal Emergency Management Agency Programs, Authorities, and Activities

1. Significant Events and Federal Legislation

- Swamp Land Acts 1849, 1850
  - Transferred swamp & overflow land to States on condition that sales revenue was used to build levees
- 1874 Mississippi River Flooding
  - Major flooding on Lower Mississippi resulted in congressional funding for Corps of Engineers study. Study concluded that most ongoing flood control efforts were uncoordinated & inadequate
- 1879 Mississippi River Commission Established
  - Focus was navigation improvements
  - Purpose: Identify and implement the most satisfactory flood control plan possible to improve navigation
- 1917 Flood Control Act
  - First Federal Flood Control Legislation
  - Recognized the federal governments limited responsibilities for flood control in lower Mississippi & Sacramento Rivers
  - Established first cost sharing policy ($2 federal to $1 local)
- 1927 Rivers & Harbor Act
  - Authorized the Corps to conduct surveys of most of the navigable streams of the United States
  - Known as 308 reports they became basic river planning documents
- 1928 Flood Control Act
  - Expanded flood control policy on the Mississippi to include floodways, spillways and channel improvements
  - Released lower Mississippi residents from some local cooperation requirements.
- 1936 Flood Control Act
  - Recognized that flood control was a "proper activity of the federal government in cooperation with states and their localities"
  - Stipulated that federal government would not participate in any flood control project if benefits did not exceed costs.
  - Authorized $320 million for over 200 flood control projects
- Flood Control Act of 1941
  - Section 5 provided authorization to conduct rescue work and repair or maintenance of flood control works threatened or destroyed by flood.
- Emergency Flood Control Act of 1955 (PL 84-99)
  - Created the first authorization for emergency flood response.

  (1955) Category 100, 200, 300

  (1962) Category 300 HSPP

  (1974) Category 400 Contaminated Water Supply

  (1976) Category 500 Advance Measures

  (1977) Category 400 Drought Response

  (1979) Category 600 Hazard Mitigation

  (1986) Category 200 Post Flood Response

  (1990) Expanded Preparation to "All Natural Hazards"

2. Public Law 84-99

The U.S. Army Corps of Engineers has vested authority under Public Law 84-99 (PL 84-99), as amended, to conduct emergency preparation and response activities to assist public agencies in responding to flood and other emergencies. Assistance can be in the form of technical assistance, direct assistance, or rehabilitation of federal and certain non-federal flood control works damaged or destroyed by floods. Types of assistance are disaster preparedness, advance measures, emergency assistance, flood response, post-flood response, and project rehabilitation. USACE assistance must be requested through the State's Standardized Emergency Management System and coordinated through the State's Response Information Management System. The local agency requesting assistance must provide appropriate documentation (e.g., hold harmless agreements, etc.) following any verbal authorization. FEMA may also assign USACE flood emergency response activities under the Federal Response Plan separately from any PL 84-99 authorization.

3. Water Resource Development Act of 1986 (Public Law 99-662) - Flood Control Act

The major significance of WRDA 1986 was establishing a stronger flood risk reduction sponsor partnership with cost sharing and project development:

- Section 104 - Authority for crediting sponsors for certain work compatible with a federal flood risk reduction project
- Section 204 - Authorizes reimbursement to non-federal sponsors for construction of authorized federal harbor projects
- Section 902 - Established a twenty percent cap on project cost increases

4. Inspection of Completed Works (ICW) and Rehabilitation and Inspection Program (RIP)

ICW is a Corps of Engineers program that includes periodic inspection of projects. These projects fall under Engineering Regulation (ER) 1110-2-530.

RIP is a Corps of Engineers program to perform inspections of non-federal projects under ER500-1 and the provisions of Public Law 84-99, if requested by the local sponsor. An initial eligibility inspection must be performed by the Corps of Engineers and subsequent maintenance inspections are required.

Through the Inspection of Completed Works (ICW) and the Rehabilitation and Inspection Program (RIP), the Corps of Engineers performs inspections of flood damage reduction projects, including: (a) projects federally built and maintained; (b) projects federally built and locally maintained; and (c) those projects locally built and maintained to determine eligibility for inclusion in the RIP or to determine eligibility to remain in the RIP. In most cases, maintenance of levees is a local responsibility with oversight provided by the Corps Inspection Program. Levee owners have an incentive to maintain levees in a sound condition to remain in the program and receive rehabilitation assistance after flood events. Additionally, the failure to maintain a levee in sound condition may result in withdrawal of Corps certification that it meets the Federal Emergency Management Agency (FEMA) Base-flood requirement. These inspections are visual verifications of the local entity's compliance with the Operation and Maintenance Manuals and do not include the engineering assessments needed to verify project performance or stability. Results of the inspections are forwarded to the local entity with recommendations for correcting any deficiencies identified.

5. Continuing Authorities Program (CAP)

The Continuing Authorities Program (CAP) is a group of legislative authorities that give the Corps of Engineers the authority to plan, design, and construct certain types of water resources and ecosystem restoration projects without additional and specific Congressional authorization. The purpose of CAP is to implement projects of limited scope and complexity. Each authority has specific implementation guidelines, total program and per-project funding limits, and cost share requirements. The following are the most commonly used CAP authorities:

- Small Flood Control Projects authorized by Section 205 of the 1948 Flood Control Act, with a per-project federal funding limit of $7 million. This program is designed to implement projects that reduce overland flood damages. Projects must be technically sound, economically justified and environmentally acceptable.
- Emergency Stream Bank Protection Projects authorized by Section 14 of the 1946 Flood Control Act with a per-project federal funding limit of $1.5 million. These projects are designed protect essential public facilities threatened by flood induced erosion.
- Aquatic Ecosystem Restoration authorized by Section 206 of the 1996 Water Resources Development Act (WRDA) with a per-project federal funding limit of $5 million. This program is designed to develop aquatic ecosystem restoration and protection projects that improve the quality of the environment, are in the public interest, and are cost-effective.
- Project Modifications for the Improvement of the Environment authorized by Section 1135 of the 1986 WRDA with a per-project federal funding limit of $5 million. This program is designed to modify existing Corps projects for the purpose of improving environmental quality.

6. Planning Assistance to States (PAS)

Section 22 of the Water Resources Development Act (WRDA) of 1974 (Public Law 93-251), as amended, provides authority for the Corps of Engineers to assist the states, local governments, and other non-federal entities in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources. Section 208 of the WRDA of 1992 (Public Law 102-580) amended the WRDA of 1974 to include eligible Native American Indian tribes as equivalent to a state. Section 2013 of the WRDA of 2007 increased the annual program funding limits to $5 million nationally, with up to $2 million per state or tribe.

The needed planning assistance is determined by the individual states and tribes. Study costs are shared equally by the federal government and the sponsor. Every year, each state and eligible Native American tribe provides the Corps of Engineers its request for studies under the program, and the Corps then accommodates as many studies as possible within the annual funding allotment. Typical studies are only at the planning level of detail; they do not include detailed design for project construction. The studies generally involve the analysis of existing data for planning purposes using standard engineering techniques, although some data collection is often necessary.

The program can encompass many types of studies dealing with water resource issues. Types of studies include the following:

- Water Supply and Demand
- Water Conservation
- Water Quality
- Environmental Conservation and Restoration
- Wetlands Evaluation
- Dam Safety/Failure
- Flood Risk Reduction
- Floodplain Management
- Coastal Zone Management and Protection
- Harbors and Ports

7. Floodplain Management Services (FPMS)

The program's authority stems from section 206 of the 1960 Flood Control Act (Public Law 86-645), as amended.

Its objective is to foster public understanding of the options for dealing with flood hazards and to promote prudent use and management of the nation's floodplains. Land use adjustments based on proper planning and the employment of techniques for reducing flood damages provide a rational way to balance the advantages and disadvantages of human settlement on floodplains. These adjustments are the key to sound floodplain management. People who live in the floodplain need to know about the flood hazard and the actions that they can take to reduce property damage and prevent the loss of life from floods. The FPMS program was developed by the Corps of Engineers specifically to address this need.

The FPMS programs provide the full range of technical services and planning guidance that is needed to support effective floodplain management. The Technical Services program develops or interprets site-specific data on obstructions to flood flows, flood formation and timing, flood depths, floodwater velocities, and the extent, duration, and frequency of flooding. The Special Studies Program provides assistance and guidance on all aspects of floodplain management planning:

- Floodplain Delineation and Flood Hazard Evaluation
- Dam Break Analysis
- Hurricane Evacuation
- Flood Warning and Preparedness
- Regulatory Floodway
- Comprehensive Floodplain Management
- Flood Risk Reduction
- Urbanization Impacts
- Storm Water Management
- Non-structural Flood Proofing
- Inventory of Flood Prone Structures

Program services are provided without charge upon request to state, regional, and local governments, eligible Native American Indian tribes, and other non-federal public agencies. These entities may provide voluntary contributions toward requested services to expand the scope or accelerate the provision of those services. Program services are also offered to non-water resource federal agencies and to the private sector on a 100 percent cost recovery basis. The Corps has very limited circumstances under which it can accept sponsor funds since the passage of the Thomas Amendment in Section 211 of the WRDA of 2000.

8. National Levee Database Authority (Public Law 109-148)

Emergency supplemental funds appropriated under Public Law 109-148 (enacted on December 30, 2005) included $30 million for the Corps of Engineers to initiate a National Inventory of Flood and Storm Damage Reduction projects, including an assessment of the condition of levee projects. In addition, the President's budget for Fiscal Year 2007 included $20 million to continue this effort. The Corps is working with FEMA to coordinate its efforts with the FEMA Map Modernization program. It is envisioned that data from the inventory will be able to provide technical information to perform or be used as a basis for periodic re-certification of levees as required by FEMA for floodplain mapping purposes. The inventory will be a geospatial database that will allow data to be incorporated into the flood maps prepared by FEMA or, if more detailed mapping is available, could be used with that mapping. The database will allow users to have real time information readily available.

The Corps completed an initial survey of federal program levee systems in July 2006 and developed a national database to capture information about each levee, including the location and last recorded inspection rating. The levees included in this initial survey are: (1) federally owned and maintained; (2) federally built and locally maintained; and (3) locally built and maintained that meet specified Corps standards. The initial Corps survey included approximately 2,000 levees, encompassing approximately 13,000 miles, in the Corps Inspection of Completed Works (ICW) and Rehabilitation and Inspection (RIP) programs. Many of these projects were authorized by Congress for federal construction and later turned over to state and local sponsors to operate and maintain. These projects are inspected on a biennial schedule.

9. Water Resources Development Act of 2007 (Public Law 110-114) - National Levee Safety Act of 2007

This WRDA established the National Committee on Levee Safety (NCLS) and charged it with developing a national levee safety policy. Section 9003 of Title IX listed nine areas of concern to be addressed by the NCLS in a report to Congress:

(1) Ensuring the protection of human life and property by levees through the development of technologically, economically, socially, and environmentally feasible programs and procedures for hazard reduction and mitigation relating to levees.

(2) Encouraging use of the best available engineering policies and procedures for levee site investigation, design, construction, operation and maintenance, and emergency preparedness.

(3) Encouraging the establishment and implementation of an effective national levee safety program that may be delegated to qualified States for implementation, including identification of incentives and disincentives for State levee safety programs.

(4) Ensuring that levees are operated and maintained in accordance with appropriate and protective standards by conducting an inventory and inspection of levees.

(5) Developing and supporting public education and awareness projects to increase public acceptance and support of State and national levee safety programs.

(6) Building public awareness of the residual risks associated with living in levee protected areas.

(7) Developing technical assistance materials for State and national levee safety programs.

(8) Developing methods to provide technical assistance relating to levee safety to non-Federal entities.

(9) Developing technical assistance materials, seminars, and guidelines relating to the physical integrity of levees in the United States.

Section 9004 of Title IX The legislation also expanded the National Levee Database from listing federal levees to include all levees in the United States, with an emphasis on condition, establishing the population at risk and determining location by GIS coordinates.

Section 9006 of Title IX authorized $20 million per year for each federal fiscal year from 2008 through 2013.

The Federal Emergency Management Agency (FEMA) Authorities and Activities:

A. Statutes/Legislation:

1)National Flood Insurance Program (NFIP): Includes flood hazard identification (mapping, including areas impacted by levees), floodplain management, and flood insurance authorities.

The U.S. Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968. The NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the Federal Government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the Federal Government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an insurance alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Legislation relating to the NFIP include:

i. The National Flood Insurance Act of 1968 (NFIA)

ii. The Flood Disaster Protection Act of 1973 (FDPA)

iii. The National Flood Insurance Reform Act of 1994 (NFIRA 1994)

- Resulted in major changes to the NFIP. NFIRA, which amended the FDPA, provides tools to make the NFIP more effective in achieving its goals of reducing the risk of flood damage to properties and reducing Federal expenditures for uninsured properties that are damaged by floods.
- Community Rating System -Subtitle C Section 541. Community Rating System and Incentives for Community Floodplain Management.
  - To provide incentives for measures that reduce the risk of flood or erosion damage that exceed the criteria set forth in Section 1361 and evaluate such measures;
  - To encourage adoption of more effective measures that protect natural and beneficial floodplain functions;
  - To encourage floodplain and erosion management; and
  - To promote the reduction of Federal flood insurance losses.
- Flood Mitigation Assistance Grant Program:
  - Pre-disaster grant program that provides funds every year to states and communities for projects that reduce or eliminate the long-term risk of flood damage to buildings, homes, and other structures that are insured under the NFIP.

iv. The National Flood Insurance Reform Act 2004 (NFIRA 2004): The Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (PL 108-264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al.)

- Repetitive Flood Claims Grant Program
  - A pre-disaster nationally competitive grant program that funds mitigation projects for certain repetitive loss properties in communities or states that cannot participate in the FMA program because they do not have funds for the non-federal match or lack the capacity to manage FMA grant activities.

  (http://www.fema.gov/government/grant/rfc/index.shtm)
- Severe Repetitive Loss (SRL) Grant Program
  - A pre-disaster grant program that is reserved for "severe" repetitive loss properties (i.e., residential properties with a high frequency of losses or a high value of claims). The funding is used to reduce or eliminate the long-term risk of flood damage to SRL structures insured under the NFIP. (http://www.fema.gov/government/grant/srl/index.shtm)

2)Disaster Assistance:

Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Stafford Act), PL 100-707: Signed into law November 23, 1988; amended the Disaster Relief Act of 1974, PL 93-288. This Act constitutes the statutory authority for most Federal disaster response activities especially as they pertain to FEMA and FEMA programs. The Stafford Act provides the statutory framework for a Presidential declaration of an emergency or a declaration of a major disaster. Such declarations open the way for a wide range of federal resources to be made available to assist in dealing with the emergency or major disaster involved. The

Stafford Act structure for the declaration process reflects the fact that federal resources under this statute supplement state and local resources for disaster relief and recovery. Except in the case of an emergency involving a subject area that is exclusively or preeminently in the federal purview, the Governor of an affected state, or Acting Governor if the Governor is not available, must request such a declaration by the President.

Financial Assistance:

i. Individual Assistance

The FEMA Individual and Households Program (IHP) provides assistance to victims of presidentially declared disasters. IHP assistance can be available to individuals, families and businesses. Assistance can include temporary housing, financial assistance for repairing a damaged dwelling, and assistance with other disaster-related needs such as transportation or medical and dental expenses incurred as a result of the disaster. IHP assistance is meant to help those affected by disasters with critical expenses that cannot be covered in other ways; it is not intended to restore an individual's damaged property to its condition before the disaster. While some housing assistance funds are available through the Individuals and Households Program, most disaster assistance from the Federal government is in the form of loans administered by the Small Business Administration.

ii. Public Assistance- Section 406 of the Stafford Act

- Public Assistance is a post-disaster program established under Section 406 of the Stafford Act that is jointly administered by FEMA and individual states. As part of the reimbursements made to restore damaged public facilities and certain private non-profit (PNP) facilities, public assistance funds may be made available for cost-effective mitigation measures undertaken as part of the recovery. The amount of Section 406 Mitigation funds made available in any given disaster is not computed by a formula, but is based on a project-by-project evaluation of the feasibility and cost-effectiveness of mitigation measures.

Post-Disaster Grant Program Assistance:

i. Hazard Mitigation Grant Program (HMGP) - Section 404 of the Stafford Act

- The Hazard Mitigation Grant Program offers post-disaster funding to states, communities, and other eligible grant recipients to invest in long-term measures that will reduce vulnerability to future natural hazards. The states have a strong role in administering HMGP, with FEMA providing oversight.

ii. Pre-Disaster Mitigation (PDM) - Section 203 of the Stafford Act

- Pre-Disaster Mitigation is a nationally competitive grant program designed to assist states and communities to develop mitigation plans and implement mitigation projects. PDM funds are appropriated annually. FEMA convenes national panels to evaluate eligible applications that are submitted by states following the state selection process.

Hazard Mitigation Planning

i. Disaster Mitigation Act of 2000 (DMA) (PL 106-390): Amends Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U.S.C. 5165, and provides for States, Tribes, and local governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning. The National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq, reinforced the need and requirement for mitigation plans, linking flood mitigation assistance programs to State, Tribal and Local Mitigation Plans.

B. Regulations:

1)NFIP:

a. Title 44 Code of Federal Regulations (CFR) Part 65 - Identification and Mapping of Special Hazard Areas

i. 44 CFR 65.10 - Mapping of Areas Protect by Levee Systems - Established on August 25, 1986. FEMA regulatory responsibilities with regard to mapping areas protected by levees. FEMA is charged with accrediting levees certified by others, determining the appropriate flood risk designations for areas behind levees, and accurately depicting these flood risks on flood hazard maps

b. Parts 59, 60, 61, and others covering flood insurance and floodplain management activities

2)Disaster Assistance:

a. Title 44 CFR Part 206 - Federal Disaster Assistance

3)Mitigation Grants:

a. Title 44 CFR Part 79 - Flood Mitigation Grants

4)Hazard Mitigation Planning:

a. Title 44 CFR 201 - Mitigation Planning

C. Policies/Guidance:

1)NFIP:

a. FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners Guidelines and Specifications Appendix H:

i. This Appendix describes the FEMA requirements and procedures for evaluating earthen levee systems and mapping the areas affected by those systems.

b. Procedural Memorandums (PMs): PMs supplement and clarify the information in Appendix H of FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners on mapping the base flood in areas with levees.

i. FEMA Procedural Memo 34 - Interim Guidance for Studies Including Levees Aug. 22, 2005

- This Procedure Memorandum provides FEMA staff, contactors, and mapping partners with guidance for the evaluation and mapping of levees and levee-affected areas as part of the FEMA Flood Map Modernization effort.

ii. FEMA Procedural Memo 43 - Guidelines for Identifying Provisionally Accredited Levees (revised) Mar. 16, 2007 - Supersedes version issued on Sept. 25, 2006

- This Procedure Memorandum provides FEMA staff, contractors, and mapping partners with guidance for identifying Provisionally Accredited Levees (PALs) and mapping levee-affected areas. Also included is a fact sheet, prepared in question-and-answer format, that provides detailed information regarding National Flood Insurance Program procedures for the evaluation and mapping of levee systems with emphasis on Procedure Memorandum No. 43 and PAL systems. This fact sheet was designed for a more technical audience. Additional documents include flowcharts and sample letters for different levee scenarios.

c. CRS Guidance

2) Disaster Assistance

a. Individual Assistance Policy and Guidance

b. Public Assistance Policy and Guidance

c. Hazard Mitigation Assistance Program Guidance

d. Hazard Mitigation Planning Guidance

c. CRS Guidance

Appendix F— Cursory Cost Estimates for a National Levee Safety Program

Cursory Cost Estimates for National Levee Safety Commission Activities

Preliminary costs were estimated for the following components:

- Establishing and maintaining Commission members, staff and Advisory Committees.
- Technical Programs, including establishing *National Levee Safety Code*, publications, developing and distributing training materials, providing technical assistance, and establishing and maintaining a research and development program.
- Remapping FEMA NFIP maps to establish AL and XL zones, and other augmentations of FEMA mapping programs.
- Leading public involvement and education/awareness campaigns to improve the understandings of risk and to change behavior in leveed areas.
- Developing and implementing measures and practices to more closely harmonize levee safety activities with environmental protection requirements and principles.

Costs were estimated for both a 5-year initial start-up phase, and a steady-state or long-term phase. Average costs for both phases are displayed in Table F-1 below.

Cursory Cost Estimates for State Levee Safety Programs

Recent experience from California was used to estimate the costs necessary for establishing and maintaining an average State Levee Safety Program. The process for this was as follows:

- The first step was to take the estimated 100,000 miles of non-federal levees in the nation and assume that the average state program would involve approximately 2,000 miles of levees. Using the experience from California for 1,600 miles of state-federal project levees, as detailed in Table F-2, it was estimated that there would be an average one-time start-up cost of approximately $6.5 million. After start-up, there would be an average annual cost of approximately $3.4 million.
- Taking the average annual cost of $3.4 million per year per state would end up totaling approximately $170 million per year for 50 states.
- It was assumed that the average one-time start-up cost of $6.5 million would be spent over five years. This would lead to a total start-up cost of approximately $65 million per year for 50 states spread over each of the first five years. However, during this same time, some states will have completed portions of their initial start-up activities and begun accruing some of the long-term annual costs. If we assume during the first five years that, on the average, about half of the long-term annual costs are being expended, then the average annual costs for all 50 states during the first five-year start-up period would be approximately $150 million [$65 million + (0.5 x $170 million)].
- It was assumed that the average annual cost for all 50 states during the first five years would be cost-shared, with the federal government paying approximately $113 million (75%) and non-federal entities paying approximately $37 million (25%) per year.
- It was assumed that the average annual cost for all 50 states during the long-term steady state

Table F-1: Estimated Costs for Establishing and Maintaining a National Levee Safety Commission

National Levee Safety Commission	Annual Costs by Implementation Phase			Annual Costs by Implementation Phase		
	Phases I and II (Years 1 - 5)			Phase III (Steady State)		
Activity	*Cost*	*Cost-Share*		*Cost*	*Cost-Share*	
		Federal	*Non-Federal*		*Federal*	*Non-Federal*
Commissioners, Commission Staff, Advisory Committees, and Managing State Program Delegation	$15M	100%	0%	$20M	100%	0%
Technical Programs--Codes, Publications, Training, Technical Assistance, and Research & Development	$11M	100%	0%	$13M	100%	0%
Remapping for AL and XL Zones and augmenting FEMA mapping program	$10M	100%	0%	$5M	100%	0%
Public Involvement and Education	$3M	100%	0%	$2M	100%	0%
Environment and Public Safety	$1M	100%	0%	$1M	100%	0%
TOTAL	$40M			$41M		

Note: Federal funds to assist state levee safety programs are envisioned to flow to the agency that is actually performing the federally funded work. It is intended that much of the funding would be delivered to the responsible agency to perform functions such as inspections, preparation of reports and emergency action planning (see section entitled Strong Levee Safety Programs in All States) for more detail.

phase would also be cost-shared, with the federal government paying approximately $85 million (50%) and non-federal entities paying $85 million (50%) per year. The rationale for the lower federal cost share for the long-term steady state phase is that the costs of continued annual inspections would be expected to be borne completely by the non-federal entities over long-term.

Average costs for both phases are displayed in Table F-2.

Table F-2: Estimated Costs for State Levee Safety Programs

Activity	One-time Cost ($1,000)	Annual Cost ($1,000)	Comments	Basis for Cost
Adopt National Code	$400	$100	Enact regulations, supplement, and update. This can involve significant staff effort and public review.	Assumed
Safety inspections annually	$400	$1,500	Program setup and training would be signficant. Likely more expensive for locals to perform work and state to have some oversight. Assume typical state has 2,000 miles nonfederal levees currently uninspected.	California 1,600 miles cost of $1.5 M for twice annually. Increased by 25% for 2,000 miles. Decreased by 33% for once annually. Increased by 20% for state oversight of local inspection. Assumed cost for initial setup and training.
Identify hazard potential of levees	$20	$20	Some initial training. Includes identifying possible new jurisdictional levees.	Assumed
Provide updated information to NLD	$100	$50	Program setup and training. Some annual maintenance.	Assumed
Emergency action plans and evacuation plans/2,300 miles (includes 300 miles of federal levees)	$4,300	$50	Add 300 miles of federal levee since evacuation plans currently not required for federal levees—for total of 2,300 miles of levees. Assume 500 miles of high hazard potential levees need robust plans and 900 miles of significant hazard potential levees need ⅓ of the effort of a robust plan.	Use Sacramento County as cost basis for robust plans. Sacramento County 2004 cost of $325,000 for 90 miles of levee. Increased by 25% to include some additional effort and inflation. Assumed annual cost of $50,000 for periodic updates.
Enter public or private property for inspection/ response	$0	$0	Would likely take legislation, possibly controversial. Legislative activities already funded.	Assumed
Provide risk notification and public outreach	$300	$500	Could spend much less or more, depending on how thorough the outreach must be. Initial annual cost may start out low, but would expect to increase to something like $500,000 per year. Develop initial communication plan thru public input and research.	Assumed gathering public input and initial modest level of outreach involving public meetings, newspaper ads, PSAs, internet, email. Over time could approach something closer to California's effort. California has budgeted $1 million annually for 1,600 miles of levees, with mailer to every property owner. Assume $500,000 annually for well-developed state outreach program. Assumed cost of initial communication plan and program setup.
Provide reports on program status and performance	$200	$300	Inspection reporting costs are covered above.	Assumed
Promulgate rules and procedures	$800	$100	Enact regulations, supplement, and update. This can involve significant staff effort and public involvement.	Assumed
Consider nonstructural measures		$100	Initial procedures are covered above. Provide guidance and assistance to communities for nonstructural programs.	Assumed
Act as coordinator		$400	Initial procedures are covered above. Provide coordination within state and with national level program on levee safety program issues.	Assumed
Prepare and approve grant application packages		$90	Initial procedures are covered above. Assume this involves verifying that the updated HMPs cover levees.	Assumed 3% administration cost for national grants of $3 million/state.
Receive, disburse, and administer grants		$210	Initial procedures are covered above.	Assumed 7% administration cost for national grants of $3 million/state.
TOTAL	$6,520	$3,420		

Note: Estimated cost for a state with 2,000 miles of non-federal levees.

Appendix G— Sources Presented or Consulted by National Committee on Levee Safety (NCLS)

The National Levee Safety Committee actively sought and benefited immensely from its consultation with experts in a variety of disciplines and fields and from the rich history of studies and reports issued previously on the topic of levee safety and floodplain management. Below is a list of this source material that was consulted by the Committee and informed its discussions and recommendations.

Presentations

- *ASFPM Foundation Report Levees 2050.* Sam Riley Medlock, Association of State Floodplain Managers (ASFPM), October 2008.
- *ASFPM/NAFSMA Joint Wye River Levee Policy Summit Recommendations.* Susan Gilson (NAFSMA), October 2008.
- *California's FloodSAFE Program.* Rod Mayer, Assistant Deputy Director, FloodSAFE, State of California, October 2008.
- *Congressional Research Service; Teleconference on Governance Issues.* Nicole Carter, Claudia Copeland, Mary Tiemann, Jim McCarthy, Rob Meltz, October 30, 2008.
- *Dam Safety Program Structure, USACE: Governance and Program Scope Overview.* Eric Halpin, Special Assistant for Dam and Levee Safety, USACE, October 2008.
- *Double Edged Sword.* Chad Berginnis, Association of State Floodplain Mangers (ASFPM), October 2008.
- *FEMA Programs as Incentives or Disincentives to National Levee Safety Program.* Bill Blanton and Craig Kennedy, FEMA, November 2008.
- *FEMA's Programs that Relate to Levees.* Bill Blanton, Chief of Engineering and Management, FEMA, October 2008.
- *Flood Risk Communication.* Mary Jo Vrem (FEMA), teleconference, November 14, 2008.
- *A Focus on Behavior Change: Applying social marketing to reducing risks around levees.* Peter Mitchell, Marketing for Change, November 2008.
- *How We Got Where We are Today: An Historical Perspective on Levees and Summary of Issues.* Dr. Gerry Galloway, University of Maryland, October 2008.
- *Hurricane Katrina Response and Recovery.* James B. Walters, USACE, November 2008.
- *Improving Flood Protection—Understanding How Levees are Different from Dams.* Les Harder, Senior Water Policy Advisor, HDR, Inc., October 2008.
- *Keeping the Strategic in Your Strategic Plan.* Philip Rizzi, Business Program Manager, Human Capital Account, SRA International, October 2008.
- *Learning from Katrina: Actions for Change and Implementing the IPET Recommendations.* Gary House, Actions for Change Program Manager, USACE, October 2008.
- *Levee Policy Summits: Outcomes and Summary.* Dusty Williams & Susan Gilson, National Association of Flood and Stormwater Management Agencies (NAFSMA), October 2008.
- *Levee Safety Act, Title IX Overview.* Eric Halpin, Special Assistant for Dam and Levee Safety, USACE, October 2008.
- *Mississippi River Commission: History, Organization, Governance and Authorities.* Stephen Gambrell, R.D. James, Member, and Charles Camillo, Mississippi River Commission (MRC), November 2008.
- *New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS).* Karen Durham Aguilera, Director, Task Force Hope, USACE, November 2008.
- *Overview of the Delaware River Commissions Organization and Structure.* Carol Collier, Executive Director, Delaware River Commission, November 2008.
- *Status of the National Levee Database.* Tim Pangburn, Chief of Remote Sensing/GIS and Water Resources Branch ERDC-CRREL, USACE, October 2008.
- *Tolerable Risk.* Eric Halpin, Special Assistant for Dam and Levee Safety, USACE, October 2008.
- *USACE Levee Safety Program.* Tammy Conforti, Levee Safety Program Manager, USACE, October 2008.

Relevant Reports and Documents

- American Institutes for Research. 2006. *An Evaluation of the National Flood Insurance Program (NFIP) Final Report.* Washington, DC.
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- Association of State Floodplain Managers. 2006. *Liability for Water Control Structure Failure Due to Flooding.*
- Association of State Floodplain Managers Foundation. 2008. *A Comparative Look at the Public Liability for Flood Hazard Mitigation.*
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- *Charterizing Flood Risk for More Informed Public Involvement.* Version 1. Charles Yoe. September 2006.
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- Federal Tolerable Risk Workshop, March 18-19, 2008. Alexandria, Virginia.
- FEMA. 1986. A Unified National Program for Floodplain Management. Washington, DC.
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- *The National Levee Challenge: Levees and the FEMA Flood Map Modernization Initiative*, Report of the Interagency Levee Policy Review Committee (2006).
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- *Transforming the Corps into a Risk Managing Organization.* David Moser, Todd Bridges, Steve Tone, Yocov Haimes, Brian Leonard Shabman, Charles Yoe. undated
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- FEMA. 2008. *Frequently Used Terms for Levee Systems.*
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- Thompson, Robert. ASCE. *Standard of Care Versus Codes and Standards.* September/October 2008.
- US Army Corps of Engineers. *National Dam Safety Program Act (NDSPA).*

Informal Consultation

- Levee Safety Program Framework Roundtable. October 27, 2008.
  - Tom Browning, Colorado Water Conservation Board
  - Jack G. Byers, Applegate Group
  - Bill DeGroot, Denver Urban Drainage and Flood Control District
  - Dave Edwards, U.S. Bureau of Reclamation
  - Rich Hansen, Colorado Division of Emergency Management
  - Mark Haynes, SEO
  - Paul Hindman, Denver Urban Drainage and Flood Control District
  - Kevin Houck, Colorado Water Conservation Board
  - Ken Maxey, U.S. Bureau of Reclamation
  - Chris Pauley, Anderson Consulting Engineers
  - Marge Price, Price Howlett, Inc.
  - Roz Trojan, Trojan Associates, Inc.
  - Scott Tucker, Water Resource Consulting (retired)
  - Phil Workman, Workman & Associates
  - Ben Urbonas, Urban Watersheds Research Institute
- Public Involvement. Charles E. Yoe. College of Notre Dame of Maryland.

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Responses for Questions from Senator Barbara Boxer

From Steven W. Verigin, Vice President – GEI Consultants, Inc.
Member of National Committee on Levee Safety

1) ***How can a new National Levee Safety Program help to achieve the goals of comprehensive and consistent national leadership and alignment of existing federal programs for levee safety? Why is a new program needed in addition to the current Federal programs focused on levee safety?***

A National Program is Needed to Assess the Levee Situation in the U.S. and Prioritize Actions
Currently, responsibility for levees is often uncoordinated and incomplete, distributed across all levels of government (federal, state, regional, local) and housed in different agencies and functions within each level of government. This shared and diffused responsibility impedes development of comprehensive policies and programs, impairs ongoing coordination, and prevents a sustained focus on this issue.

The vast majority of the levees across the nation are not part of any federal program, yet levees are abundant and integral to economic development in many communities in the nation. There are approximately 14,800 miles of levee enrolled in U.S. Army Corps of Engineers programs (including those built by the Corps and locally maintained) and another 14,000-16,000 miles estimated to be operated by other federal agencies (U.S. Bureau of Reclamation, National Resources Conservation Service).

In addition, the NCLS estimates there may be as many as 100,000 miles of additional levees in the nation with tens of millions of people living behind them. These levees are not federally operated or maintained, and with few exceptions, are not subject to any federal or state oversight, levee safety criteria, standards, or guidelines. Recent surveys by the Association of State Dam Safety Officials and the Association of State Floodplain Mangers found that only 10 states keep any listing of levees within their borders and only 23 states have an agency with some responsibility for levee safety.

Federal investment in all types of public infrastructure is located behind these levees – roads, bridges, schools, water and wastewater treatment plants, post offices, court houses, etc. – and they are all at risk from flooding. When flooding does occur, not only does the federal government have to pay to repair its facilities, but communities turn to the federal government to help provide relief. While many of these structures have afforded the country economic prosperity, they have also had the unintended consequence of obligating the U.S. taxpayer to pay for disaster damages and repairs when these same levees fail. Best information from the National Flood Insurance Program indicates that the value of residential and commercial properties (structures and contents) located in leveed areas constitutes a total national exposure of more than $375 billion ($5 to $10 billion annual exposure based on rough estimates extrapolated from State of California historic flood damage data).

For the most part, existing federal programs are neither aligned nor coordinated, creating a situation of uncertain and often times, unknown risk for many communities. For example:

- Several federal and some state agencies have varying policies and criteria concerning the many aspects of levee design, construction, operation and maintenance. But there are no national policies, standards or best practices that are comprehensive to the issues of levee safety and that can be adopted broadly by governments at all levels. Several federal agencies have built and/or operate levees according to their own standards and guidelines, including the U.S. Army Corps of Engineers, the Federal Energy Regulatory Agency, the U.S. Bureau of Reclamation, and

the International Boundary and Water Commission. The level of protection and robustness of design and construction vary considerably across the country, helping to create a wide-ranging profile of risk exposure, risk understanding, risk levels and consequently, public safety.

- The Federal Emergency Management Agency (FEMA) identifies flood hazards, assesses flood risks, and provides appropriate flood hazard and risk information to communities nationwide as part of administering the National Flood Insurance Program.
- Three federal agencies administer programs to fund emergency levee repairs, flood fighting, and (to varying degrees) permanent repairs: USACE's Rehabilitation & Inspection Program, the Natural Resource Conservation Service's Emergency Watershed Program; and FEMA's Rehabilitation Assistance for Levees and other Flood Control Works under the Stafford Act.
- Regulatory programs in various agencies, including the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the U.S. Army Corps of Engineers impact the design, construction, operations, and maintenance of the nation's levees.
- The lack of national standards for levees creates a scenario where licensed professional engineers, levee owners and governments cannot rely on an accepted standard of care while performing critical services in design, construction, and certification of levees. This legal environment appears to be making such work increasingly riskier and effectively reducing the private sector's interest and ability to provide these services.

A National Levee Safety Program is Needed to Lead the Development and Implementation of a Consistent National Approach That Will Require a Broad Set of Disciplines

The nation needs a single National Levee Safety Program that would help move the county away from a reactive disaster assistance environment and toward a proactive, safety-oriented culture where the general public and governments are informed and able to participate in shared responsibility of risk management and where levees are reliable. A national program would be charged with a leadership role in understanding and communicating risks associated with levees, developing national safety standards, facilitating dialogue and research on important levee related topics, and providing technical materials and assistance to all levels of government – in short, overseeing all aspects of the National Levee Safety Program. Specifically, the NCLS envisions a Commission with program responsibilities to:

- Expand and maintain the National Levee Database (NCLS Recommendation 2);
- Adopt a Levee Hazard Potential Classification System (NCLS Recommendation 3);
- Develop and adopt National Levee Safety Standards (NCLS Recommendation 4);
- Develop Tolerable Risk Guidelines (NCLS Recommendation 5);
- Address growing concerns regarding liability for damages resulting from levee failures (NCLS Recommendation 8);
- Lead the public involvement and education/awareness campaign to understand risk and change behavior in leveed areas (NCLS Recommendation 9);
- Provide technical materials, assistance, and training to states, communities, and levee owners/ operators (NCLS Recommendations 10 and 11);

- Develop and implement measures and practices to more closely harmonize levee safety activities with environmental protection requirements and principles (NCLS Recommendation 12);
- Conduct research and development to support efficient and more cost-effective levee safety technologies and practices (NCLS Recommendation 13);
- Design, delegate, and oversee Levee Safety Program responsibilities to states (NCLS Recommendation 14); and
- Coordinate federal agency activities and programs.

A National Levee Safety Program is Needed to Change the Way People and Governments Think About Levees

Many government officials and the general public have only a limited understanding of levees and the risks associated with them. Clear and consistent communication on issues related to levee safety is an important role for the National Levee Safety Commission, including coordinating key messages with other federal agencies and sharing those messages with states, levee owners and operators, communities, and residents living and working behind levees. A National Levee Safety Program is needed to develop a comprehensive national public involvement and education awareness campaign to communicate risk and change behavior in leveed-areas.

An Independent National Levee Safety Program is Needed to Forge a New Era of Shared Responsibility Across Federal Agencies and Levels of Government

The NCLS believes an independent federal agency with strong guidance by state, tribal, and local governments and the private sector is the ideal model for the National Levee Safety Commission. To be effective in aligning federal agencies and working with states and local governments will require a level of independence from any one agency. A national Commission should have the following characteristics.

- Independence to address levee safety holistically, unconstrained by the momentum and priorities of existing programs, and the ability to make politically challenging and unpopular decisions when necessary;
- Leadership for the significant horizontal integration of effort across federal agencies and alignment of their programs, as well as for the vertical integration to achieve strong and balanced participation at all levels of government and in the private sector;
- Organizational capabilities spanning regulatory policy development, program implementation and oversight, grants management, technical expertise, public communications expertise and environmental policy and program experience.

While the National Committee on Levee Safety strongly believes that an independent agency is preferable, it also considered the possibility of embedding the National Levee Safety Program in a single existing federal agency, particularly on an interim basis as a permanent governance solution is created. The National Committee on Levee Safety determined that neither the U.S. Army Corps of Engineers nor the Federal Emergency Management Agency alone has the full suite of expertise needed in the key areas of: 1) levee engineering; 2) risk mitigation in leveed areas; and 3) administering incentives. The National Committee on Levee Safety was also concerned that housing a national program in an existing agency would further stretch the resources of these agencies by expanding their existing large missions,

and provides challenges to that agency in managing alignment of other federal agencies' programs. Should Congress determine that this governance model is appropriate, the National Committee on Levee Safety would like to recommend that a part-time advisory committee be established to provide national leadership and comprehensive and consistent approaches to levee safety.

2) ***During the hearing, you stated that there are levees in the U.S. that do not protect against a 100-year flood, let alone provide a 200 to 500-year level of protection that many urban areas need. Would you please provide any information that you have that indicates how many levees in California have a federal nexus and how many are entirely under state and local level ownership and operation? Also, could you indicate what portions of these levees are known to have less than a 100-year level of protection?***

The California Department of Water Resources (DWR) has developed a California Levee Database (CLD) and populated it with information submitted voluntarily by local government agencies. The CLD identifies 2,129 miles of levees built by the U.S. Army Corps of Engineers out of 13,726 miles of levees in total. The remaining 11,000 plus miles of levees include state, local or regional government /agency and private ownership. The 11,000 plus miles also includes levees with a federal nexus that were not built by the Corps, such as non-federally constructed levees enrolled in the Corps' PL 84-99 program, levees built by the Natural Resources Conservation Service, and canal embankments built by the U.S. Bureau of Reclamation. The information in the CLD has not been verified in the field and may change substantially based on site visits.

Information is not readily available regarding the portion of these levees known to have less than a 100-year level of protection. However, DWR has contacted FEMA and may be able to develop some additional information for a follow-up response. In addition, DWR is evaluating about 2,000 miles of federal levees (and closely associated nonfederal levees) in California's Central Valley. The levee evaluations are not aimed at determining whether levees provide 100-year flood protection; rather, the evaluations rate the likely performance of levees and whether they meet certain design criteria. Preliminary results from the levee evaluations and other important information on Central Valley levees will be presented in DWR's Flood Control System Status Report, which should be available in spring 2011. DWR will provide a copy of the report to the Committee when it is available.

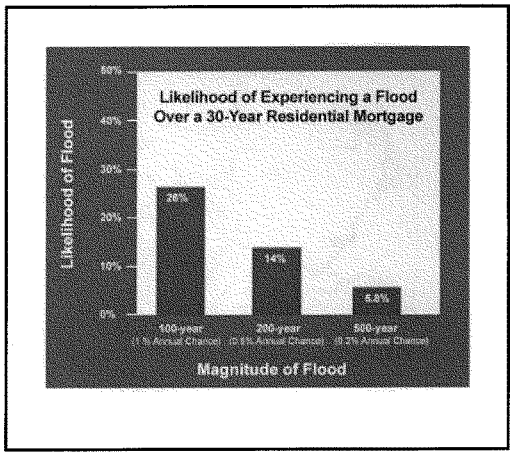
Levee information developed by DWR is used by local communities to evaluate their levee systems for 100-year flood protection and for design of State-local Early Implementation Projects (EIP). EIPs in urban areas are planned for 200-year flood protection pursuant to California law (Senate Bill 5, from 2007). To date, DWR has entered into cost sharing contracts with local agencies for eight EIPs, totaling $742 million ($539 million State bond funds and $203 million local funds). We have included a map of federal levees in the Central Valley of California that indicates the 1,600 miles of levees the U.S. Army Corps of Engineers built.

Confusion Regarding National Levee Safety Standards

Many government officials and individuals have come to think that the 1-percent-annual-chance (100-year) flood, which was designated by the National Flood Insurance Program for insurance purposes is a levee safety standard. This is not true and a dangerous belief – it is based on neither sound scientific foundations nor statistical analyses of safety, but purely for insurance purposes. The NFIP uses the 1-percent-annual-chance flood to determine where the "mandatory purchase requirement" for flood

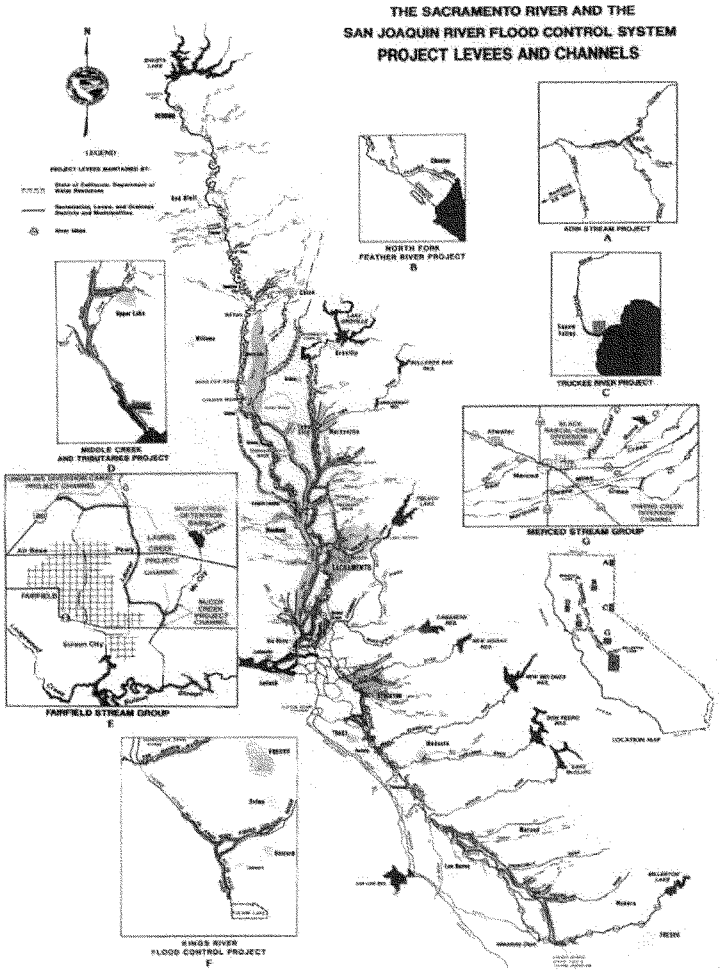
insurance applies to properties secured by federally regulated mortgage lenders. Currently, homeowners living behind levees designed, built, and maintained to meet or exceed that 1%-annual-chance flood standard often are exempt from the mandatory purchase requirement. Further, the area behind the levee is mapped as if no levee were present.

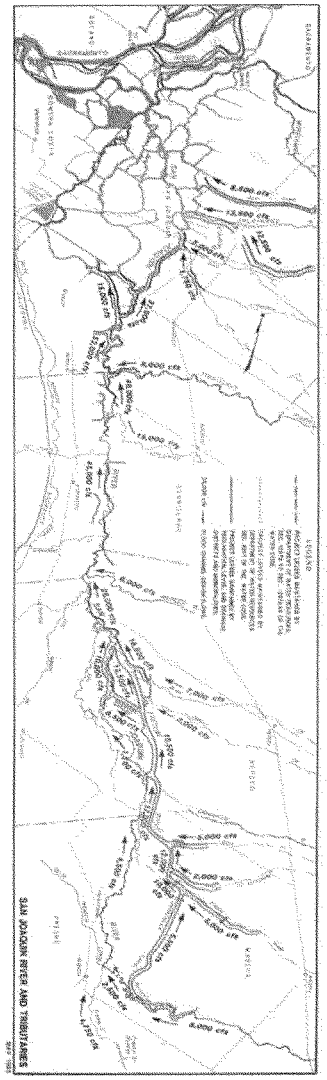
There is also misunderstanding about what the 100-year flood actually means. Many believe this means that a destructive flood will only occur every 100 years. In reality, it means there is a 1% chance every year that a flood of that magnitude or greater will occur, translating to a 26% chance that a flood of that magnitude or greater will occur during a typical 30-year mortgage.

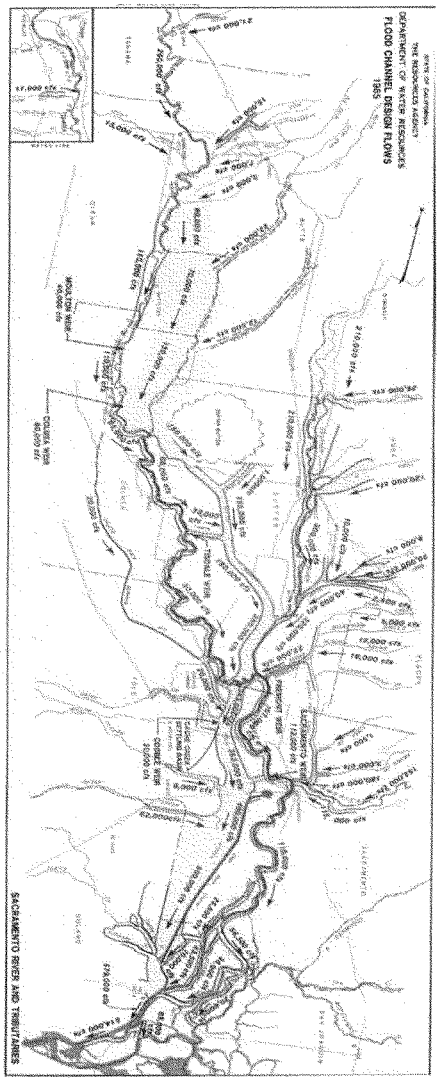


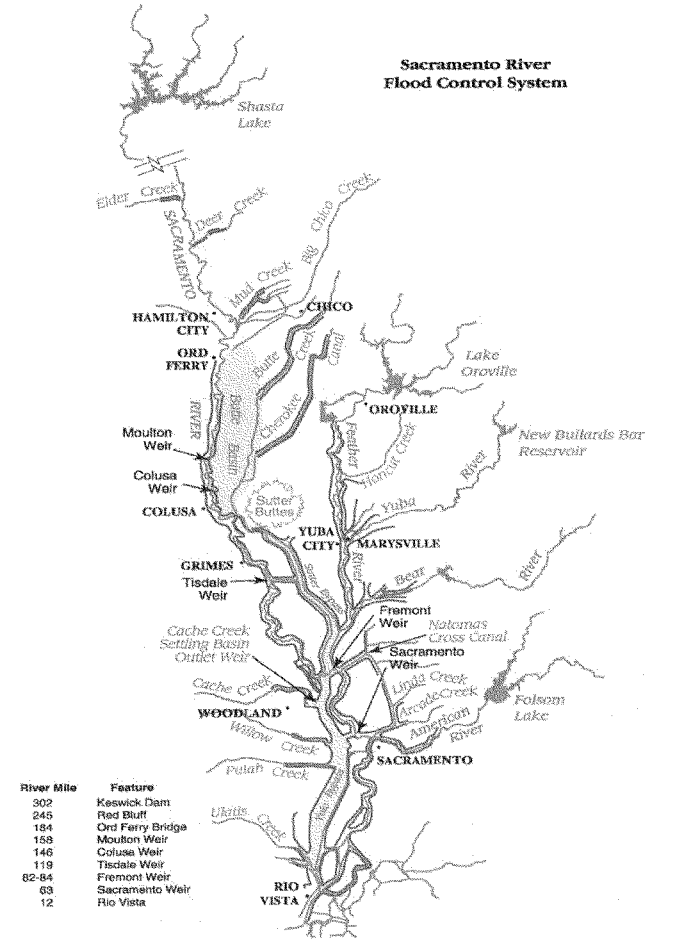
While never intended to be a safety standard, the 1%-annual-chance flood standard has become a design criterion for many communities, with many local building codes following it. The National Committee on Levee Safety believes that the inappropriate use of the 1%-annual-chance flood standard as a safety standard has allowed an increase in the numbers of people and amount of property at risk from flooding in leveed areas. The exemption from flood insurance requirements also led many individuals and communities in leveed areas to mistakenly believe that they do not need flood insurance, and that they are protected from all flooding by that levee.

However, no levee provides full protection from flooding – even the best flood control system or structure cannot completely eliminate the risk of flooding. Levees are designed to provide a specific level of protection, and larger flood events can cause them to be overtopped or fail. Levees also decay and deteriorate over time. Regular maintenance and periodic upgrades are needed to ensure that they retain their designed level of protection. Maintenance can become a serious challenge as a levee system gets older. When levees do fail, they often fail catastrophically – the damage may even be more sudden and significant than if the levee was not present.


THE SACRAMENTO RIVER AND THE
SAN JOAQUIN RIVER FLOOD CONTROL SYSTEM
PROJECT LEVEES AND CHANNELS
N
LEGEND
NORTH FORK
FEATHER RIVER PROJECT
B
ADMI STREAM PROJECT
A
TRUCKEE RIVER PROJECT
C
MIDDLE CREEK
AND TRIBUTARIES PROJECT
D
MERCED STREAM GROUP
G
FAIRFIELD STREAM GROUP
E
KINGS RIVER
FLOOD CONTROL PROJECT
F
LOCATION MAP


SAN JOAQUIN RIVER AND TRIBUTARIES


SACRAMENTO RIVER AND TRIBUTARIES
DEPARTMENT OF WATER RESOURCES
FLOOD CHANNEL DESIGN FLOWS
1965



River Mile	Feature
302	Keswick Dam
245	Red Bluff
184	Ord Ferry Bridge
158	Moulton Weir
146	Colusa Weir
119	Tisdale Weir
82-84	Fremont Weir
63	Sacramento Weir
12	Rio Vista

Responses to Questions from Senator Thomas R. Carper

From Steven W. Verigin, Vice President – GEI Consultants, Inc.
Member of National Committee on Levee Safety

1) ***What are some innovative financing and project delivery tools that you have seen work in your organizations that could help reduce the backlog of projects, lower project costs, and deliver projects more efficiently and effectively?***

The NCLS has attempted to address the issue of efficiency and reduced costs by recommending direct federal funding to the state and local agencies through the development of a National Levee Rehabilitation, Improvement and Flood Mitigation Fund to provide funds to reduce risk associated with non-federally operated levees. This recommendation addresses gaps in existing federal programs for recapitalization of levee infrastructure and is intended to reduce the existing barrier many state and local agencies are confronting – the inability to move quickly to implement levee improvements through the traditional Corps processes. We feel this fund will be more efficient, effective and timely than existing Corps programs and provide more timely risk reduction for the following reasons:

- Will not be limited to restrictions of existing Corps authorities and so will allow flexibility to address both structural and non-structural measures so long as the combination of measures maximizes overall risk reduction. This flexibility will also allow communities to combine levee repair, rehabilitation with other objectives such as natural resource protection, where appropriate, reducing costly delays and improving stakeholder acceptance of projects;
- Funding would be provided to states based on a screening level risk-informed priority system based in part on information in the National Levee Database thereby focusing efforts on areas with the highest risk first, giving the greatest benefit for dollars spent;
- Providing funds directly to the states, and not set by a federal timeline or budgeting cycle, allows states to plan construction activities in a manner consistent with other community and infrastructure improvements and at a pace that is most cost-effective – reducing costly starts and stops; and
- Eligibility for funding would require owners and operators to maintain a high level of upkeep of their levees and engage in responsible activities related to the public protected by these levees such as: 1) provide data to the National Levee Database; 2) demonstrate financial means for ongoing operations and maintenance in alignment with national standards, once developed; 3) notify public of flood risk through communications and buyer notification; 4) promote purchase of flood insurance; 5) develop an emergency response plan and an inspection of completed works program; 6) develop an overall floodrisk management plan; and 7) have community participation in the National Flood Insurance Program. These robust set of eligibility requirements would ensure that the community was aware of and addressing the levee-related risks and has the wherewithal to maintain its levees into the future.

In time, this approach will lower overall disaster relief costs as well as promote a rational, efficient process for risk reduction.

The NCLS has suggested that this program be cost shared with the federal government 65/35, but has since heard from stakeholders that a broader array of options should be considered such as low/no interest loans and other ideas. The NCLS has not fully explored the full nature of options and

innovations but has been interested in the applicability of research and analysis conducted by the Government Accountability Office (GAO) in response a recognized gap in water and wastewater management infrastructure, namely *GAO-99-657 Clean Water Infrastructure: A Variety of Issues Need to Be Considered When Designing a Clean Water Trust Fund.*

Currently, states and local governments across the country, including special districts such as levee boards or flood management districts, have a variety of tools at their disposal for funding levee construction, operation, and maintenance based on state/local laws and authorities. These schemes are available, but are not used widely used, perhaps due to lack of awareness of their actual risks or other factors. Examples include:

- The State of Texas authorizes the collection of fees on flood insurance premiums, generating $6.2 million biannually to support floodplain management throughout the state;
- State and local jurisdictions use a portion of collected property taxes or fees to support levee inspection, operations, and maintenance;
- Public-private partnerships have been used to finance some projects, including generating funding for non-structural components of flood risk reduction approaches (such as preserving or increasing green space to allow for flooding and to prevent harm to people or properties in the event of levee overtopping or failure, or developing constructed wetlands); and
- State and local governments use bonding to fund significant levee improvement or rehabilitation projects.

In trying to promote an ethic of shared responsibility, the NCLS feels that innovative ways of funding all aspects of levee safety should be considered.

2) How can our water resources policy and our surface transportation policy be crafted in a way that is mutually beneficial and that creates jobs, helps our economy, and builds smart infrastructure?

The National Committee on Levee Safety did not directly develop any recommendations for this important policy question, but recognize that water resources, transportation, and natural resources policies and programs are inextricably linked. The NCLS's recommendations for a National Levee Safety Program are prefaced by the recognized need for a broader national flood risk management approach, which in turn is part of a national water resources policy approach currently lacking in the United States. The NCLS also recognizes as communities plan for resource needs to address climate change, flood management efforts will have to be more integrated into water resource questions and transportation investments. We would like to provide the following thoughts to assist in Congressional discussions and deliberations and would be happy to provide additional thoughts and suggestions on this question supported by research and deliberation, if so desired. Please find included responses to aspects of the question the NCLS did consider.

Levee Safety Can Serve as a Catalyst for Integrated Resource and Transportation Policies

One of the most important recommendations of the National Committee on Levee Safety is to conduct a one-time, federally funded inventory of all the nation's levees. In so doing, the nation will also learn about the location and condition of other types of public infrastructure that connect with levees (e.g. road and rail embankments) and public infrastructure located in leveed areas (e.g. water and wastewater infrastructure, public buildings, hospitals, etc.). Conducting this inventory will teach us

much about the risk to the existing water and transportation infrastructure as well as the risk to personal property and loss of life. These new data will enable communities to better understand the relationships between levees and other public and private infrastructure and help them make informed choices related to siting of transportation and other public infrastructure, long-term risk reduction efforts, investments in flood proofing, improving or moving critical infrastructure such as hospitals, police stations, schools, etc.

Recommendation to Align Federal Programs Aims at Integration and Harmonization of Water Resource Policies, Transportation Policies, and More

Another critical recommendation calls for the study and alignment of federal agency programs and processes. The NCLS recommends that all federal programs that significantly impact governmental and individual decision-making in leveed areas be aligned toward the goal of reliable levees, and an informed, involved public, and shared responsibility for protection of human life and mitigation of public and private economic damages. Federal programs should not only be aligned with each other, but can be used as an enticement for responsible levee stewardship.

Levee Repair and Rehabilitation Creates Jobs in Communities

Levee evaluation, repair, remediation and reconstruction work creates jobs and contributes to the economy through the performance of inspections, evaluations, engineering and capital improvement projects. At the time when the NCLS report was drafted, statistics from economic stimulus initiatives tracked by the Corps IMPLAN economic modeling system indicate that for every $1 billion in infrastructure investment, we create over 47,000 jobs in the economy, using regional labor rates and job categories. So, identifying and fixing the problems in our levee systems not only is a good return on initial investments, but creates a multiplier effect in the overall economy. The NCLS recommends that a National Levee Rehabilitation, Improvement and Flood mitigation Fund be established. Not only will this create jobs, but it is intentionally designed to promote integrated thinking between levee safety and overall water resources by providing flexibility to fund a combination of structural and non-structural measures as long as the combination maximizes risk reduction.

Reliable Levees Help Protect Against Loss of Jobs, Business Interruption and Social Disruption

Best information from the National Flood Insurance Program indicates that the value of residential and commercial properties (structures and contents) located in leveed areas constitutes a total national exposure of more than $375 billion ($5 to $10 billion annual exposure based on rough estimates extrapolated from State of California historic flood damage data).

While we tend to measure flood impacts in terms of damage to property, public infrastructure and loss of life, we observe and intuit that impacts of flooding to individuals, businesses, and communities goes far beyond those paltry measures. Waterborne diseases due to contaminated public water systems are often the norm. Loss of local and regional employment and erosion of tax base coincide with needed community investment for recovery and rebuilding, and increases in physical and mental health problems. Included are some sobering statistics from the Gulf Coast, 5 years after Hurricane Katrina. In addition to exposure, other types of losses are experienced during severe flooding such as business interruption, etc. For example, 5 years after Hurricane Katrina:

- Flooding displaced 1 million residents. 600,000 were still displaced one month later. Some were still in temporary housing 5 years later.

- The population of New Orleans fell to half, and then rebounded to 80%, but percentage of households with children has dropped dramatically.
- Post-Katrina housing is unaffordable with 58% of renters in the City paying more than 35% of their pre-tax income on rent and utilities.
- Violent crime is twice that of the national rate; and
- Post Traumatic Stress Disorder in Katrina survivors is 63%, 20 times the national average.

Responses for Questions from Senator Benjamin L. Cardin

From Steven W. Verigin, Vice President – GEI Consultants, Inc.
Member of National Committee on Levee Safety

1) ***The Committee recommends the development and implementation of national levee safety standards; however, many levees nationwide have failed to meet current safety standards. In 2007, the Corps identified about 120 levees with unacceptable maintenance problems. What are the Committee's recommendations for addressing high-risk maintenance problems immediately?***

Need for National Levee Safety Standards

There are currently no national standards for levee design, construction, operation, maintenance, rehabilitation, repair, improvement (improving the level of flood risk reduction provided by a levee system), or removal. This fact is often misunderstood and confused with levee accreditation as it relates to flood insurance under the National Flood Insurance Program (NFIP).

Multiple federal agencies have guidelines for levee design and construction (e.g., Corps and the Federal Energy Regulatory Commission). Other federal agencies, such as the U.S. Environmental Protection Agency and the U.S. Fish and Wildlife Service, may have regulatory authority over certain aspects related to operations, maintenance, and repair of levees (e.g., under the National Environmental Protection Act or the Endangered Species Act).

The 120 levees that received an "unacceptable" rating during their inspections in 2007 were federally designed and constructed levees that were turned over to local sponsors to operate and maintain. Aside from annual inspections to retain eligibility for participation in the USACE Rehabilitation & Inspection Program, these levees are not subject to any significant federal or state enforcement of operation and maintenance requirements. Without a single set of national levee safety standards, the level of flood risk reduction and the robustness of levee design and construction will continue to vary considerably across the country, creating a situation of uncertainty and unknown risk for those living in leveed areas. Lacking clear national standards and policies, individuals, engineers providing levee services, levee owners/operators, and even governments, do not know where to turn for the most useful information and up-to-date guidance regarding levees and public safety.

The importance of establishing and adopting national levee safety standards is woven throughout the recommendations for a National Levee Safety Program developed by the NCLS. Three recommendations, in particular, lay the groundwork:

- Develop and adopt a set of national levee safety standards for common, uniform, use by all federal, state, and local agencies. The national standards should incorporate policies, procedures, standards and criteria for a range of levee types, canal structures, and related facilities and features. The national levee safety standards should be comprehensive and include standards for levee design, construction, operation, inspection, maintenance, emergency management, rehabilitation, improvement, and removal. These standards must, of course, also account for regional differences and variations. Once national levee safety standards have been established, the NCLS has recommended that federal legislation should be passed requiring that all federal agencies with authority over levee planning, design, regulation, or funding, or that own, operate, or maintain levees adopt and enforce the Standards. The NCLS

has also recommended that states, in an approach akin to the Uniform Building Code, adapt and adopt the national levee safety standards.

- Develop and adopt the recommended Hazard Potential Classification System to assist federal, state, and local governments to better understand the risk and consequences of levee failure. The Hazard Potential Classification System will be useful in setting priorities for action (e.g., where high hazard levees require immediate action) and funding. This is an interim step until the adoption of national tolerable risk guidelines and will be an important first step in addressing high-risk maintenance problems immediately.
- Develop and adopt national tolerable risk guidelines for levees. Tolerable risk guidelines help answer the question: How much protection is reasonable to provide populations against the risk of property damage or personal injury due to floods? Tolerable risk guidelines enable the following; informed prioritization of public investment where there is a possibility of high consequence (e.g., large population at risk if the levee fails) and also where the probability of failure is high, improved citizen and government knowledge and understanding regarding risk, and enhanced public debate regarding the true benefits and costs of flood risk mitigation alternatives.

Confusion Regarding National Levee Safety Standards

Many government officials and individuals have come to think that the 1-percent-annual-chance (100-year) flood, which was designated by the National Flood Insurance Program for insurance purposes is a levee safety standard. This is not true and a dangerous belief – it is based on neither sound scientific foundations nor statistical analyses of safety, but purely for insurance purposes. The NFIP uses the 1-percent-annual-chance flood to determine where the "mandatory purchase requirement" for flood insurance applies to properties secured by federally regulated mortgage lenders. Currently, homeowners living behind levees designed, built, and maintained to meet or exceed that 1%-annual-chance flood standard often are exempt from the mandatory purchase requirement. Further, the area behind the levee is mapped as if no levee were present.

There is also misunderstanding about what the 100-year flood actually means. Many believe this means that a destructive flood will only occur every 100 years. In reality, it means there is a 1% chance every year that a flood of that magnitude or greater will occur, translating to a 26% chance that a flood of that magnitude or greater will occur during a typical 30-year mortgage.

While never intended to be a safety standard, the 1%-annual-chance flood standard has become a design criterion for many communities, with many local building codes following it. The National Committee on Levee Safety believes that the inappropriate use of the 1%-annual-chance flood standard as a safety standard has allowed an increase in the numbers of people and amount of property at risk from flooding in leveed areas. The exemption from flood insurance requirements also led many individuals and communities in leveed areas to mistakenly believe that they do not need flood insurance, and that they are protected from all flooding by that levee.

However, no levee provides full protection from flooding – even the best flood control system or structure cannot completely eliminate the risk of flooding. Levees are designed to provide a specific level of protection, and larger flood events can cause them to be overtopped or fail. Levees also decay and deteriorate over time. Regular maintenance and periodic upgrades are needed to ensure that they retain their designed level of protection. Maintenance can become a serious challenge as a levee system

gets older. When levees do fail, they often fail catastrophically – the damage may even be more sudden and significant than if the levee was not present.

NCLS Recommendations for Addressing High-Risk Maintenance Problems Immediately
Our nation's levee problems took generations to build and will not be solved overnight. The average age of levees within Corps programs is approximately 50 years, and the age of many non-federal levees can be much older – 100 years or more. Much of our nation's levee infrastructure is decades old, and was built without the benefit of modern engineering. Even responsible levee owners, following operation and maintenance plans developed when their levee was built, may not be using the most current and best engineering practices, potentially increasing the risk of levee failure. In addition, changes in demographics have led to increased development behind earthen levees originally built to protect cropland from flooding and often built without meeting engineering standards appropriate to residential or commercial development in the leveed area.

While upkeep of maintenance is critical to good levee safety, lack of maintenance is often not the biggest risk factor. For example, New Orleans had dozens of levee failures during Hurricane Katrina, none of which were due to inadequate maintenance. Under designed levees (e.g., levee of protection/height of levee is too low for a concentrated urban areas) can become overtopped or fail after overtopping. Inadequately designed levees are also an issue – many of our older levees were built upon unsatisfactory materials and added onto over the years from original piles of dirt pushed together by farmers trying to protect their fields from flooding.

That considered, the NCLS developed a suite of 20 recommendations that is focused primarily on risk reduction – understanding and addressing the worst problems first. Below are a few key examples of how this would be achieved:

- Immediately conduct a one-time federally funded inventory and inspection of all levees in the nation so as to better understand where the risks are greatest;
- Establish a National Levee Safety Program to:
    - Develop National Levee Safety Standards to ensure that best practices are available and implemented nationwide; and
    - Develop a Comprehensive National Education and Awareness Campaign to Communicate Risk and Change Behavior in Leveed Areas.
- Establish the National Levee Rehabilitation, Improvement and Flood Mitigation Fund to aid in the rehabilitation, improvement or removal of aging of deficient national levee infrastructure. The covered items are intentionally broad to allow for a potential combination of activities, structural and non-structural that would maximize overall risk reduction. The NCLS further recommends the fund be initially focused in areas with the greatest risk to human safety.

2) The Committee recommends a Research and Development program to advance new and environmentally-friendly technologies and practices. Can you describe some of these new advancements and their potential benefits?

While levees and their maintenance can result in negative environmental effects (e.g., cutting off the river from its floodplain, altering the natural hydrology of the area by reducing recharge of aquifers, preventing seasonal overbank flooding that can provide needed nutrients to soils, and enabling increased development that can lead to destruction of ecologically important riparian and coastal

ecosystems such as wetlands and marsh), it is often these same levees that protect critical infrastructure such as wastewater treatment plants and drinking water filtration plants, which have been located in floodplains in proximity to surface waters. Levees prevent flood waters from overwhelming such structures, thereby safeguarding potable water supplies and preventing release of sewage and other pollutants into the surrounding fragile ecosystem. The NCLS believes that a balance between public safety and environmental stewardship can and must be struck – the two fundamental needs have to be brought into harmony.

The NCLS has recommended that a National Levee Safety Program, in conjunction with federal and state environmental and natural resource agencies, conduct research and development efforts to meet the following objectives:

- Operation and maintenance practices should be improved to mitigate or reduce negative impacts on the natural environment or ecosystem without compromising public safety.
- Levees or flood risk mitigation projects, including operation and maintenance activities, should be designed or modified to reduce negative environmental impacts or enhance or restore the environment.
- Innovative technology for levee inspections, repairs, operations, and maintenance could improve both the natural environment and public safety, increasing efficiency without shortcutting either the environment or public safety?

Specific ideas include:

- Evaluate O&M practices for existing projects and develop cost-effective measures to make O&M practices more compatible with present-day natural resource management practices.
- Evaluate rapid assessment tools of levee geotechnical characteristics and integrity to include initiatives that would improve the use of helicopter electromagnetic and ground-based electrical resistivity surveys.
- Develop innovative technology for repairs and improved engineering methods that would lead to more reliable levees and the most cost-effective approaches.
- Development of technology and tools to enhance the security of levees at the operation level.
- Evaluate and establish guidelines and a program for the forensic investigation of levee failures and/or severe levee distress.
- Conduct research on increasing the resilience of levees (e.g., types of armoring).
- Develop innovative and cost effective rapid repair levee breach tools.
- Consolidate the large body of R&D knowledge both nationally and internationally and make the information easily accessible to owners, operators, regulators, etc.

Responses to Questions from Senator James M. Inhofe

From Steven W. Verigin, Vice President – GEI Consultants, Inc.
Member of National Committee on Levee Safety

1) ***Was the Committee able to develop any cost estimates for its recommendation to expand the National Levee Database to include a one-time federal inspection of all levees and its recommendation to establish a grant program to rehabilitate, improve, or remove aging or deficient levees?***

Levees are abundant and integral to economic development in many communities in the United States, but there is no definitive record of how many levees there are in the nation, or what condition they are in. Based on information from the U.S. Army Corps of Engineers (USACE), the Federal Emergency Management Agency (FEMA), and the State of California, the NCLS has estimated that there may be more than 100,000 miles of levees nationwide. FEMA estimates that levees are found in all fifty states and in approximately large percentage of the nation's counties.

Cost Estimates for an Initial Inventory and Inspection of All the Nation's Levees
The Corps has conducted an inventory and inspection of approximately 14,800 miles of levees within its programs. These levees are already included in the National Levee Database. This includes levees that are owned, operated, and maintained by USACE (2,000 miles); levees that were constructed by USACE and operated and maintained by a non-federal sponsor (10,830 miles); and levees that are enrolled in the USACE Rehabilitation and Inspection Program (RIP) (2,030 miles). Based on this work, the Corps estimates it would cost approximately $625 million to conduct an initial inventory and inspection of 100,000 miles of the nation's non-federal levees. The Corps would also need additional authorities to conduct this work.

Cost Estimates to Establish Rehabilitation, Improvement, and Flood Risk Mitigation Fund
The NCLS has proposed funding a Levee Rehabilitation, Improvement, and Flood Risk Mitigation Fund at $600 million per year for the first five years of the Fund's implementation, and then at $1 billion per year thereafter. This funding level is likely not sufficient to rehabilitate the entire nation's aging levee infrastructure, but is an important step in addressing the levees with the greatest consequences and highest risk of failure. The American Society of Civil Engineering's 2009 Report Card put the rough estimate to repair and rehabilitate the nation's levees at around $100 billion and proposed investing $50 million over a 5 year period. Until the initial inventory and inspection is complete, we, as a nation, do not have a precise estimate of the overall need or consequences.

To promote the smartest, most cost-effective risk reduction measures, the Committee has recommended the Fund would be available to rehabilitate, improve, remove, or replace levees (structural measures) as well as conduct nonstructural measures, so long as the combination of measures maximizes overall risk reduction. For example, in some communities, the greatest risk reduction may be achieved by removing the levee altogether and focusing on increasing land available for water conveyance and flood storage.

While the NCLS recommended the Fund be authorized to be cost shared between the federal government and non-federal sponsors at 65% federal and 35% non-federal, stakeholders at seven workshops held in 2010 to solicit feedback and comments on the recommendations for a National Levee

Safety Program have suggested alternative approaches for funding such as no-interest or low-interest loans, sliding-scale matches based on a local tax-base, or other innovative financing approaches.

2) ***Did the Committee make any estimates of anticipated savings for the federal government by, as you said, "moving us from a reactive disaster assistance environment to a proactive safety-oriented culture"?***

There is no comprehensive national data on the location or condition of the nation's levees or on the flooding damages or loss of life resulting from to levee failure or overtopping, so annual estimates of economic damages or loss of life particularly related to levee failure or overtopping is difficult to calculate with any specificity. Improved data collection and analysis is recommended to help alleviate this problem. That said, we have more than enough data and examples to understand the devastating impacts of levee-related flooding on individuals, communities, regions, and the nation. While we continue to refine savings estimates, here are some important points.

Flood Damages and Flood Risk Is Increasing in the U.S.
Annual flood losses have increased steadily from $1.5 billion in 1930 to more than $3 billion in 1996. Demographic trends indicate that populations in coastline counties in the U.S. has grown in recent decades, from 47 million people in 1960 to 87 million people in 2008 (*NOAA: Coastline Population Trends in the United States, May 2010*). The U.S. Census Bureau estimates that an additional 40 million people will be added to the U.S. population in the next 40 years. If trends hold, we have every reason to believe that more and more people will be living in flood prone areas and behind levees, increasing the importance of their reliability and the importance of informing residents of their risks.

When Levees Fail, They Often Do So Catastrophically
Food risk reduction is a complicated formula when it comes to levees and floodwalls. On the one hand, they can buy time for people to evacuate and move their belongings out of harm's way. On the other hand, over reliance on levees as a primary (and sometimes exclusive) solution to managing flood risk has drawn more people to live and work behind levees, intensifying development and increasing consequences should the levee fail or be overtopped. This scenario, when combined with what we know about the condition and aging of our levee systems is a perfect storm for catastrophic failures with significant loss of life and property damage.

We have experienced catastrophic levee-related failures and are certain to experience more
As a nation, we have several salient examples of severe flooding for which levee failures and overtopping contributed to the damages and loss of life. Because our record keeping does not distinguish between losses of life related directly to levees, we are providing the following examples of significant recent flood events for which we know levee breaches and failures played a significant part. The examples do not provide data for hard analysis of annualized loss of life or rate of return on levee investment; rather they underscore recent examples of events that are not uncommon and often widespread:

- *The Great Flood of 1993* – was widespread along the Mississippi River Basin, covered nine states and 31,000 square miles of inundation. In some places, flooding lasted for more than 200 days. Damage by this record flood stage was massive. More than 200 counties were declared federal disaster areas, including the entire state of Iowa. 72,000 homes suffered major damage along with 45,000 commercial structures. 12 airports were closed and more than 1,000 miles of road,

including major interstates. 40 of the 229 federal levees were overtopped or damaged during the flood event. Estimates of the losses from this flood are $15.6 billion (1994 dollars).

- *California's Central Valley 1997* – 30 levees failed killing nine people, and damaging over 23,000 homes and businesses, agricultural lands, bridges, roads and flood management infrastructure – valued at about $2 billion.
- *Grand Forks in 1997* – In April 1997, the Red River crested at 54 feet in Grand Forks, ND, and East Grand Forks, MN, overtopping levees and dikes that had been raised to 49 feet, the level of the previous record-setting 1979 floods. Following a season of record snowfall, this historic flood covered over 2,000 square miles, an area about twice the size of Rhode Island. As it became clear the levees would be overtopped, 50,000 residents were evacuated from East Grand Forks. The flood damaged 83% of affected homes and impacted all downtown businesses. In East Grand Forks, only eight homes were left undamaged by floodwaters. Every business in downtown Grand Forks and East Grand Forks was damaged. The total cost of damages was estimated to reach $3.6 billion ($4.7 billion in 2009 dollars).
- *Hurricanes Katrina and Rita in 2005* – 1810 people died, a majority of these people were over the age of 60. Over $200 billion in direct economic damages to property and untold damage to the regional economy. More than 1 million people were displaced (see text box for more detailed information). The Corps is spending $15 billion to upgrade the flood protection system. FEMA invested more than $75 billion in emergency relief alone.
- *Midwest Flood of 2008* – affected the states of Indiana, Illinois, Iowa, Michigan, Missouri, Minnesota, and Wisconsin including 35,000 people evacuated for weeks at a time. Iowa's agricultural losses alone are estimated to exceed $2 billion. In Cedar Rapids, alone, flood waters covered 1,300 city blocks inundating city hall, the county jail, the fire and police departments, the public library and 3,900 homes. $2.7 billion have been spent in federal flood relief. Two dozen people lost their lives.

We Are Heavily Reliant on Levees

Our recent experience with levee and floodwall failures is sobering and indicative of a type of catastrophe that could be suffered by other major cities in the U.S. According to the Corps, 33% of communities with populations of at least 50,000 have some portion of their community protected by a Corps' levee. If you live in a community of more than 1 million, your chance of having a portion of your community protected by a levee increases to 50% including densely populated portions of many of our large cities such as Sacramento, St. Louis, New Orleans, Des Moines, Kansas City, and Washington, D.C. The NCLS estimates that there are potentially 100,000 miles of state and local levees in the nation.

An Ounce of Prevention is Worth a Pound of Cure – Mitigation is a Good Investment

The NCLS believes that investments in the National Levee Safety Program will return many dollars in benefits for every dollar spent. This is supported by the Corps estimates that for every dollar invested in flood damage reduction projects there is a $6.48 return on that investment in flood damages prevented. Further, the Multihazard Mitigation Council in a recent report to Congress entitled, *Natural Hazard Mitigation Saves: An Independent Study to Asses the Future Savings from Mitigation Activities* concluded that mitigation efforts such as flood proofing, evacuation planning, etc. pay off in the long run for communities and the federal government. They concluded that for every dollar spent on mitigation, society saves an average of $4 on losses avoided (e.g. property damage, business interruption, deaths/injury, costs of emergency response, etc.). It was separately calculated that a dollar spent from

the U.S. Treasury on FEMA mitigation grants potentially saves the Treasury about $3.65 in avoided post-disaster relief costs and increased federal tax revenues.

3) ***Did the Committee discuss, or do you have a personal opinion, whether a newly created levee safety program should be integrated with the existing National Dam Safety Program, either upon establishment or after some period of time for implementation?***

While the NCLS was charged with developing recommendations for Congress for a National Levee Safety Program, it considered the structure, responsibilities, and authorities of the National Dam Safety Program. The NCLS used the National Dam Safety program as a guide to develop the National Levee Safety Program recommendations and took the opportunity to apply lessons learned over the past 30 years. The Committee, however, felt the current scope of the National Dam Safety program was too limiting to achieve the vision of "An involved public and reliable levee systems working as part of an integrated approach to protect people and property from floods."

Clearly there are some areas of synergy and overlap between dam and levee safety. There are shared engineering approaches. Many professionals, both public and private, who are engaged in one are also engaged in the other. Where nascent levee programs exist at the state level, they are typically co-located with dams, etc. There are also critical differences related to ownership, residual risk, operation and maintenance requirements, etc. Any long-term goal would be to provide better flood protection continuity between these frequently enjoined structures, sharing the same watershed.

NCLS Review Team Feedback on Combining the NLSP and the NDSP

Opinions about combining or segregating the National Dam Safety Program and a National Levee Safety Program have been mixed in feedback received from a Review Team assembled to provide feedback on the recommendations for a National Levee Safety Program as they were developed, as well as from a series of seven stakeholder workshops held across the country in 2010. The NCLS and many of the stakeholders they consulted – both those in the dam safety and levee safety communities – expressed concern that a combined program would force limited resources to be allocated to either dams or levees at the detriment of the other. If a national flood risk management program were to be developed, it would be logical that dam safety and levee safety would be two elements of that program.

NCLS Recommends Additional Study Regarding Combining Dam and Levee Safety Programs

Although there are similarities in the structure proposed for the National Levee Safety Program and the current National Dam Safety Program, there are also major concerns identified by the NCLS, and the NCLS has recommended that the two programs not be combined into a single program at the outset. The NCLS has also recommended that the National Levee Safety Program, once established, specifically consider the benefits and drawbacks of combining with the National Dam Safety Program and recommend a course of action to Congress. The NCLS has called for a study of the possible integration of the two programs prior to the National Dam Safety Program reauthorization scheduled in 2012.

Proposed Legislative Framework Implementing the Recommendations of the National Committee on Levee Safety

Introduction

Congress created the National Committee on Levee Safety (NCLS) to develop recommendations for a national levee safety program, including a strategic plan for implementation of the program. The NCLS adopted the vision of an involved public and reliable levee systems working as part of an integrated approach to protect people and property from floods, and has been working toward this vision since October 2008.

The NCLS developed twenty recommendations for creating a National Levee Safety Program, and presented these in *Recommendations for a National Levee Safety Program: A Report to Congress from the National Committee on Levee Safety* on January 15, 2009.

The specific recommendations of the NCLS for a National Levee Safety Program embrace three main concepts: (1) the need for leadership via a National Levee Safety Commission, which would support state delegated programs, provide national technical standards and risk communication, and coordinate environmental and safety concerns; (2) the building of strong levee safety programs in all states, which would provide oversight, regulation, and critical levee safety processes; and (3) a foundation of well-aligned federal agency programs.

Legislation is needed to fully implement 12 of the 20 recommendations at a national level. The US Army Corps of Engineers (USACE) and Federal Emergency Management Agency (FEMA) are working within existing authorities and funding to begin the first steps in implementing several of the recommendations that address the basics of communication and outreach, use of common language and refinement of their existing programs. Further, USACE is considering NCLS recommendations in the development of its own levee safety standards and risk assessment and communication methodologies.

The nonfederal members of the NCLS have drafted a proposed legislative framework establishing a National Levee Safety Program and addressing the areas where the NCLS sees that legislation is needed to implement their recommendations. The proposed legislative framework is a starting point, an outline of the elements needed to implement the NCLS's recommendations for a National Levee Safety Program.

Disclaimer: *This draft legislative framework has been developed by the nonfederal members of the National Committee on Levee Safety and is not endorsed by nor should it be construed as an Army or Administration position.*

Proposed Legislative Framework to Create the National Levee Safety Program

To direct the President to carry out programs and activities to enhance the safety of levees in the United States.

A BILL

To direct the President to carry out programs and activities to enhance the safety of levees in the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION I. SHORT TITLE

This Act may be cited as the 'National Levee Safety Act of 2010.'

SECTION II. FINDINGS, PURPOSES AND MEANS

(a) FINDINGS – Congress finds the following:

(1) Levees are now abundant in many communities in the United States, although the number, location, and condition of all the levees in the Nation is unknown. Preliminary estimates indicate there may be more than 100,000 miles of levees across the nation, and tens of millions of people live and work behind them;

(2) The reliability of many levees is not commonly known;

(3) Levees have often been the primary tool in flood risk management, protecting not only people and property, but also other critical infrastructure (e.g., roads, hospitals, drinking and wastewater facilities, power generating facilities) and in some cases the environment;

(4) Although constructed to protect property, levees have often inadvertently increased flood risks by attracting development to the floodplain. Many levees originally constructed to protect agricultural fields now protect large urban communities;

(5) Risks are growing as population and economic investment behind levees increases, the infrastructure ages, and storm severity increases due to climate change;

(6) Levees only reduce the risk of flooding for communities, but they do not eliminate it;

(7) Many individuals and communities in leveed areas do not understand their flood risk. Many believe that levees – by themselves – make the public safe from flooding;

(8) Many urban areas protected by levees, particularly those in deep floodplains, place people who live behind them at an unacceptably high risk. Failure of such levees has recently resulted in high loss of life, property damage, economic losses, environmental damages, and the disruption of social and cultural community fabric;

(9) There are currently no national policies, standards or best practices relating to the safety of levees;

(10)Responsibility for levee safety is often ignored, and when addressed it is often done in an incomplete and nonsystematic manner and distributed across all levels of government,

within different agencies and functions. This impedes a comprehensive approach, impairs coordination, and prevents a sustained focus on the issue; and

(11) There is currently no overall flood risk management policy to guide related efforts such as zoning and building codes, emergency evacuation, flood warning, and public awareness and education, creating a situation where many community leaders and citizens have only a limited understanding of the role and condition of levees and the risks associated with them.

(12) Therefore:

(A) There is an urgent need to establish a National Levee Safety Program to provide national leadership, delegate levee safety programs to states, and align federal agencies;

(B) Knowing the location condition and ownership of levees, as well as understanding the population and infrastructure at risk in leveed areas, is necessary for identification and prioritization of activities associated with levees according to hazard potential;

(C) This National Levee Safety Program should apply to all federal, tribal, state, local, regional and private levees within the United States and its territories; and

(D) This National Levee Safety Program should be part of a larger, national flood risk management strategy.

(b) PURPOSES. The purposes of this Act are to:

(1) Employ sound technical practices in levee design, construction, operation, inspection, assessment, security, and maintenance;

(2) Ensure effective public education and awareness of risks involving levees;

(3) Establish and maintain competent levee safety programs and procedures that emphasize the protection of human life; and

(4) Implement feasible governance solutions, incentives, and disincentives that encourage and sustain effective levee safety programs at all levels of government, including basic hazard reduction and mitigation measures related to levees.

(c) MEANS. By:

(1) Providing Comprehensive and Consistent National Leadership – through a National Levee Safety Commission charged with understanding and communicating risks associated with levees, developing national safety standards (e.g., a National Levee Safety Code), facilitating dialogue and research on important levee related topics (e.g., research and development, facilitating dialogue with environmental interests), providing technical materials and assistance to all levels of government, encouraging improved safety measures and programs through grants, and overseeing national and state levee safety program development and implementation activities;

(2) Building and Sustaining Strong Levee Safety Programs in all States – recognizing that the cornerstone of an effective National Levee Safety Program is effective state programs following a consistent set of national safety standards and mitigation protocols. Similar to their role in dam safety, states are well positioned to provide assistance and oversight to local owner/operators, and to coordinate activities in a systems approach among entities within and among states; and

(3) Aligning Existing Federal Programs – in order to ensure that investment in our nation's levees and programs to protect the people who live behind them are effective, all federal programs that impact community and individual behavior in leveed areas should be aligned toward the same goals of risk reduction, developing resilient and reliable levees, and protection of human life and property.

SECTION III. APPLICABILITY

(a) This Act applies to all federal, tribal, state, local, regional and private levees within the United States and territories.

(b) Levees and canal structures are exempt from regulation under this Act if they meet the following conditions:

(1) Highway and railroad embankments not functioning as part of a flood damage reduction system; or

(2) A canal constructed completely within natural ground without any manmade structure such as an embankment or retaining wall to retain water, or where water is retained only by natural ground; or

(3) Canals regulated by the federal government, provided that applied federal safety criteria meet or exceed the *National Levee Safety Code*, or, prior to development of the *National Levee Safety Code*, interim Levee Safety Standards or Guidelines, developed and adopted by the Commission; or

(4) The levee or canal structure meets *all* of the following criteria:

(A) Not part of a federal flood control project, and

(B) Not recognized within the National Flood Insurance Program as providing protection from the 1-percent-annual-chance or greater flood, and

(C) Not greater than 3 feet high, and

(D) Not protecting a population greater than 50 people, and

(E) Not protecting an area greater than 1,000 acres.

SECTION IV. DEFINITIONS

For purposes of this Act, the following definitions apply:

(a) CANAL STRUCTURE. The term "canal structure" means an embankment, wall, or structure along a manmade canal or watercourse that constrains water flows and is subject to frequent water loadings, but that does not constitute a barrier across a watercourse.

(b) COMMISSION. The term "Commission" means the National Levee Safety Commission established under Section V.

(c) COMMISSIONER. The term "Commissioner" refers to those individuals appointed to the Commission as set forth under Section V.

(d) FEDERAL AGENCY. The term "federal agency" means a federal agency that designs, finances, constructs, owns, operates, maintains, or regulates the construction, operation, or maintenance of levees.

(e) FLOOD MITIGATION. The term "flood mitigation" refers to both structural and non-structural measures that reduce risks by either lowering the probability of failure, or the consequences of failure, or both.

(f) INDEPENDENT TECHNICAL REVIEW. The term "independent technical review" means a review— by subject matter experts not involved in the design or construction of, and without vested interest in, the levee system — which evaluates the completeness and adequacy of the engineering analyses and conclusions.

(g) LEVEE.

(1) In general

The term "levee" means a manmade barrier (embankment, floodwall, or structure)—

(A) the primary purpose of which is to provide hurricane, storm, or flood protection relating to seasonal high water, storm surges, precipitation, or other weather events; and

(B) that is normally subject to water loading for only a few days or weeks during a year.

(2) Unless otherwise stated, the term "levee" refers to a levee system, inclusive of canal structures and highway and railroad embankments, as defined below.

(3) Inclusion. The term includes levees and canal structures that constrain water flows and are subject to more frequent water loadings, but that do not constitute a barrier across a watercourse. Highway and railroad embankments can be considered levees only if they are integral to performance of a flood control system and to the extent that such structures provide some level of flood protection.

(4) Exclusion. The term does not include shore line protection or river bank protection systems, such as revetments or barrier islands.

(h) LEVEE FEATURE. The term "levee feature" means a structure that is critical to the functioning of a levee, including, but not limited to, embankment sections, floodwall sections, closure structures, pumping stations, interior drainage works, and flood damage reduction channels.

(i) LEVEE SEGMENT. The term "levee segment" means a discrete portion of a levee system that is owned, operated, and maintained by a single entity, or discrete set of entities.

(j) LEVEE SYSTEM. The term "levee system" means one or more levee segments and other features that collectively provide flood damage reduction to a defined area. Failure of one feature within a levee system may constitute failure of the entire system. The levee system is inclusive of all features that are interconnected and necessary to ensure protection of the associated leveed areas. Unless otherwise stated, the term "levee" refers to a levee system, inclusive of canal structures and highway and railroad embankments.

(k) LEVEED AREA. The term "leveed area" means the lands from which flood water is excluded by the levee system.

(l) NATIONAL LEVEE DATABASE. The term "National Levee Database" means the levee database authorized to be established under Sec. 9004 of the National Levee Safety Act of 2007.

(m) NATIONAL LEVEE SAFETY CODE. The term "National Levee Safety Code" means a set of national levee safety standards for common, uniform use by all federal, state, tribal and local agencies.

The national standards incorporate engineering policies, procedures, standards, and criteria for a range of levee types, canal structures, and related facilities and features.

(n) REHABILITATION. The term "rehabilitation" means the repair, replacement, reconstruction, or removal of a levee carried out to meet applicable national levee safety standards.

(o) STATE. The term "state" means any of the 50 states, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and any other territory or possession of the United States.

(p) DELEGATED LEVEE SAFETY PROGRAM. The term "Delegated Levee Safety Program" means a state or tribal levee safety program approved by the National Levee Safety Commission.

(q) RESIDUAL RISK. The term "residual risk" means that portion of risk that remains after structural and non-structural risk reduction measures are in place.

(r) TOLERABLE RISK. The term "tolerable risk" means:

(1) Risks society is willing to live with so as to secure certain benefits; and

(2) Risks society does not regard as negligible or something it might ignore; and

(3) Risks that society is confident are being properly controlled by the owner; and

(4) Risks the owner keeps under review and reduces still further if and as practicable.

(s) TRIBE. The term "tribe" means a federally-recognized tribe.

(t) UNITED STATES. The term "United States" means all of the states, territories and tribes.

SECTION V. ESTABLISH A NATIONAL LEVEE SAFETY COMMISSION

NOTE: The National Committee on Levee Safety defined the following characteristics of a National Levee Safety Commission as essential:

(a) Independence to address levee safety holistically, unconstrained by the momentum and priorities of existing programs, with the ability to make politically challenging decisions when necessary;

(b) Leadership for significant horizontal integration of effort across federal agencies and alignment of their programs, with vertical integration to achieve balanced participation at all levels of government; and

(c) Organizational capabilities spanning regulatory policy development, program implementation, oversight, and grants management; and significant experience in the relevant technical, public communication and environmental areas.

The preference of the National Committee on Levee Safety is to establish a Commission as a new independent federal agency with functional and operational responsibility, with the National Levee Safety Program placed therein.

(a) ESTABLISH A NATIONAL LEVEE SAFETY COMMISSION. The President shall establish an independent National Levee Safety Commission (Commission) to provide national leadership and comprehensive and consistent approaches to levee safety, including standards, research and development, technical materials and assistance, training, public involvement and education, design and oversight of delegated programs, and the ability to align federal programs;

(b) ESTABLISH ADVISORY COMMITTEES OF THE COMMISSION. The Commission shall be supported by Advisory Committees, comprised of volunteers from all levels of government and the private sector with specific responsibility to advise the Commission on matters related to the National Levee Safety Program. The following four (4) Standing Advisory Committees shall be established simultaneously with the establishment of the Commission:

(1) *Standing Committee on Delegated Programs* – to advise the Commission concerning the development and implementation of delegated levee safety programs in qualified states, sustainment of delegated programs, rescission of state delegated programs, management of incentives and disincentives (including grant programs) for state, tribal, local and regional entities;

(2) *Standing Committee on Technical Matters* – to advise the Commission on matters related to the management of the National Levee Database, development and maintenance of the National Levee Safety Code, processes and materials for technical assistance and training, and research and development associated with levee safety;

(3) *Standing Committee on Public Involvement, Education and Awareness* – to advise the Commission in the development, fielding, and evaluation of targeted public outreach programs to gather public input, provide education, raise risk awareness, communicate information on delegated programs and track public understanding and behavior changes;

(4) *Standing Committee on Environment and Safety* – to advise the Commission on operations and maintenance permitting processes for existing projects, coordination of environmental and safety concerns on removal, rehabilitation and new levee projects, and efforts for environmental and safety collaboration in leveed and adjacent areas; and

(5) The Commission is authorized to create additional Advisory Committees as it deems necessary.

(c) COMMISSION MEMBERSHIP, LEADERSHIP, AND MANAGEMENT.

(1) MEMBERSHIP. The President shall appoint full-time Commissioners which represent interests from the following areas: state government, local government, tribal government, regional government, and the private sector. A single Commissioner may represent more than one identified area. Two Commissioners will be appointed from the federal government representing the U.S. Army Corps of Engineers and the Federal Emergency Management Agency. Commissioners will serve for a term of up to 3 years on a staggered basis.

(2) QUALIFICATIONS OF MEMBERSHIP. Appointed Commissioners shall be knowledgeable in the fields of water resources and risk management, and as a Commission, represent the diversity of skills needed to lead the Commission including engineering, public communications, program development and oversight, and environment and public safety collaboration.

(3) LEADERSHIP. The leadership activity shall be the responsibility of Chair and shall be exercised by chairing the Commission to coordinate national efforts to improve the safety of levees in the United States. The Commissioners shall appoint the Commission Chair from their membership to serve a term of up to 2 years.

(4) MANAGEMENT. The Administrator shall be responsible for managing the day to day activities of the National Levee Safety Program at the direction of the Commission. The Commission will hire the Administrator.

(5) DUTIES and AUTHORITIES.

(A) The Commissioners shall have the authority and responsibility to perform the following duties and responsibilities to oversee and represent the National Levee Safety Program, including, but not limited to:

(i) Oversee the establishment of the National Levee Safety Program including the program elements and Advisory Committees;

(ii) Hire the National Levee Safety Program Administrator;

(iii) Examine potential incentives and disincentives for good levee safety behavior and coordinate alignment of federal programs related to leveed areas;

(iv) Review and approve all key regulatory and programmatic changes to the National Levee Safety Program once established;

(v) Review and approve criteria, process, and timing for delegation of the National Levee Safety Program;

(vi) Review and approve criteria, process, and timing for rescission of a delegated program for nonperformance;

(vii) Provide periodic recommendations to the President on the effectiveness of the National Levee Safety Program, including needed authorities, budgets, coordination with other federal agencies and programs, and improvements to governance;

(viii) Communicate risks associated with levees to the people of the United States;

(ix) Address policies, procedures and legal issues (e.g., liability) related to levee safety;

(x) Chair and manage the Interagency Committee on Levee Safety; and

(xi) Conduct and submit annual evaluations to Congress on the state of the nation's levees and the effectiveness of the National Levee Safety Program, including progress achieved by federal agencies, recommendations for legislation and other Congressional actions considered necessary.

(B) The Administrator, supported by Commission staff, shall have the authority and responsibility to perform the following duties and responsibilities to create and maintain the National Levee Safety Program, including, but not limited to:

(i) Carry out the day to day activities of management of the National Levee Safety Program;

(ii) Hire National Levee Safety Program staff;

(iii) Conduct rulemaking to support elements of the National Levee Safety Program;

(iv) Provide technical and financial assistance to states and other entities (e.g., grant making);

(v) Review and evaluate eligibility for state delegation and rescission per regulation;

(vi) Provide support to the Advisory Committees of the National Levee Safety Program;

(vii) Measure and report to the Commission Chair the performance of the National Levee Safety Program;

(viii) Provide technical and financial support for delegated programs as established by rulemaking;

(ix) Develop a comprehensive National Public Involvement and Education/Awareness Campaign to communicate risks and change behaviors in leveed areas; and

(x) Provide management and technical expertise to all elements of a National Levee Safety Program not assigned to the Commissioners.

(d) COMPENSATION and CONTRACTS

(1) FEDERAL EMPLOYEES. Each member of the Commission who is an officer or employee of the United States shall serve without compensation in addition to compensation received for the services of the member as an officer or employee of the United States.

(2) OTHER MEMBERS. The Commissioners who are not an officer or employee of the United States shall be compensated by the Commission for labor, travel, and expenses.

(3) ADVISORY COMMITTEE MEMBERS. Advisory Committee members will serve in a voluntary capacity and be reimbursed for travel and per diem only.

(4) CONTRACTS WITH FEDERAL AGENCIES. The Commission may use the expertise of federal agencies and enter into contracts to carry out the National Levee Safety Program.

(e) APPLICABILITY OF FEDERAL ADVISORY COMMITTEE ACT. The Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to the Commission or its standing Advisory Committees.

(f) REGULATIONS. The Commission is authorized to develop and enforce regulations as needed to implement the National Levee Safety Program.

(g) AUTHORIZATION OF APPROPRIATIONS. There is authorized to be $30 million to establish the National Levee Safety Commission and $30 million annually for each of fiscal years 2011 through 2015.

(1) A total of $15 million will be designated for funding Commissioners, Commission staff, Advisory committees, and managing state program delegation;

(2) A total of $11 million will be designated for Technical Programs, including development of codes, publications, training, technical assistance, and research and development;

(3) A total of $3 million will be designated for public involvement and education programs; and

(4) A total of $1 million will be designated for environment and public safety efforts.

Alternative Governance Option: EMBED THE NATIONAL LEVEE SAFETY PROGRAM IN AN EXISTING FEDERAL AGENCY WITH THE COMMISSION AS AN ADVISORY BODY.

GENERAL -- While the National Committee on Levee Safety strongly believes that an independent agency is preferable, it also considered the possibility of embedding the National Levee Safety Program in a single existing federal agency, particularly on an interim basis as a permanent governance solution is created. The National Committee on Levee Safety determined that neither the U.S. Army Corps of Engineers nor the Federal Emergency Management Agency alone has the full suite of expertise needed in the key areas of: 1) levee engineering; 2) risk mitigation in leveed areas; and 3) administering incentives. The National Committee on Levee Safety was also concerned that housing a national program in an existing agency would further stretch the resources of these agencies by expanding their existing large missions, and provide challenges to that agency in managing alignment of other federal agencies' programs. Should Congress determine that this governance model is appropriate, the National Committee on Levee Safety would like to make the following recommendations for a part-time Commission supporting an embedded National Levee Safety Program:

(a) ESTABLISH AN ADVISORY COMMISSION. The Secretary of the Army or the Administrator of the Federal Emergency Management Agency shall establish a National Levee Safety Commission to provide national leadership and comprehensive and consistent approaches to levee safety, including standards, research and development, technical materials and assistance, training, public involvement and education, design and oversight of delegated programs, and ability to align federal programs.

(b) LEADERSHIP, QUALIFICATIONS and COMPENSATION. The membership, appointments and qualifications of Commissioners and Administrator should be identical to the requirements set forth in Section V for the National Commission on Levee Safety with the following exceptions:

(1) The National Levee Safety Program's Administrator shall be hired by the Secretary of the Army or the Administrator of the Federal Emergency Management Agency in consultation with the Commissioners; and

(2) The Commissioners shall serve on a part-time basis with compensation for labor, travel and per diem.

SECTION VI. ELEMENTS OF NATIONAL LEVEE SAFETY PROGRAM

(a) GENERAL. The President shall establish a National Levee Safety Program to institute comprehensive and consistent approaches to levee safety as detailed in the report entitled "Recommendations for a National Levee Safety Program" developed by the National Committee on Levee Safety, dated January 15, 2009, including, but not limited to:

(1) an inventory of federal and non-federal levees;

(2) a national levee database that includes federal and non-federal levees;

(3) a national public involvement and education/awareness program with an emphasis to communicate risk and change behavior;

(4) periodic and on-going inspection of levees;

(5) national levee safety standards;

(6) a hazard potential classification system;

(7) independent technical review of levee system data and documentation in order to comply with the National Flood Insurance Program requirements;

(8) ongoing research and development;

(9) harmonizing of levee safety activities and environmental protection;

(10)technical materials and assistance;

(11)levee safety training;

(12)tolerable risk guidelines;

(13)delegation of program elements to qualified states;

(14)grants to assist states in developing levee safety programs;

(15)grants to rehabilitate, improve, replace, or remove levees;

(16)alignment of federal programs to incentivize good levee safety behavior;

(17)mandate purchase of risk-based flood insurance in leveed areas;

(18) augment floodplain mapping of leveed areas;

(19)align federal departments, agencies and programs; and

(20)address legal and liability issues related to levees.

(b) LEVEE DATABASE. 33 USC 3303. SEC. 9004

(1) CONTENTS – shall be amended as follows: The database shall include – (A) location information of all federal and non-federal levees in the nation [including Geographic Information Systems (GIS) information] and collection of updated levee information provided by the states, federal agencies, and other entities.

(c) INVENTORY AND INSPECTION OF LEVEES. 33 USC 3303. SEC. 9004.

(1) FEDERAL LEVEES – shall be amended as follows:

(A) FEDERAL AND NON-FEDERAL LEVEES. The Secretary of the Army is authorized, at federal expense, to conduct a one-time inventory and inspection of all federally and non-federally owned and operated levees. Ongoing maintenance of the National Levee Database shall be the responsibility of the Secretary.

(d) AUTHORIZATION OF APPROPRIATIONS FOR LEVEE INVENTORY AND INSPECTION. 33 USC 3303. SEC. 9006.

(1) There is authorized to be appropriated to the Secretary of the Army to carry out Subsection (c) $125,000,000 for each of fiscal years 2011 through 2015.

(e) DEVELOP NATIONAL LEVEE SAFETY STANDARDS

Within five years of enactment, the Commission shall develop and adopt a National Levee Safety Code. Policies, procedures, standards and criteria should be linked to Levee Hazard Potential Classifications and should include concepts of tolerable risk. The National Levee Safety Code shall be updated at least every ten years. All federal agencies and delegated levee safety programs are required to adopt the National Levee Safety Code.

As in interim step, within one year after enactment and appropriation for this activity, the Commission shall establish Interim National Levee Engineering Guidelines, including policies, procedures, standards and criteria, for levees, canal structures, and related facilities and features using the International Code Council code development process.

(f) DEVELOP TOLERABLE RISK GUIDELINES

The Commission shall assemble a panel of experts knowledgeable of tolerable risk concepts with the purpose of assessing and developing National Tolerable Risk Guidelines for levees. Within two years, the Commission shall submit a Report to Congress including recommendations for the development and adoption of National Tolerable Risk Guidelines including any needed legislation or rulemaking.

(g) INDEPENDENT TECHNICAL REVIEW FOR LEVEE INFORMATION FOR THE NATIONAL FLOOD INSURANCE PROGRAM

Congress shall direct the Federal Emergency Management Agency to require independent technical review of levee data and documentation provided by a professional engineer as part of the process for determining compliance with National Flood Insurance Program regulations.

(h) HARMONIZE LEVEE SAFETY ACTIVITIES WITH ENVIRONMENTAL CONCERNS RELATED TO LEVEES

The Commission shall address operation and maintenance permitting processes for existing projects and coordination of environmental and safety concerns related to levees. The Commission shall require delegated levee safety programs to establish an approach to facilitate operations and maintenance permits among each of the state environmental and resource agencies. After two years, the Commission shall deliver a Report to Congress that recommends a series of actions to better understand and remove barriers to effective levee operations and maintenance.

(i) RESEARCH AND DEVELOPMENT

The Commission shall establish a Research and Development Program that includes innovative technology for repairs and improved engineering methods that would lead to more reliable levees and more cost effective approaches, technical and archival research of current technologies for repair and improved engineering methods, dissemination of research products, technologies and tools to enhance security, establishment of guidelines and a program for forensic investigations of levee failures and severe distress, and cost effective measures to make operations and maintenance practices more compatible with natural resource management principles.

The Commission's Standing Committee on Technical Matters should seek advice from representatives from academia, the National Science Foundation, the National Research Council, the White House Office of Science and Technology, the National Science and Technology Council and the U.S. Army Corps of Engineers Engineering Research and Development Center regarding this effort. The National Science Foundation shall focus some of its research on improving rapid assessment of levee geotechnical performance.

(j) DEVELOP A COMPREHENSIVE NATIONAL PUBLIC INVOLVEMENT AND EDUCATION/AWARENESS CAMPAIGN TO COMMUNICATE RISK AND CHANGE BEHAVIOR IN LEVEED AREAS

The Commission shall develop a comprehensive national public involvement and education/awareness campaign to communicate risk and change behavior in leveed areas,

ensure consistency of messages across government agencies, and provide national leadership in risk communication for implementation at the state and local levels. The Commission shall guide development and implementation of the public involvement and education/awareness campaign.

(k) AUGMENT FEMA's FLOOD HAZARD MAPPING PROGRAM

The Federal Emergency Management Agency shall:

(1) Identify levee systems, including structures along canals, and associated levee system failure consequence zones, in accordance with development of the National Levee Database;

(2) Improve risk identification and communication in leveed areas by re-designating Zone A/AE or Zone X areas impacted by levees as either AL or XL, respectively; and

(3) Depict on FEMA's website additional flood hazard information (e.g., 200-year level of protection) that may be provided by local/region/state entities.

(4) AUTHORIZATION OF APPROPRIATIONS.—There is appropriated to the Federal Emergency Management Agency to carry out this Section $10,000,000 annually for each of fiscal years 2011 through 2015.

(l) ALIGN COMMUNITY RATING SYSTEM TO REWARD DEVELOPMENT OF STATE LEVEE SAFETY PROGRAMS

FEMA shall revise the National Flood Insurance Program Community Rating System (CRS) Program to provide communities additional credits based on an approved delegated levee safety program and augment/decrease maximum credits allowed for certain CRS activities.

(m) DEVELOPMENT OF TECHNICAL MATERIALS AND TRAINING

The Commission shall establish a national levee safety training program to develop and deliver technical assistance materials, curricula and training. The Commission may rely on the U.S. Army Corps of Engineers, Federal Emergency Management Agency, the U.S. Bureau of Reclamation, and others to provide technical assistance materials, curricula and training as appropriate.

(n) ALIGN FEDERAL PROGRAMS TO PROVIDE ADDITIONAL INCENTIVES AND DISINCENTIVES RELATED TO LEVEES

The Commission, in consultation with federal agencies, shall identify opportunities for alignment of federal programs to provide incentives and disincentives to governments and the citizenry to promote shared responsibility for levee safety and incentivize the development of strong state and tribal levee safety programs. The Commission shall chair the Interagency Committee on Levee Safety (Section VII) and make recommendations to Congress for needed legislative changes.

SECTION VII. INTERAGENCY COMMITTEE ON LEVEE SAFETY

(a) GENERAL. In order to ensure that levee investments provide the maximum benefit, all federal programs that significantly impact governmental and individual decision-making in leveed areas must be aligned toward the goal of reliable levees, an informed and involved public, and shared responsibility for protection of human life and mitigation of public and private economic damages and environmental protection. Federal programs shall not only be aligned with each other, but shall be used as an enticement for development of state and tribal levee safety

programs. In aligning federal programs and creating incentives and disincentives, the following principles should be followed:

(1) Immediate disaster response functions should not be included as incentives and disincentives; and

(2) Ensure that promoting synergies between the National Levee Safety Program and other federal programs (e.g., the National Flood Insurance Program) does not result in unintended adverse impacts.

(b) ESTABLISHMENT. There is established an Interagency Committee on Levee Safety with broad representation from each of the affected federal departments and agencies—

(1) Composed of a representative of each of the following: the Department of Agriculture, the Department of Defense, the Department of Energy, the Department of Homeland Security, the Department of Housing and Urban Development, the Department of Interior, the Department of Labor, the Environmental Protection Agency, the Federal Emergency Management Agency, the Federal Energy Regulatory Commission, the Nuclear Regulatory Commission, the United States Section of the International Boundary and Water Commission, and other federal agencies, departments or programs with a nexus to levee safety as determined by the Commission; and

(2) Chaired by the Commission.

(c) DUTIES. The Interagency Committee on Levee Safety shall encourage the establishment and maintenance of effective federal and state programs, policies, and guidelines intended to enhance levee safety for the protection of human life and property through:

(1) Facilitating information exchange among federal agencies and state levee agencies;

(2) Analyzing possible alignment of federal programs to identify incentives and disincentives to governments and the citizenry that have delegated state levee safety programs; and

(3) Coordinating activities among federal agencies concerning implementation of the Report to Congress from the National Committee on Levee Safety.

SECTION VIII. DELEGATION OF NATIONAL LEVEE SAFETY PROGRAM TO STATES AND TRIBES

(a) AUTHORITIES NEEDED FOR DELEGATION OF A NATIONAL LEVEE SAFETY PROGRAM. Responsibilities of the National Levee Safety Program may be delegated to states and tribes. To qualify for delegation, a state or tribe must have authority to do the following:

(1) Participate in the National Levee Safety Program;

(2) Receive such funds as the federal government may make available for program implementation and distribute some portion of those funds to local government entities, consistent with National Levee Safety Program requirements;

(3) Adopt or establish standards for levee classification, inspection, construction, operation, maintenance and emergency preparedness;

(4) Perform or require inspection of levees during and after construction, and to prepare or require preparation and submittal of inspection reports and records;

(5) Perform or require development and implementation of emergency action planning procedures;

(6) Prepare reports on levees within the jurisdiction, including location, condition, maintenance, areas protected, and risks posed thereby, and to publish and distribute such reports to public or private entities;

(7) Communicate with and educate local government, levee owners and operators, and the public about the risks and benefits associated with levees and other flood risk reduction measures, and to promote prudent practice with regard to levees;

(8) Require that local governments develop and implement emergency action planning procedures and evacuation plans for imminent or actual levee failure;

(9) Enter public or private property for safety inspections or to perform emergency action; and

(10)Promulgate rules, regulations and procedures to implement statutory authorities.

(b) RULES, REGULATIONS AND PROCEDURES NEEDED TO IMPLEMENT A DELEGATED STATE LEVEE SAFETY PROGRAM. To qualify for delegation, a state or tribe must promulgate rules, regulations and procedures to implement the aforementioned statutory authorities including:

(1) Coordinate levee safety activities with neighboring states and among entities within the state owning, operating, regulating or using levees and between those entities and the National Levee Safety Program;

(2) Receive and review application packages from entities within the state for grants from the National Levee Safety Program, to submit acceptable applications to the National Levee Safety Program, and to receive and disburse grant funding from the National Levee Safety Program;

(3) Request an initial federal inspection by the U.S. Army Corps of Engineers for levees within the state's or tribe's jurisdiction;

(4) Inspect or require the inspection of levees by a registered engineer within the state's or tribe's jurisdiction at least annually and after all significant high water events;

(5) Provide information to the National Levee Database for the levees within the jurisdiction and provide updates at least annually, following the database standards;

(6) Implement a levee risk communication and public outreach/education program, including publication of an annual report on the delegated Levee Safety program, and on the results of levee inspections, and providing levee owner and operator notification and public notification of the maintenance ratings and risk behind levees;

(7) Adopt the National Levee Safety Code for all levee projects under the state's or tribe's jurisdiction or involving state or tribal funds or, prior to development of the National Levee Safety Code, Interim Levee Safety Standards or Guidelines, developed and adopted by the Commission;

(8) Require all communities that are protected by Significant or High Hazard Potential Levees, as defined by regulation, develop emergency action and evacuation plans in accordance with National Levee Safety Program guidance;

(9) Adopt measures as needed to require consideration of non-structural measures associated with any levee related activities;

(10)Have a Hazard Mitigation Plan approved by the Federal Emergency Management Agency; and

(11)Provide liaison and coordination on environmental permitting actions related to operation and maintenance of levees.

(c) TO QUALIFY FOR A STATE DELEGATED LEVEE SAFETY PROGRAM. To qualify for delegation, a state or tribe must have in place funding, qualified personnel, equipment and vehicles to conduct elements of a delegated program.

(d) TO MAINTAIN A STATE DELEGATED LEVEE SAFETY PROGRAM. To maintain delegation, a state or tribe must meet the performance standards as promulgated through rulemaking.

(e) RESCISSION OF DELEGATION. Delegation to a state or tribe may be rescinded upon finding that the state or tribe is not performing to the minimum requirements established for a delegated program.

(f) ABSENCE OF DELEGATION. In the absence of delegation to a qualified program, the Commission shall implement the following program measures:

(1) After an initial federal inspection and assessment, conduct or cause to be conducted an inspection of High or Significant Hazard Potential Levees after significant flood events, and at least every five years, and update the National Levee Database;

(2) Provide inspection reports and findings to local emergency management officials;

(3) Conduct a program of public information concerning the presence of levees, their condition and their associated risks, including notification of the state legislature and governor; and

(4) Other and further action as the Commission deems appropriate to encourage, publicize the benefits of, and foster support for a qualified state program.

(g) PHILOSOPHIES OF INCENTIVES AND DISINCENTIVES FOR STATE LEVEE SAFETY PROGRAMS. During the first 5-10 years of the National Levee Safety Program, delegated programs will be highly encouraged through direct support (e.g., program start-up grants, technical assistance, and training) with no penalties for non-participation. By the end of the start-up period, after states and tribes will have been afforded ample opportunity and assistance to ensure the safety of their populations through strong levee-related mitigation activities and the maintenance of resilient and reliable levees, an increasingly substantial set of disincentives should be applied. Over time, increasingly stringent disincentives will be applied, making it more difficult for states, tribes, regional and local governments to secure federal investment in areas located behind uncertain or unreliable levees. This phased approach toward application of incentives and disincentives recognizes two equally important principles:

(1) Significant time and assistance is needed for governments and owner/operators to understand and address their levee situation; and

(2) Continued federal investment in areas protected by levees where states, tribes and local governments do not invest in protecting the people and property located behind them (e.g., participate in a minimum delegated program) is both fiscally irresponsible and places citizens at unacceptable risk.

(h) Within three years, Commission shall submit a report to Congress describing how to employ incentives and disincentives to promote coordinated, positive behavior in leveed areas.

SECTION IX. ASSISTANCE TO CREATE STRONG LEVEE SAFETY PROGRAMS IN ALL STATES AND TRIBES

(a) IN GENERAL. To encourage the establishment and maintenance of effective delegated programs intended to ensure reliable and resilient levees, as well as increase capacity to assess whether a structural solution is the most appropriate risk reduction measure, the Commission shall provide financial assistance to assist states and tribes in establishing and maintaining levee safety programs in all states in accordance with:

(1) the criteria specified in Section VIII; and

(2) more advanced requirements and standards established by the Commission.

(b) CRITERIA AND BUDGETING REQUIREMENT. For a state or tribe to be eligible for assistance under this subsection, a delegated levee safety program must be working toward meeting the criteria included in Section VIII.

(c) WORK PLANS. The Commission shall enter into a contract with each state or tribe receiving assistance to develop a work plan necessary for the delegated levee safety program to reach a level of program performance specified in the contract.

(d) MAINTENANCE OF EFFORT. Assistance may not be provided to a state or tribe under this subsection for a fiscal year unless the state or tribe enters into such agreement with the Commission that the state or tribe will maintain the aggregate expenditures of the state or tribe from all other sources for programs to ensure levee safety for the protection of human life and property at or above a level equal to the average annual level of such expenditures for the two fiscal years preceding the current fiscal year.

(e) COST SHARING. The federal share of the cost for which a grant is made to a state or tribe for Assistance for Delegated Levee Safety Programs under this Section may not exceed 75 percent of the eligible cost of implementing the delegated levee safety program.

(f) CONTRACTUAL REQUIREMENTS.

(1) IN GENERAL. As a condition on the receipt of a grant under this Section, a state or tribe that receives the grant shall require that each contract and subcontract for program management, construction management, planning studies, feasibility studies, architectural services, preliminary engineering, design, engineering, surveying, mapping, and related services entered into using funds from the grant be awarded in the same manner as a contract for architectural and engineering services is awarded under—

(A) Chapter 11 of Title 40, United States Code; or

(B) an equivalent qualifications-based requirement prescribed by the State.

(g) AUTHORIZATION OF APPROPRIATIONS. There is authorized to be appropriated to the Commission to carry out this Section $113 million for each of the fiscal years 2011 through 2015.

SECTION X. ASSISTANCE FOR LEVEE REHABILITATION, IMPROVEMENT AND FLOOD MITIGATION

(a) GENERAL. The Commission shall establish a program to provide financial assistance for use in rehabilitation, improvement, and removal of publicly-owned levees and other flood mitigation measures in leveed areas. These funds would only be authorized pre-disaster and shall not replace or substitute for any Federal Emergency Management Agency Hazard Mitigation Assistance Programs funding.

(b) AWARD OF FINANCIAL ASSISTANCE.

(1) APPLICATION.

(A) IN GENERAL. An entity interested in receiving a grant under this Section may submit to the Commission an application for the grant; and

(B) REQUIREMENTS. An application submitted to the Commission under this Section shall be submitted at such time, be in such form, and contain such information as the Commission may prescribe by regulation.

(c) ELIGIBILITY. In order to be eligible to receive federal assistance a grant applicant must:

(1) Provide the minimum data to populate the National Levee Database;

(2) Demonstrate the financial means to provide their cost share contribution for the initial rehabilitation and to operate and maintain the levee system in accordance with the National Levee Safety Code;

(3) Evaluate an array of non-structural alternatives/activities, and where applicable identify a non-structural/structural blend of flood risk management approaches, and demonstrate that the appropriate combination of hazard mitigation measures are being implemented to best reduce flood risk and maximize net benefits to society;

(4) Engage in public outreach/notification;

(5) Provide buyer notification of flood risk;

(6) Promote purchase of flood insurance;

(7) Develop an emergency response plan;

(8) Develop and implement good levee safety practices including routine and periodic inspections and other activities of a safety program;

(9) Provide a flood risk management plan as part of a public safety element of a general/master land use plan that demonstrates the local community plan to manage land use over time to move substantially towards the established national tolerable risk guidelines; and

(10)Participate in the National Flood Insurance Program or be located entirely within one or more participating communities.

(d) GRANT.

(1) IN GENERAL. The Commission may make a grant in accordance with this Section for rehabilitation, improvement and flood mitigation of a levee to a state or tribe.

(2) PROJECT GRANT AGREEMENT. The Commission shall enter into a project grant agreement to establish the terms of the grant and the project, including the amount of the grant.

(3) Funds under this program can be applied to the combination of activities, both structural and non-structural, that combined would maximize overall risk reduction.

(A) Priority System. The Commission shall develop a risk-based priority system for use in identifying levees for which grants may be made under this Section.

(B) Use of Funds. Funds provided in the form of a cost shared agreement shall be used only for levees that are not federally operated and maintained.

(4) Funds may not be used to:

(A) perform routine operation or maintenance of a levee; or

(B) make any other modification to a levee that is not associated with the rehabilitation or improvement of the levee system.

(e) COST-SHARING. The federal share of the cost of rehabilitation, improvement, removal, replacement and flood mitigation of a levee for which a grant is made under this Section may not exceed 65 percent of the cost of the rehabilitation, improvement, removal, replacement and flood mitigation.

(f) NO PROPRIETARY INTEREST. A contract awarded in accordance with this Section shall not be considered to confer a proprietary interest upon the United States.

(g) AUTHORIZATION OF APPROPRIATIONS. There is authorized to be appropriated to the Commission to carry out this Section $600 million for each of the fiscal years 2011 through 2015.

SECTION XI. MANDATORY RISK – BASED FLOOD INSURANCE IN LEVEED AREAS

(a) SPECIAL FLOOD HAZARD AREAS. Not later than 180 days after the date of enactment of this title, the Administrator of the Federal Emergency Management Agency shall issue final regulations establishing a revised definition of areas of special flood hazards for purposes of the National Flood Insurance Program.

(b) RESIDUAL RISK AREAS. The regulations required by subsection (a) shall—

(1) include any area previously identified by the Federal Emergency Management Agency as an area having special flood hazards under Section 102 of the Flood Disaster Protection Act of 1973 (42 U.S.C. 4012a); and

(2) require the expansion of areas of special flood hazards to include areas of residual risk, including areas that are located behind levees.

(c) MANDATORY PURCHASE REQUIREMENT.

(1) IN GENERAL. Any area described in subsection (b) shall be subject to the mandatory purchase requirements of Sections 102 and 202 of the Flood Disaster Protection Act of 1973 (42 U.S.C. 4012a, 4106).

(2) ACCURATE PRICING. The Director shall ensure that the price of flood insurance policies in areas of residual risk accurately reflects the flood risks and the level of flood protection provided by any levee in such area.

May 25, 2011

Senate Committee on Environment and Public Works
ATTN: Ms. Heather Majors
410 Dirksen Senate Office Building
Washington, D.C. 20510

Subject: Additional Information as requested by Senator Barbara Boxer

Dear Senator Boxer and Members of the Committee on Environment and Public Works:

It was my honor to appear before the Committee on Environment and Public Works on November 17, 2010, to offer testimony on the recommendations for a National Levee Safety Program made by the National Committee on Levee Safety. In a letter dated December 21, 2010, members of the Committee on Environment and Public Works submitted additional questions for the hearing record.

In my response to the December 21 letter, I was not able to answer the following question from Senator Boxer: ***During the hearing, you stated that there are levees in the U.S. that do not protect against a 100-year flood, let alone provide a 200- to 500-year level of protection that many urban areas need. ... Could you indicate what portions of California's levees are known to have less than a 100-year level of protection?*** At the time of my response, the information on the portion of levees in California known to have less than a 100-year level of protection was not readily available. Since that time, the California Department of Water Resources (DWR) has worked with the Federal Emergency Management Agency (FEMA) to provide the following information.

Title 44 of the Code of Federal Regulations Section 65.10 (44 CFR 65.10), *Mapping of Areas Protected by Levee Systems*, contains the federal regulatory criteria used for determining if a levee system will be mapped on a Flood Insurance Rate Map (FIRM) as providing protection against the 1%-annual-chance flood (a "100-year" level of protection). If a levee system meets those criteria, including criteria for levee design, operations plans, maintenance plans, and certification by a registered engineer, it is "accredited" by FEMA. An accredited levee may lose its accreditation if it no longer meets the criteria of 44 CFR 65.10 when the FIRM is updated. A community or levee owner may choose to not pursue accreditation of a levee system for a variety of reasons, including if the levee system is not designed to meet, or is not expected to meet, the criteria of 44 CFR 65.10.

According to FEMA records, 940 miles – 7% of the levee mileage that FEMA has catalogued in California – have been demonstrated to meet the regulatory criteria of 44 CRF 65.10 as providing protection against the 1%-annual-chance flood. In FEMA's inventory of levees in California, 1,404 out of 13,273 miles of levees are currently recognized as accredited on FIRMs. However, 464 miles of these 1,404 miles are planned to be no longer accredited by FEMA in the future, as they no longer have been demonstrated to meet the regulatory criteria of 44 CRF 65.10.

Ninety-three percent (93%) of the miles of levees in California are not recognized as protecting against the 1%-annual-chance flood. This does not mean that those levees necessarily have less than a 1%-annual-chance level of protection. It does tell us that approximately 93% of the levees in California (12,333 miles) were not designed to, or have not been demonstrated to, satisfy the federal regulatory criteria of 44 CFR 65.10.

In addition, the California Levee Database, which was developed and is maintained by DWR, contains 450 miles of levees that are not in FEMA's inventory. DWR and FEMA have not yet conducted a careful comparison of the two databases to identify the specific differences and cannot characterize those 450 miles of levees.

The mileage of accredited levees is constantly in flux as FIRMS are updated. We can expect that some of the 318 miles of levees currently provisionally accredited will no longer be accredited after their provisional accreditation period expires, while other levees that are not accredited (currently 11,869 miles state-wide) may be improved and accredited in the future.

Levees in California & Their Accreditation Status (Miles), As of May 2011

Not Accredited	Soon To be Not Accredited	Accredited	Soon to be Accredited	Provisionally Accredited Levee	Total Miles
11,869	464	394	228	318	13,273

Not Accredited – Levee owner has not submitted documentation demonstrating that the levee is in compliance with 44 CFR 65.10, or the levee system has not met the criteria. Levee is not recognized as protecting from the 1%-annual-chance-flood on an effective FIRM.

Soon To be Not Accredited – Levee system is currently provisionally accredited on an effective FIRM. However, documentation has not been submitted by the levee owner to FEMA demonstrating that the levee is in compliance with 44 CFR 65.10 and provisionally accredited status is set to expire.

Accredited – Levee is currently accredited on an effective FIRM. Documentation submitted by the levee owner to FEMA demonstrates that the levee is in compliance with 44 CFR 65.10.

Soon to be Accredited – Levee system is currently provisionally accredited on an effective FIRM. Documentation has been submitted by the levee owner to FEMA demonstrating that the levee is in compliance with 44 CFR 65.10 and the Provisionally Accredited Levee (PAL) notation on the FIRM will be removed.

Provisionally Accredited Levee – Levee system is currently "provisionally accredited" on effective FIRM with PAL notation, or planned for provisional accreditation.

Thank you for your engagement and leadership on the issue of levee safety. If you have any additional questions for either me or the National Committee on Levee Safety, we would be happy to provide further information or meet with you or your staff.

Sincerely,

Stephen W. Verigin

Stephen W. Verigin, P.E., G.E.

Senator BOXER. Thank you very much, Mr. Verigin.

And Mr. Roth, again, welcome to you, speaking on behalf of the American Society of Civil Engineers. Welcome.

STATEMENT OF LAWRENCE ROTH, SENIOR VICE PRESIDENT, ARCADIS U.S., INC.

Mr. ROTH. Thank you, Madam Chair.

My name is Larry Roth, and I am a project manager for ARCADIS in Sacramento. The firm is currently the independent consultant for review of the Bay Delta Conservation Plan for California's Delta Stewardship Council. I am a civil and geotechnical engineer, specializing in water resources. I have worked on the design and construction of more than 50 major dams throughout California and the U.S.

I am pleased to appear before you to day to testify on behalf of the American Society of Civil Engineers on the need for a Water Resources Development Act in 2010. ASE's 2009 Report Card for America's Infrastructure shows that decades of under-funding and inattention have jeopardized the ability of our Nation's infrastructure to support our economy and our quality of life. The report card assumed a cumulative grade of D to the Nation's infrastructure. It noted that a 5-year investment of $2.2 trillion from all levels of Government and the private sector was needed to bring our infrastructure into good condition. About half that sum will be available with present Federal, State, and local spending, leaving an infrastructure investment gap of about $1.1 trillion through 2014.

The Congressional Budget Office states that spending on infrastructure produces positive economic returns. The CBO notes that a recent study suggests that public capital enhances the economy's ability to produce goods and services to the extent that $1 spent on infrastructure generates close to $1 of output within 1 year. Current economic and political conditions notwithstanding, we all recognize that the path forward will be expensive. But Federal and local investments in essential public works can create jobs, provide for economic growth, and ensure public safety through modern, well-engineered national infrastructure.

Levees received a D minus. More than 85 percent of the Nation's estimated 100,000 miles of levees are locally owned and maintained. The reliability of many of these levees is unknown. Many are more than 50 years old and were originally built to protect crop and farm land from flooding.

Congress must move quickly to enact Federal legislation to protect the health and welfare of American citizens from the catastrophic effect of flooding and levee failures. The levee safety program should be modeled on the successful National Dam Safety Program. The Act should require that Federal and State governments conduct mandatory safety inspections for all levees and establish a national inventory.

The National Flood Insurance program should map all areas potentially flooded by a levee breach and identify them as special flood areas to better communicate risk and encourage affected property owners to seek appropriate protection. The Committee should add S. 732, the Dam Rehabilitation and Repair Act, as a separate title within WRDA 2010. Senator Akaka's bill would

amend the National Dam Safety Program to provide a modest yet critical $200 million over the next 5 years for repairs and rehabilitation or removal of non-Federal, publicly owned, high hazard dams in the United States.

The Committee should support legislation similar to H.R. 5892, which contains a provision requiring that all appropriations from the trust fund each fiscal year should be equal to all revenues received by the fund in that year. In the face of the Corps' aging infrastructure need, the President's budget for a civil works program in fiscal year 2011 continues to reduce Federal investments in essential national civil works systems. The budget proposal totaled only $4.9 billion, a reduction of 9.3 percent from fiscal year 2010 enacted level of $5.4 billion. The Administration request represented a 51 percent decrease from the fiscal year 2009 enacted total of $10 billion through regular appropriations and the American Recovery and Reinvestment Act. This trend is not likely to improve in future years.

ASE believes that these levels of spending are inadequate to meet the Nation's security as well as its economic and environmental demands for the 21st century.

This concludes my testimony, Senator Boxer. I would be pleased to answer any questions.

[The prepared statement of Mr. Roth follows:]

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Testimony of
The American Society of Civil Engineers
Before The
Senate Committee on Environment and Public Works
On
The Water Resources Development Act of 2010:
Legislative and Policy Proposals to Benefit the Economy, Create Jobs, Protect
Public Safety and Maintain America's Water Resources Infrastructure
November 17, 2010

Testimony of

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On

The Water Resources Development Act of 2010:

Legislative and Policy Proposals to Benefit the Economy, Create Jobs, Protect Public Safety and Maintain America's Water Resources Infrastructure

November 17, 2010

Madame Chairwoman, Senator Inhofe, and Members of the Committee:

Good morning. I am Larry Roth, and I am project manager for ARCADIS in Sacramento. The firm is the independent consultant for the Bay Delta Conservation Plan for California's Delta Stewardship Council. I am a civil and geotechnical engineer specializing in water resources. I have worked on the design, construction, and evaluation of more than 50 major dams throughout California and the U.S. I also served for a number of years as Executive Vice President of the American Society of Civil Engineers (ASCE) in Washington.

I am pleased to appear before you today to testify on behalf of ASCE[1] on our views on the need for a Water Resources Development Act (WRDA) in 2010. We congratulate the Committee for assuming a leadership role in pursuing a public-safety agenda through reauthorization of WRDA in 2010.

A. National Infrastructure Needs

America's infrastructure picture certainly looks bleak. In urban areas, roadway congestion tops 40 percent. The number of high hazard dams—dams that, should they fail, pose a significant risk to human life—has increased by more than 3,000 just since 2007. Our 2009 Report Card for America's Infrastructure reported that decades of underfunding and inattention have jeopardized the ability of our nation's infrastructure to support our economy and facilitate our way of life.[2]

The Report Card assigned a cumulative grade of D to the nation's infrastructure; it noted that a five-year investment of $2.2 trillion from all levels of government and the private sector was needed to bring our infrastructure into good condition. About half of that sum will be available under present federal, state and local spending plans, leaving an overall infrastructure investment gap of $1.1 trillion through 2014.

Levees received a D–. More than 85 percent of the nation's estimated 100,000 miles of levees are locally owned and maintained. The reliability of many of these levees is unknown. Many are more than 50 years old and were originally built to protect crops from flooding. With an increase in development behind these levees, the risk to public health and safety from failure has increased. Rough estimates put the cost at more than $100 billion to repair and rehabilitate the nation's levees. The nation's 12,000 miles of inland waterways received a grade of D– as well. The average age of all federally owned or operated locks is nearly 60 years, well past their planned design life of 50 years.

Current economic and political conditions notwithstanding, the path forward will be expensive. But federal, state and local investments in essential public works can create jobs, provide for economic growth, and ensure public safety through a modern, well-engineered national infrastructure.[3] Since the passage of the American Recovery and Reinvestment Act in February 2009, the economy has regained more than two million jobs due to investments—much of it in infrastructure—provided by the law.[4]

Now I would like to highlight briefly some of the nation's most pressing infrastructure needs in the area of water resources.

B. Congressional Action on a National Levee Safety Program Is Essential.

Earlier this year, a 120-year-old levee made of sand on the Wisconsin River collapsed near Portage, Wisconsin, flooding hundreds of homes. Five years after Hurricane Katrina devastated the Gulf Coast, there is still no national safety program for federal or state levees.[5]

Congress must move quickly to enact federal legislation to protect the health and welfare of American citizens from the catastrophic effects of levee failures. The levee safety program should be modeled on the successful National Dam Safety Program. The act should require the federal and state governments to conduct mandatory safety inspections for all levees and establish a national inventory of levees.

The act should require the federal and state governments to conduct mandatory safety inspections for all levees and establish a national inventory of levees. The National Flood Insurance Program should map all areas potentially flooded by a levee breach and identify these as special flood areas to better communicate risks and encourage affected property owners to seek appropriate protection.

WRDA 2010 should require the Comptroller General, in consultation with the Secretary of the Army, to study the potential benefits of formally uniting the National Dam Safety Program with the National Levee Safety Program. The study should examine (1) the potential to improve the protection of the general public health, safety, and welfare from dam and levee failures through a unified dam and levee safety program; (2) the administrative and budgetary efficiencies to be achieved in the unification of the national dam and levee safety programs; and (3) any other factors the Comptroller determines will assist the Congress in assessing the benefits of the integration of the two programs.

In addition, WRDA should require the Secretary of the Department of Homeland Security and the Secretary of the Army to complete a study of the potential benefits of transferring the two programs into an independent federal dam and levee safety agency.

Many privately built levees are deeded to local governments or associations who do not maintain them or even recognize the risks. There is no dependable catalog of the location, ownership, condition, or hazard potential of levees in the United States. Flooding from Katrina demonstrated the need for consistent, up-to-date standards for levees based upon reliable engineering data on their location, function, and condition.

The nation must use all the tools available to reduce damages from hurricanes and major storms. This means the use of structural methods, such as levees, floodwalls, and dams, but also non-structural approaches, such as flood-resistant design, voluntary relocation of homes and businesses from flood-prone areas, the revitalization of wetlands for storage, and the use of natural barriers to storm surges.

The federal government must accept the responsibility for the safety of all federally funded and regulated levees. Similarly, state governments must enact legislation authorizing an appropriate entity to undertake a program of levee safety for non-federal levees.

C. The Committee Should Act on the Dam Rehabilitation and Repair Act This Year.

The Committee should add S. 732, the Dam Rehabilitation and Repair Act as a separate title in WRDA 2010. Senator Akaka's bill would amend the National Dam Safety Program Act to provide a modest, yet critical, $200 million over five years for repairs, rehabilitation, or the removal of non-federal, publicly owned, high hazard dams across the United States. A version of this bill passed the House in the 110th Congress with a vote of 263–102.

According to the National Inventory of Dams, there are more than 85,000 dams in the United States. These dams are a vital part of our nation's aging infrastructure and provide enormous benefits to the majority of Americans including drinking water, flood protection, renewable hydroelectric power, navigation, irrigation, and recreation. Yet these critical daily benefits provided by the nation's dams are inextricably linked to the potential consequences of a dam failure if the dam is not maintained, unable to safely impound water, carefully pass large flood events or withstand earthquakes.

The number of dams determined to be unsafe or deficient has risen from 3,500 in 2005 to 4,095 in 2007. Meanwhile, the Association of State Dam Safety Officials has estimated that it would cost more than $10 billion over the next 12 years to upgrade the physical condition of all critical non-federal dams — dams that pose a direct risk to human life should they fail.

Senator Akaka's bill has strong bipartisan support. Members of Congress recognize that the federal government should bear some responsibility in repairing ailing dams as failures do not necessarily respect state and local boundaries and the proposed legislation would distribute that funding to those dams in greatest need.

D. Congress Must Solve the Problem of Declining Balances in the Inland Waterways Trust Fund.

The tax rate for the trust fund has been 20 cents per gallon since January 1, 1995. We believe that an increase in the waterways user fee is long overdue, and we concur in the recommendation that the current fee be increased between six and nine cents a gallon.

ASCE endorses the recommendations of the Inland Marine Transportation System (IMTS) Capital Investment Strategy Team released in April. This plan would invest $7.6 billion in inland waterways improvements over the next 20 years.

We believe, however, that any increase in the Inland Waterways User fee also include a provision to index that fee to the consumer price index (CPI)

and be adjusted every two years. We further recommend that any diesel fuel tax revenues received by the IWTF be "firewalled" to establish discretionary spending limits in the same manner used for Highway Trust Fund and the Aviation Trust Fund to reserve the IWTF revenues exclusively for the reconstruction of the system's aging infrastructure.

Forty-seven percent of all locks maintained by the U.S. Army Corps of Engineers were classified as functionally obsolete in 2006. Assuming that no new locks are built within the next 20 years, by 2020, another 93 existing locks will be obsolete—rendering more than 8 out of every 10 locks now in service outdated. The need for increased investment at the federal level is compelling.

Our nation's inland waterways are a strategic economic resource. The nationwide network includes nearly 11,000 miles of federal user fees through an excise tax on fuel. Commercial waterway operators on these designated waterways pay a fuel tax of 20 cents per gallon, which is deposited in the Inland Waterways Trust Fund (IWTF).

The IWTF, which was created in 1978, now funds half the cost of new construction and major rehabilitation of the inland waterway infrastructure. But the IWTF fund balance has eroded in recent years; the administration has proposed phasing out the existing tax on waterways fuel and establishing a lock user fee.

Moreover, the Atlantic Intracoastal Waterway (AIWW) is a designated IWTF project. The commercial users on the AIWW have been paying into the fund since its inception while receiving very little in return for the AIWW system. As there are no new construction activities or major rehabilitation projects planned for the AIWW, there is little likelihood any of the fees collected on the Intracoastal Waterway will be used to improve or maintain the AIWW. ASCE believes that this inequity for the AIWW needs to be addressed.

The IWTF balance has declined each year for more than a decade. In FY 2011, the Office of Management and Budget estimates fund revenues at $85 million, with a year-end balance of approximately $30 million.

The administration's budget request noted for FY 2011 that the administration will propose to replace the current fuel tax with a new funding mechanism that will raise the revenue needed to meet the authorized non-federal cost-share of these capital investments "that is more efficient and more equitable than the fuel tax" for traffic on the inland waterway system.

If the administration's proposal is enacted, the budget forecasts additional receipts of $72 million for the IWTF for FY 2011. Together with the $85 million in estimated receipts from the current excise tax and interest income, total receipts for the Inland Waterways Trust Fund would be $157 million under the administration's budget request in FY 2011.

According to the Inland Waterways Users Board, large project cost overruns and delays in project schedules on the waterways have drawn down the IWTF balance. Project completion delays result from a federal budgeting and appropriations model that provides funding in annual and often-insufficient increments rather than a more reliable multi-year funding mechanism that would provide the certainty needed to more efficiently contract and build these capital projects.[6]

E. The Committee Must Pass Legislation That Would Require All Revenues in the Harbor Maintenance Trust Fund to Be Appropriated Each Year.

The balance in the Harbor Maintenance Trust Fund (HMTF) has been increasing each year. The current balance at the end of fiscal year 2010 is estimated at more than $5 billion.[7]

Therefore, the Committee should support legislation similar to H.R. 5892, which contains a provision requiring the total of all appropriations from the HMTF each fiscal year be equal to all revenues received by the HMTF each year.

Such legislation would require Congress to create a mechanism to ensure the equitable distribution of HMTF monies so that federal assistance would go to the ports in greatest need. The U.S. Army Corps of Engineers data indicate that a significant portion of annual HMTF disbursements now go to harbors that handle little or no cargo, according to a recent report by the Congressional Research Service (CRS).

This provision would establish a policy for increased expenditures from the Harbor Maintenance Trust Fund to ensure that annual revenues collected are utilized to meet the nation's navigation maintenance dredging needs.

The Corps of Engineers estimates that full channel dimensions at the nation's busiest 59 ports are available less than 35 percent of the time, the CRS reported.

> This can increase the cost of shipping as vessels carry less cargo in order to reduce their draft or wait for high tide before

transiting a harbor. It could also increase the risk of a ship grounding or collision, possibly resulting in an oil spill.[8]

We support the deepening and widening of ship channels, as necessary, to accommodate the new, larger ships in the world fleet and the continued maintenance dredging of ship channels for the efficient handling of maritime commerce. ASCE also supports programs that limit erosion and sedimentation in ports, harbors and waterways.

On land, U.S. port facilities are primarily a collection of state, local, or privately owned facilities and private companies.[9] More than 13 billion tons of freight, valued at $11.8 trillion, were transported nearly 3.5 trillion ton-miles in the United States during 2007, according to the Commodity Flow Survey conducted by the U.S. Bureau of Transportation Statistics.[10]

These ports and their related facilities are an essential element of the national economy and must be preserved and strengthened.

F. The Committee Must Support Increased Budgets for the U.S. Army Corps of Engineers Civil Works Program

In the face of the Corps' aging infrastructure needs, the president's budget for the Civil Works Program in FY 2011 reduced federal investments in essential national civil works systems.

The budget proposal totaled only $4.9 billion, a reduction of 9.3 percent from the FY 2010 enacted level of $5.4 billion. The administration request represented a 51 percent decrease from the FY 2009 enacted total of $10 billion through regular appropriations and the American Recovery and Reinvestment Act.

Moreover, the trend is not likely to improve in future years. The Corps estimates that its budget proposals will continue to decline through FY 2015, with a low estimate of $4.5 billion for FY 2013. The Corps expects that inflation will reduce actual spending on key infrastructure programs by a further $3 billion over the next five years. [11] ASCE believes that these levels of spending are inadequate to meet the nation's security, economic and environmental demands in the 21st century.

The proposed construction budget for FY 2011 would assign $1.7 billion to 99 construction projects; only two of these are new starts. The administration's request represents a reduction of $341 million from the FY 2010 appropriation for this account. These funds are used for the construction of river and harbor, flood control, shore protection, environmental restoration,

and related projects specifically authorized or made available for selection by law.

Increased funding to the states for water resource planning is vitally important to encourage statewide collaborative efforts to avert future crisis such as flooding or drought. Preparedness is a cornerstone for ensuring future water supply availability for population and economic growth and new challenges to address environmental needs. At least $100 million should be provided on a cost-shared basis in the Civil Works program to help states develop strategies to address their future challenges and needs.

We urge the removal of the prohibition on "new starts" in future Appropriations bills. We believe this is not in the best interest of the Corps' work on the nation's waterways, flood control needs and ecosystems restoration. Congress took a strong stand and made a serious commitment to the American people when it voted to override President Bush's veto of the 2007 Water Resources Development Act and authorized more than $23 billion in new projects for the Corps of Engineers. It is time to meet that commitment by addressing this backlog of funding needs and provide additional funding for this critically important program. Failing to move on new projects that have been authorized will stop the Corps from addressing pressing needs.

G. Conclusion

That concludes my testimony, Senator Boxer. I would be pleased to answer questions from the Committee.

NOTES

[1] ASCE was founded in 1852 and is the country's oldest national civil engineering organization. It represents more than 140,000 civil engineers individually in private practice, government, industry and academia who are dedicated to the advancement of the science and profession of civil engineering. ASCE is a non-profit educational and professional society organized under Part 1.501(c) (3) of the Internal Revenue Service rules.

[2] The American Society of Civil Engineers, Report Card for America's Infrastructure (2009), http://www.infrastructurereportcard.org/. Fifteen infrastructure systems received a cumulative grade of D due to deferred maintenance and a lack of investment in new systems.

[3] The connection between economic expansion and infrastructure investments was most clearly explained more than 20 years ago. See David A. Aschauer, Is Public Expenditure Productive?, 23 J. MONET. ECON. 177 (1989) (finding that "the fall-off in productivity growth [in the 1970s] is matched, or slightly preceded, by a precipitous decline in addtions to the net stock of public nonmilitary structures and equipment.")

[4] "One year after the passage of the Act, we can report that approximately 2 million jobs have been created or saved thanks to the Act's impact on hiring in the private sector, by local and state governments and by non-profits." Vice President Biden, Annual Report to the President on Progress Implementing the American Recovery and Reinvestment Act of 2009 (February 2010), http://www.whitehouse.gov/recovery/anniversary/message (last visited Nov. 15, 2010).

[5] The U.S. Army Corps of Engineers is responsible for approximately 2,000 levees that stretch about 14,000 miles overall. Tens of thousands of miles of additional levees are under state, local or private authority. http://www.usace.army.mil/CEPA/NewsReleases/Pages/0906TreesLevees.aspx.

In addition, the Bureau of Reclamation in the Interior Department manages 8,116 miles of water-filled canals. Although WRDA 2007 states that the levee standards in title IX of the Act are intended for "structures along canals," the Bureau argues that these canals are exempt from federal levee requirements under WRDA because the Interior Department is not specifically mentioned in the Act. See Memorandum from Roseann Gonzales, Director, Policy and Program Services, Bureau of Reclamation, to

Commissioner, Bureau of Reclamation, Non-Applicability of the Levee Safety Act to Bureau of Reclamation Canals (Nov. 25, 2008) (on file with ASCE).

[6] Inland Waterways Users Board, Annual Report to Congress (2009), http://www.iwr.usace.army.mil/usersboard/AnnualReportToCongress.htm (The 2010 report is due out in October, according to Corps officials.)

[7] U.S. Treasury Department, Treasury Bulletin 127 (March 2010), http://www.fms.treas.gov/bulletin/b2010_1.pdf . In 1986, Congress authorized a tax on imports and exports to finance the HMTF. In 1998, the U.S. Supreme Court declared the export tax unconstitutional. That decision has caused a decrease of 30 percent in overall HMTF revenues, but the unexpended balance nevertheless continues to increase each year. Id.

[8] Congressional Research Service, Harbor Maintenance Trust Fund Expenditures (Jan. 25, 2010).

[9] The ports and harbors contain landside port infrastructure such as terminals, wharves, rail yards, and roadways within the harbor districts. The vast bulk of America's landside port infrastructure is owned and operated by state, local and private sector entities. The owners and operators are not required by law to report regularly on the physical condition of their landside infrastructure.

[10] Bureau of Transportation Statistics, U.S. Freight on the Move: Highlights from the 2007 Commodity Flow Survey Preliminary Data, http://www.bts.gov/publications/bts_special_report/2009_09_30/html/entire.html#2 (last visited Apr. 29, 2010).

[11] U.S. Army Corps of Engineers, The Fiscal Year 2011 Budget and an Alternative View of the Civil Works Mission 11 (Mar. 9, 2010) (unpublished PowerPoint presentation, on file with ASCE).

January 4, 2011

Environment and Public Works Committee Hearing
November 17, 2010
Follow-Up Questions for Written Submission

Questions for Roth (American Society of Civil Engineers)

Questions from:

Senator Barbara Boxer

1. Mr. Roth, in your testimony you highlighted the job-creation benefit of the infrastructure investments in the American Recovery and Reinvestment Act and the need for additional investments to provide for economic growth. Can you please describe how passage of a Water Resources Development Act that invests in the nation's water resources infrastructure can help promote economic growth in the U.S. and create jobs? Why is it important for us to quickly move forward with a new WRDA bill?

Economists have long appreciated the value of investment in public works infrastructure.[1] Narrowly defined as the most well-known capital-intensive natural monopolies—highways, wastewater and drinking-water systems, levees, dams, and other large systems—they are (with some exceptions) publicly owned. Each of these systems plays a central role in the economic health of the nation. "Our infrastructure is the bloodline for our nation."[2]

Public works investments in the form of grants and other funding mechanisms support the construction or rehabilitation of essential public infrastructure and facilities necessary to generate or retain private sector jobs and investments, attract private sector capital, and promote regional competitiveness, innovation, and entrepreneurship. This includes investments that expand and upgrade infrastructure to attract new industry, support technology-led development, accelerate new business development, and enhance the ability of regions to capitalize on opportunities presented by free trade.[3]

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[1] See, e.g., David Alan Aschauer, Is Public Expenditure Productive?, 23 J. MONETARY ECON. 177 (1988). ("The empirical results indicate that (i) the nonmilitary public capital stock is dramatically more important in determining productivity than is either the flow of nonmilitary or military spending, (ii) military capital bears little relation to productivity, and (iii) a 'core' infrastructure of streets, highways, airports, mass transit, sewers, water systems, etc. has most explanatory power for productivity.")

[2] Robert Prechter, Major Infrastructure Stock Too Cheap to Ignore, http://www.marketoracle.co.uk/Article22658.html (last visited Jan. 4, 2011).

[3] U.S. Commerce Department, Investments for Public Works and Economic Development Facilities, https://www.cfda.gov/index?s=program&mode=form&tab=step1&id=f860a3b8eeae5e8f25a41e38e511a72 (last visited Jan. 4, 2011).

The debate over the economic importance of the national infrastructure properly focuses on the future wealth of the nation. This has resulted in the U.S. Chamber of Commerce's developing of an "infrastructure index" to measure the performance of U.S. infrastructure in supporting the productivity necessary to improve the wealth of America and Americans. The final index is expected to be released this year; the initial findings are in line with other economic analyses in concluding that infrastructure "is the foundation for national competitiveness in a global age."[4]

Enacting a Water Resources Development Act in 2011 will be a key component in the overall rebuilding of the nation's commercial muscle, thus enhancing our recovery from the recession and establishing the foundations of lasting economic progress.

Senator Thomas R. Carper

1. What are some innovative financing and project delivery tools that you have seen work in your organizations that could help reduce the backlog of projects, lower project costs, and deliver projects more efficiently and effectively?

The design-build project-delivery system offers the most immediate way to speed up the design and construction of critical water resources infrastructure projects. The design-build system, codified at FAR part 36.3, "Two-Phase Design-Build Selection Procedures," incorporates the design and construction of projects into a single procurement and allows the federal agency to delegate all responsibility for designing and constructing a project to an outside party through one contract.

A prime contractor or joint venture is commissioned to carry out the design and construction of a project. A design professional who renders architectural and engineering services may be employed directly by the prime contractor as part of the design-build team or the design work may be awarded to a subcontractor by the prime contractor. The design-build method has some advantages. It reduces the owner's administrative burdens by putting the entire project into one overall contract. This means there is little need for the owner to coordinate among the various project contractors and subcontractors. The project delivery time may be reduced, and there is an opportunity for construction engineering and techniques to be considered earlier in the project. Finally, design-build also may simplify the implementation of project changes during actual construction.

The Corps has enjoyed notable success with the design-build project-delivery system in Louisiana as it rebuilds the state's hurricane protection system following Hurricane Katrina. USACE has used design-build to deliver approximately $14 billion worth of

[4] U.S. Chamber of Commerce, Infrastructure Index Project: Measuring the Relationship between Infrastructure and the Economy, http://www.uschamber.com/lra/infrastructure-index-project%3A-measuring-relationship-between-infrastructure-economy (last visited Jan. 4, 2011).

hurricane-protection projects since 2005, a feat that ordinarily might take two or three times as long.

In addition, ASCE recognizes public-private partnerships (PPPs) as one of many methods of financing infrastructure improvements. PPPs are appropriate if certain safeguards are present to protect the public interest, including assurances that (1) all revenue derived from PPPs must be dedicated exclusively to comparable infrastructure facilities in the state or locality where the project is based; (2) PPP contracts must include performance criteria that address long-term viability, life cycle costs, and residual value; and (3) transparency must be a key element in all aspects of contract development, including all terms and conditions in the contract. There should be public participation and compliance with all applicable planning and design standards, and environmental requirements.

2. How can our water resources policy and our surface transportation policy be crafted in a way that is mutually beneficial and that creates jobs, helps our economy, and builds smart infrastructure?

Infrastructure investment at all levels must be prioritized and executed according to well-conceived plans that complement the national vision and focus on systemwide outputs. As a nation we need to focus on freight and passenger mobility, intermodality, water use, environmental stewardship and efforts to create resiliency and sustainability. The plans must reflect a more clearly defined set of federal, state, local, and private-sector roles and responsibilities and instill better discipline in the setting of priorities, with an emphasis on funding to solve the most pressing problems. The plans should also complement our broad national goals of economic growth and leadership, resource conservation, energy independence, and environmental stewardship. Infrastructure plans should be synchronized with regional land-use planning and related rules and incentives to promote non-structural solutions to mitigate the growing demand for increased infrastructure capacity.

Senator Benjamin L. Cardin

1. Both your testimony and that of Mr. Verigin have highlighted the need to assess the safety of non-federal levees. How should state and local governments work with the federal government to ensure that all levees meet appropriate safety standards?

ASCE supports the enactment of federal and state legislation and regulations to protect the health and welfare of citizens from the catastrophic effects of levee failures. Congress should enact legislation to establish a national levee safety program that is modeled on the successful National Dam Safety Program. The federal government must accept the responsibility for the safety of all federally funded and regulated levees. Similarly, state governments must enact legislation authorizing an appropriate entity to undertake a program of levee safety for non-federal levees. The national legislation should require the federal and state governments to conduct mandatory safety inspections for all levees and establish a national inventory of levees. The National Flood Insurance Program should map all areas potentially flooded by a levee breach and identify these as special flood areas

to better communicate risks and encourage affected property owners to seek appropriate protection.

In January 2009, the Committee on Levee Safety created by the Water Resources Development Act of 2007 delivered a draft report to the Office of Management and Budget (OMB). The report, "Recommendations for a National Levee Safety Program," contains 20 specific policy suggestions for improving the safety of levees in the United States.[5] ASCE believes many of the report's recommendations—particularly the creation of a strong federal-state partnership to ensure nationally consistent regulations and guidelines for state levee safety programs—should be implemented in comprehensive legislation as soon as practicable in the 112th Congress.

For example, eight of the 20 recommendations could be enacted swiftly with little cost and wide popular support. Congress should amend WRDA to establish a national levee safety program; expand and maintain a national levee data base; adopt national hazard potential classifications; adopt national levee safety standards; develop tolerable risk guidelines; develop a national levee safety training center; require a new research and development program on state-of-the-art levee safety engineering, operations, and maintenance; and establish a levee safety grant program to help state and local governments rehabilitate or remove aging or deficient levees.

2. You recommend legislation that would support equitable distribution of HMTF revenue. In your view, what is equitable distribution, and how would you recommend prioritizing harbor maintenance projects?

The U.S. Army Corps of Engineers Civil Works Program is responsible for billions of dollars worth of infrastructure systems, including the duty to keep 12,000 miles of commercial inland waterways and 926 shallow- and deep-draft harbors in good working condition in order to ensure the efficient movement of more than two billion tons of commercial cargo annually. Improvements to the harbors are financed through the Harbor Maintenance Trust Fund (HMTF).

Although revenues have been increasing, expenditures from the HMTF have been stagnant for several years, resulting in a larger fund balance over time. "Despite the surplus, the busiest U.S. harbors are not being fully maintained."[6] Moreover, many of the harbors with the heaviest traffic receive a disproportionately smaller share of the revenues, with ports having little or no cargo receiving more funding than is warranted by their overall usage.

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[5] http://www.nfrmp.us/ncls/docs/NCLS-Recommendation-Report_012009_DRAFT.pdf.

[6] Cong. Res. Svc., Harbor Maintenance Trust Fund Expenditures 1 (Jan. 25, 2010).

ASCE believes that Congress should appropriate the full balance in the HMTF each fiscal year to ensure that the harbors with the heaviest traffic and greatest need are able to obtain an equitable share of the HMTF funding. At the same time, Congress must ensure that proper spending priorities are established to ensure that a larger portion of the HMTF goes to harbors with the largest cargo burdens.

Meanwhile, we understand the Corps seems to be examining funding equity among the nation's ports. The Corps classifies federal channel and harbor projects as either deep-draft or shallow-draft. The harbors are either high-use or low-use, based on the level of commercial traffic carried on the waterway. While channel and harbor projects with shallower depths and inland waterways segments with lower levels of commercial traffic tend to have lower levels of economic activity, the Corps' classification of projects is an imperfect indicator of the return to the nation from the investments required to operate and maintain the projects or segments. A navigation project with lower commercial use may not require as much funding to operate and maintain and, therefore, may provide a significant net economic return.

Navigation projects with lower commercial use may contribute to the nation in other important ways, such as by supporting commercial fishing, subsistence, or public transportation. In some cases they can provide a vital economic engine to local economies, especially in less populated areas, or serve as a harbor of refuge. As of yet, there is no objective means of determining how best to weigh such needs against those of the facilities that support higher levels of commercial traffic.

In Fiscal Year 2011, the Corps will begin a "Low Use Navigation Pilot Project" to encourage non-traditional ways to fund maintenance of low-use harbors and waterways. This program appears to be an effort to shift federal funds to harbors with higher traffic volumes and consequently greater revenues. The project will identify federal harbors and inland waterways segments that support lower levels of commercial use and their respective non-federal sponsors. The project will also formulate a range of possible long-term options for the funding and management of such facilities, evaluate the pros and cons of these options, and examine their applicability to the various types of low-use navigation facilities.[7]

Senator Sheldon Whitehouse

1. In your written testimony, you stated that the number of high hazard dams has increased by more than 3,000 just since 2007. In 2009, your association's report card gave a grade of "D" to our nation's dams. Why are so many dams reaching a tipping point of being unsafe and why have local and state governments been unable to maintain these dams appropriately?

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[7] U.S. Army Corps of Engineers, Fiscal Year 2011 Civil Works Budget for the U.S. Army Corps of Engineers RIO—45 (February 2010), http://www.usace.army.mil/CECW/PID/Documents/j_sheets/just_2011.pdf (last visited Jan. 3, 2011).

High-hazard dams are dams that will cause a loss of life or property damage in the event of a catastrophic failure. It is not a measure of the physical condition of the dam. More and more dams are being identified as high-hazard for two basic reasons:

1. Dams designed and built forty or fifty years ago using the best criteria at the time are now unable to meet the current design standards due to advancing science and engineering knowledge, which are better able to predict floods and earthquake events that threaten dams. In addition, our knowledge of dams, dam failures and responses to extreme events has advanced such that many dams need to be rehabilitated to assure their continued safety.

2. Downstream development has dramatically changed the consequences of a failure below dams that were originally designed and built when relatively few people were at risk of dying from a failure, thus demanding significantly more stringent dam safety standards. This new development is typically beyond the control of the dam owner who must still assure the safety of the dam commensurate with the unacceptable loss of life consequences.

Only a portion of these dams in need of remediation is owned by local or state governments; many privately owned. State governments may regulate these structures, but the owner is responsible for its rehabilitation and maintenance.

Although the owner ultimately is responsible, many owners do not have the funds to perform costly dam rehabilitations. Rehabilitation typically consists of bringing a dam up to current safety standards (increasing spillway capacity, installing modern gates and other equipment). This is different than day-to-day operation and maintenance, which most dam owners are performing relatively well. Rehabilitation is expensive; operation and maintenance are less so. A one-time grant or low interest loan would drastically reduce the public risk associated with these unsafe dams by bringing the structure up to standards.

The cost of major dam rehabilitation is quite expensive and often beyond the ability of the owner; a onetime grant or low interest loan may be the only means to reduce the public risk to acceptable levels.

2. How confident are you that we have a firm handle on the condition of our nation's dams, given the limited dam inspection resources of most states?

Our confidence level is good but not excellent. With the relatively low number of state inspectors nationally, it is very difficult to have one hundred percent assurance that the condition of each dam, especially those considered high-hazard potential (those whose failure could affect human life), is known. Even knowing what the conditions are, the challenge is getting the dam owner to make the upgrades.

State dam safety programs, which regulate 80 percent of the 85,000 dams in the U.S., have an enormous challenge to assure the safety of dams. Many have severely limited staff and budgets to do a complete and effective job. State programs typically concentrate on the high-hazard dams (those whose failure is expected to cause loss of life), often postponing or eliminating inspections of other dams. Even with these resource limitations, however, the growing number of new high-hazard dams and the alarming number of deficient or unsafe dams demands immediate leadership and action, despite the reality of a partial assessment of the condition of our nation's dams.

3. Some dams are effective for flood control, while others may exacerbate risks from flooding in the event of a sudden collapse. Repairing and maintaining some long-term dams may be more costly than removal. What place can sensible and targeted dam removal play in reducing the risk from flooding?

Dams serve a multitude of purposes. Approximately 16 percent of dams on the National Inventory of Dams have flood control as their main purpose.

Few dams present a risk of flooding from sudden collapse. Properly designed and maintained, high-hazard dams will not fail "suddenly"; regular inspections required by state or local safety programs will discover structural problems long before they lead to failure. It is true that not only sudden collapse, but release of water from spillways in order to mitigate a dam's failure, can cause catastrophic devastation.

Dam removal is a viable and responsible option to address unsafe dams, especially where the dam has no public benefits or an absentee owner. In these cases, removal will eliminate or reduce the potential loss of life from a dam failure. Flood-control dams provide flood benefits to property valued at many, many millions of dollars. Removal of flood-control dams is very complicated as removal may increase the consequences and frequency of flooding to the homes, businesses and infrastructure that were built with the expectation of continued flood protection. In that case, flood-control benefits from the dam will likely have to be replaced by levees or a federal buyout program, which may be very costly or may not provide the same level of protection.

4. Who can best identify which dams should be removed? Is there an existing process or program that can address this need in a smart, comprehensive way?

The dam owner, the state regulatory agency, local floodplain and emergency management officials, and local government agencies are in the best position to determine whether and when a dam ought to be removed. The process must examine the risk of dam failure, public benefits such a flood protection, recreation, water supply and hydropower and identify alternatives including removal or partial removal that reduces the risk to an acceptable level while maintaining critical public benefits. Often the removal option eliminates essential benefits, such as drinking-water supply and flood protection, that cannot easily be provided by other options.

5. Many dams in my home state of Rhode Island are privately owned. This can compound the challenges of responding to an impending flood, because upstream dam owners may take actions (opening their dam's floodgates to protect upstream property), or fail to take actions (warning downstream settlements of a dam's failure) that could increase the risk of dam failure or flooding downstream. What are your recommendations for coordinating the actions of private dam owners during heavy rain events?

We believe every state needs to require dams within the state must have a comprehensive emergency action plan (EAP) that is routinely updated and tested. The plan needs to be developed with the participation of all local stakeholders to mitigate effects from dam failure. Many states require owners to have EAPS but some do not. It is essential that owners see the value in maintaining an EAP. Moreover, all state and federal regulatory programs should require the maintenance and testing of EAPs. Specifically, the EAP should include a flood operations sections that designs for how flood gates are operated during flood events so as to reduce the risk of flooding while assuring the safety of the dam.

In addition to EAPs, it is essential that upstream dam owners and downstream flood-control officials coordinate activities, such as releases during flood events to minimize downstream impacts. In unusually large storm events it is not always possible to avoid downstream damages because minimum levels of release must be made from dams to avoid sudden and possibly catastrophic flooding. As noted above, it is important to understand that even though dams will eventually have to open gates and release water, some flood control benefit has been realized while the dam has been storing and holding back flood water up to that point.

In Rhode Island, state law requires the municipality in which the high- or significant-hazard dam is located to prepare an EAP. Thirty-eight of the state's 38 high hazard dams have an EAP, and another 30 significant hazard dams have an EAP.

6. Climate scientists tell us that as the climate warms, New England will likely be exposed to more precipitation and to more extreme wet weather events. Are current engineering estimates effectively considering the impact on our dams and levees from more extreme weather patterns?

No, however, dam safety design standards for high-hazard dams are typically quite strict, requiring that the dam can safely withstand extreme flood and earthquake events. As our science and engineering predictive modeling advance and include climate changes, the dam safety engineering state of practice will continue to adjust the dam safety criteria to reduce the risk of dam failures to reach our highest priority of public safety.

7. Many old dams are very small. Does the regulatory expense of addressing the challenges and opportunities these small dams inhibit taking responsible action on these small dams?

Generally, small dams have lower risk and therefore dam-safety programs suffering from limited resources have had to adopt risk-based strategies that focus scarce funding on dams with the greatest consequences (high-hazard potential) and probability of failure. Small dams typically do not require the same level of effort as is required of dam with higher risk.

Small dams, however, can also pose a significant threat to public safety. They can be overlooked due to their seemingly small threat to downstream life and property but, because of this lack of attention, they can go without proper inspections or maintenance for dangerously long periods of time. Larger dams are typically owned and operated by large interests that often employ their own engineering and dam safety staffs to ensure public safety. While in contrast the small dam may be owned by a homeowners group or even an individual with little to no engineering knowledge. Small dam failures are much more common than large dam failures. A recent example of a small dam failure was Koloko Dam on the Island of Kauai in Hawaii where seven lives were lost.

Senator James M. Inhofe
I am concerned that simply creating new grant programs for repairing dams and or levees sets expectations of federal funding that are not realistic. According to your testimony, the needs are likely to exceed $112 billion. In the current budget situation, we either need to convince everyone that these investments are more important than other government programs or we need to figure out a different type of federal assistance for dam and levee repairs. Do you have any suggestions on these choices?

The Association of State Dam Safety Officials (ASDSO) estimates that it will cost $12 billion (not $112 billion) over 10 years to upgrade all deficient public and private high-hazard dams.

Although the nation as a whole has to support a well-maintained, resilient national infrastructure, the ultimate solution cannot depend entirely on federal funding. All levels of government as well as the private sector owners and users of nationally significant infrastructure must renew their financial commitment to infrastructure across the board. All available financing options must be explored and debated. While great strides can be made with sustainable development and ongoing maintenance, to make necessary long-term improvements, significant funds must be invested. The longer critical investments to improve the operability, safety, and resilience of the nation's infrastructure are withheld, the greater the future cost and risk of failure.

We must develop and authorize innovative financing programs that not only make resources readily available, but also encourage the most effective and efficient use of those resources. Federal investment must be used to complement, encourage and leverage investment from the state and local government levels as well as from the private sector.

In addition, users of the infrastructure must be willing to pay the appropriate price for their use.

Infrastructure spending is a continuing governmental obligation and long-term investment in public safety and economic growth. Funding for the repair or replacement of major infrastructure systems may be deferred, but it cannot be put off forever. The only serious question for policymakers is when, not if, the investment should be made. Waiting for the day when a system collapses risks thousands of lives, potentially stifles the economy and costs many millions of dollars more to recover than the continuing investment ever would have cost.

# # #

Senator BOXER. Thank you.

Let me state that I am going to add myself today as a co-sponsor to the Levin bill, S. 2312. And the sponsors there include, in addition to Senator Levin, Mrs. Hutchison, Mr. Vitter, Ms. Stabenow, Mr. Shelby, Ms. Collins, Mr. Brown of Ohio, and Ms. Landrieu. This is a very bipartisan effort.

I hope that—I haven't discussed this directly with Senator Inhofe, but I am hopeful that he will agree with us that we should put that bill straight into WRDA as a title, the Harbor Maintenance Trust Fund, to ensure its use for harbor maintenance only. It just makes eminent sense. So I want you to know that that will be done today.

I also ask unanimous consent to enter into the record a letter from the California Marine Affairs and Navigation Conference on the need for increased investment in the California ports and expenditures of revenues collected in the Harbor Maintenance Trust Fund on harbor maintenance activities. And I have just a couple of questions to ask. My time should be put at about 3 minutes now.

I am very pleased to look forward to passing a WRDA bill. It is not only necessary for economic—well. I have shown photographs here of the Sacramento situation, which Mr. Verigin has described to us. So I am just going to submit a couple of questions for the record.

[The referenced letter follows:]

ORGANIZED 1956
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November 16, 2010

The Honorable Barbara Boxer
Chair,
Environment and Public Works Committee
United States Senate
Washington, District of Columbia

Dear Senator Boxer:

California's ports and harbors are grateful to you for your leadership in recognizing the need to rectify the imbalance between the collection of Harbor Maintenance Tax and the appropriation of funds to perform maintenance dredging of authorized navigation channels. It is estimated that the ending balance of the Harbor Maintenance Trust Fund (HMTF) in FY2013 will exceed Seven Billion Dollars.

Nationally, federal dredging costs, on a per yard basis, over the past decade have increased 160%. During that same time frame transfers to cover eligible maintenance from the HMTF grew 125% and the ending balance in the HMTF grew by 360%.

The last year for which we have access to both revenue and expenses by state, 2007, shows that over $410 million of Harbor Maintenance Tax was collected in California and $55.5 million was expended for maintaining federal channels.

CMANC believes authorized federal channels should be maintained to 100% of their authorized dimensions 100% of the time. Failure to do so has an impact upon the citizens, farmers, manufacturers and coastal communities of California. Additionally, the President's National Export Initiative maybe compromised by such a failure.

Shippers need to have certainty in transportation costs and recent studies by the Corps of Engineers show that there is $400+ million worth of cargo is disrupted for every foot of reduced depth of channel. These disruptions have lasting impacts on the global competitiveness of goods grown or manufactured in California.

Examples of navigation channels in California that are impacted by insufficient appropriations, while the balance of the Harbor Maintenance Trust Fund grows include:

> It is only this week that a contractor arrived to start the FY2010 maintenance dredging for the Port of Oakland. The recent deepening of the channels at the Port of Oakland was considered to be of *national significance*. Yet, the funding being provided is not adequate to maintain this crucial port in Northern California that loads and discharges more than 99% of the containerized goods in the region and is

the fourth largest container port in the nation. Shoaling in the center of one of its channels this year reduced the channel capacity by 10% and disrupted billions of dollars worth of cargo.

At the end of FY2010 bids were opened to dredge the channel leading into San Diego Harbor and place the clean sand dredged onto a local beach to provide for community resiliency to potential storm damage impacts. The low bid of five bids received exceeded the independent government estimate by 180% and the funds available, which has caused the postponement of this project to FY2012 or later. San Diego Harbor is home to over 40 ships of the U.S. Navy's Pacific Fleet and the Port of San Diego which had almost 3 million tons of cargo cross its docks and wharfs last year, as well as, being one of 16 ports in that nation that is designated a strategic port.

The inland Port of Stockton is 75 miles from the Golden Gate Bridge. Vessels get to Stockton via several federally authorized navigation channels and connecting bays and straits. Over the past dozen years it is estimated that not once have all the channels been dredged to their authorized depth due to funding constraints. The Port of Stockton is not only a major agricultural port for California's central valley with imports of fertilizer and exports for farm goods such as bagged rice, it is becoming a hub with its rail and truck corridors to Oregon, Washington, Idaho and Arizona.

These examples and numerous others in California show that there is an urgent need to spend the collected Harbor Maintenance Tax funds for their intended purpose.

We desperately need your continued leadership and action to make certain authorized federal navigation channels are maintained using the taxes collected for this critical transportation infrastructure program. Jobs in California and other western states depend on having properly maintained navigation channels.

We continue to offer you, the members of your Committee and staff our assistance in maintaining federal channels which directly provides jobs and private sector investments for the betterment of all.

Sincerely,

James M. Haussener
Executive Director

Senator BOXER. In addition to the 13 million jobs that the port industry supports and the $3.15 trillion in marine cargo-related spending, I am looking at the importance of averting a crisis. I want to talk about the levee safety program, which is another title that I intend to work with Senator Inhofe on putting in this bipartisan bill, this program to look at levee safety.

I want to ask Mr. Verigin, can you expand on the benefits we can expect for cities across the country—including Sacramento as an example—if we move forward with a WRDA bill that begins to address the recommendations of the National Committee on Levee Safety, which is my intention?

Mr. VERIGIN. Yes, thank you. The Natomas area in Sacramento is a good example and would apply to many cities across the country. It is a city that has levees that protect it that have gone from the purpose of protecting agricultural land to now a highly urbanized area. It is also an area with a system that has been subject to changing standards. Those levees weren't designed or constructed by the current standards that are required for the levee systems that protect urban areas, both in dimension, foundation, improvements, et cetera. Those design criteria continue to evolve. So a national program would standardize that type of criteria and make it uniform across the country.

It is Federal levee system that is currently being—the improvement project is being funded by State and local funds. And the implementation of this program would hopefully streamline the process where in Federal, State, and local projects could be more expediently accomplished. It would allow the State's economy to continue to grow. California is a place where the population keeps coming. They are not waiting to see if the levees are safe to protect the areas. So it is an area that has already urban areas developed behind levees. So we have to upgrade them and protect the valuable investment that we already have.

Last, it would definitely avoid the tremendous catastrophic loss that you mentioned. We are at great risk there. We have levees that are not up to 100-year standard. Most levees protecting areas of this importance would be 200- or 500-year level of protection.

Senator BOXER. Thank you, Mr. Verigin.

Before I turn to Senator Vitter, would you do me a favor? Would you send me a report that indicates how many of those levees have a Federal nexus and how many are State, local? If you could do that, that would be very helpful.

Mr. VERIGIN. Yes.

Senator BOXER. Thank you.

Senator Vitter.

Senator VITTER. Thank you, Madam Chair. Thanks to all of you again for great testimony.

Mr. Woodruff, I wanted to ask you a couple of things about the Inland Waterways' proposal. The costs of these projects and this maintenance has been going through the roof. One way this proposal would obviously control that is by not allowing projects to languish forever, over decades, over which obviously costs go up and up and up.

But apart from that time factor, are there other specific ways the proposal controls costs under Corps projects? I can tell you my ex-

perience in Louisiana, it is mostly on the flood and hurricane protection side; is that the same work up to the same standards overseen and done through the Corps process is much more expensive than overseen and done by State or local government. So there are other factors there besides time. How can we try to attack those other factors?

Mr. WOODRUFF. The plan includes a number of things that we can do. Better planning, having a better understanding of what the project scope is, what the geotechnical requirements are before we come to Congress and seek authorization for a project, so that when we bring that project to you it will have a very high confidence level that the project can be brought in for the amount of money that you authorize that it be built for.

There is project delivery improvements—some of which are already underway—to standardize some of the design features of locks and dams, to have centers of expertise that will allow us to develop some synergy and save money in terms of not having a lock designed in one place have components that are different than locks designed in another place. Modularity of design will also save money. Smoothing out the funding will have a great effect in terms of allowing those projects to be built at the most efficient way possible. To give an example would be the project on the East Bank, which has been done very quickly, on time and on budget. The money was there for it to be done, and as a consequence, it was done.

Those are some of the things that we think can be done to ensure that these projects will cost the Nation less in the future. They must cost the Nation less in the future.

Senator VITTER. OK. On both sets of fund proposals, the Corps has obviously been involved in the discussions. Can we expect the Corps/Administration to take an affirmative position in support of these proposals, and when will that happen?

Mr. WOODRUFF. Well, from my perspective, the Users Board presented this to the Administration back in April, and we are still waiting to learn their position on it. We are eager to hear what that position will be. We think this is a sound plan that needs to move forward. Because we can't start gaining the benefits that are there to be gained until we do so.

Senator VITTER. Do you realistically expect the Corps/Administration to take an affirmative position in support of it?

Mr. WOODRUFF. I would certainly hope so. We worked very long and very hard with a lot of experts in the Corps to develop this plan. We think it is sound. We think it is the right path forward for the Nation.

Senator VITTER. Mr. Weakley, what about the Harbor Maintenance Trust Fund?

Mr. WEAKLEY. Senator, my experience will be the Corps will do what the Administration tell it to do publicly. I would hope they would affirmatively support this. The Corps can only do what they are given money to do. So I think, candidly, with the AIR–21 experience, their top line would increase. I don't see how the Corps could oppose it. I am not sure, once you get to the OMB level and above, whether the Administration would support this.

Certainly, as you pointed out, sir, it is a fairness issue. I think also Senator Inhofe considered it a moral issue. If you are going to collect money for a reason, you ought to spend it on that reason.

Senator VITTER. Right. I would encourage all of us to push the Corps and the Administration, and you are right, the ultimate decision will be made above the level of the Corps, to affirmatively support the proposals. Because it is a very common, frustrating experience of mine to work with the Corps on all sorts of language, and then when it comes to legislating, they are either nowhere to be seen or actively opposing the proposal with the key committee chairs or subcommittee chairs or whatever.

So I think it is reasonable for us to ask them for a direct public position, hopefully in support of the proposals.

Mr. WEAKLEY. Yes, Senator. I would agree.

Senator VITTER. And if I could just have one more, Madam Chair, for Mr. Verigin.

Representing Louisiana, I am obviously all for levee safety. And clearly, certain standards have to be raised. But since Katrina I have also had the following experience, which is in some cases the Corps and others have proposed the perfect, and it has been the enemy of the good. In a sense, from the bureaucracy's perspective, from the Corps' perspective, the safest levee is the one that is never built. They almost in some cases have an interest in having standards so demanding and so perfect that lots of levees are never built. And the one levee that can never breach is the one that is never built.

I am just wondering how we balance these interests, because I have experienced that as a real problem post-Katrina.

Mr. VERIGIN. Yes, that is a balance that we struggle with all the time. I think we have to realize that these levees have evolved over 70 to 100 years. So while if today we could decide not to build or build out of the flood plain or setback or do many of the things that would keep people out of harm's way, that would be a wonderful thing to do. But that is not the situation that we are in. We have highly urbanized areas with levees protecting them.

So we have to take measures to get those up to standards that are going to protect people. And that, too, has to be done, in my opinion, in balance over time. We can't afford to do everything we want to do right away. So we need to identify—and it is advocated through assessing our highest risks—where we need to improve things, how far we can go and to actually develop a plan that is going to take decades to move us from where we are today to where we want to be.

Senator VITTER. And I just note that part of that is in that transition. In the meantime, I don't think it is fair to take the current FEMA and Corps position that a levee system that is a meaningful system but doesn't match the new 100-year whatever requirements are treated as if it doesn't exist for purposes of flood insurance.

Mr. VERIGIN. Yes, that has been a singing to the choir problem that has caused communities to struggle across the Nation, and I think will continue to do so. But I think that the answer to that is to improve things with time.

Senator VITTER. Thank you, Madam Chair.

Mr. ROTH. May I add something to Mr. Verigin's comments?

Senator BOXER. Yes.

Mr. ROTH. I think this issue of risk is extremely important.

Senator Boxer, I would like to just relate a personal experience.

Senator BOXER. Sure.

Mr. ROTH. I have been here in the Washington, DC, area for the past decade with the American Society of Civil Engineers. I am moving back to California. And in this case, well, I am actually there now. But in the process of moving back to California, my family and I purchased a home in California and went through the process, knowing that it is one of the more flood risk-prone cities in the United States.

Senator BOXER. Sacramento?

Mr. ROTH. Sacramento. Knowing full well that we wanted to avoid that as much as possible in the purchase of our own home. It is exceedingly difficult, particularly for an uninformed buyer, to find out what that level of risk might be for property that they are going to sink essentially their life savings into.

I think it is extremely important for us to look at not only the levee safety issues and to provide the levels of protection, but to communicate them extremely clearly to the public. Because Senator Vitter, often the public is not informed that they are living behind a levee that may be substandard, that may not be able to protect them from a 100-year flood. And a substantial portion of their life's savings are being put at risk.

The alternative is perhaps flood insurance. It may be a difficult pill to swallow, but maybe that is the right way to go. So we really must take a holistic approach to this. We have to provide a level of safety for people. But we then absolutely must communicate to them what that level of risk that they may be accepting is or is not.

Senator VITTER. And Madam Chair, let me just say quickly, I don't disagree with any of that. What I disagree with is that the flood insurance program, acting as if a system which may be below, say, a 100-year level, doesn't exist. The current policy is to treat that as if there is nothing there. Clearly, there is something there that offers some mitigation.

Senator BOXER. That is true of our flood insurance, isn't it, that it only address the 100-year.

Senator VITTER. Right.

Senator BOXER. Senator Merkley.

Senator MERKLEY. Thank you very much, Madam Chair, and thank you all for your testimony today to highlight the importance of these projects. Along Oregon's coast, there are along 20 ports that provide employment, and they are part of a global supply chain and important sources of recreation and wildlife habitat. And of course these ports need consistent maintenance and repair schedules.

By the Corps' own data, Oregon has nearly 200 communities and 24 counties with levees that will need recertification. I can hardly go to a town hall and not have someone speak about the challenges to the community from the recertification process, the changes therein, particularly on communities of modest size facing extraordinary expenses under the changes in recertification process.

Mr. Woodruff, I wanted to ask you about the inland marine transportation system capital investment strategy team's proposal.

How would you prioritize the annual investment across the inland water system of the U.S.? The highest needs may not be in communities that can afford a match. How do you tackle that problem?

Mr. WOODRUFF. The match in this case comes from the fuel taxes paid by the industry across the entire system. So the communities wouldn't be asked for a match. What we look at is the system as a national whole, and we prioritize on the basis of the risk of failure and the economic impact that would be associated with it. Then we use the resources of the Inland Waterway Trust Fund collected across the entirety of the system to address those needs.

Senator MERKLEY. Can you give us a sense of how the jobs created per dollar of investment compare to other investments around the country?

Mr. WOODRUFF. I don't know that I can necessarily give you a comparison. But I think it is important to recognize that we are not just looking at the jobs we create by building and maintaining the infrastructure, but the jobs that we sustain and maintain through the low cost transportation opportunities that the system provides to us. For example, in the case of agriculture we have competitors in South America. The price that the Chinese or other consumers want to pay is the price delivered to their doorstep. Our inland waterway system allows us to provide the lowest cost delivered to our customers, and therefore that sustains not just the jobs building and maintaining locks but the farmers and all those who support the farmers.

Senator MERKLEY. And with substantial energy savings as well.

Mr. WOODRUFF. Absolutely.

Senator MERKLEY. Which is a big plus.

Mr. Weakley, your testimony highlighted the Harbor Maintenance Trust Fund surplus, and the HMTF collected $1.3 billion in 2009. Yet only $808 million was reimbursed through regular appropriations. Presumably, that leaves a surplus in excess of $1 billion for harbor maintenance.

What are the current backlogs in harbor and port maintenance across the U.S.? And if all the revenues collected were spent, how much of an impact would it make on that backlog?

Mr. WEAKLEY. Senator, it would basically double the amount of money spent on an annual basis. Two thousand-nine was a robust year. Annually, they spend about half of what they take in. On a national basis, I don't know the number. I can tell you from a Great Lakes perspective the current backlog is about 17 million cubic yards. It would take about $200 million to clear that.

And remember, that just gets us back to what they call functional dimensions, not authorized dimensions. You could probably double that number. And I think the gentleman sitting to my right nailed it; it is about efficiency. We save the American consumer just within the Great Lakes navigation system $3.6 billion. Should the American consumer be asked to pay $3.6 billion more to get nothing other than what they are already getting, efficient transportation?

Senator MERKLEY. So it sounds like you would recommend spending that surplus to tackle these needed repairs, maintenance, efficiencies, and thereby we would also be creating jobs during this difficult period.

Mr. WEAKLEY. Absolutely, Senator. And it is a nationwide problem. All four of our coasts need dredging. Oakland in particular I know is in need of maintenance dredging. As ports get deepened, that increase goes up. But on the Great Lakes we are not talking about deepening anything. We are talking about taking a two-lane highway and restoring the four lanes of usage.

Senator MERKLEY. Thank you.

Madam Chair, is it appropriate for me to ask one more question?

Senator BOXER. You can, in fact, because we still have time, yes.

Senator MERKLEY. Mr. Roth, I want to turn to the issue of the levee certifications. First, just note that the change in law with the Corps no longer taking on those certifications, has imposed extraordinary stress on numerous communities in Oregon. I am certainly not satisfied that we have a strategy to address those recertifications. The situation now is such that there is a sense of paralysis on the ground, trapped between the requirement to decertify and the absence of a financial strategy to be able to do so. How do we tackle this?

Mr. ROTH. This is certainly a very complex problem, and extends well beyond, in many cases, just the amount of money that might be required to evaluate a levee system and provide a certification for as required under the NFIP. Certification is also an extremely loaded word in the consulting engineering community. For a professional engineer to certify a levee, it may be interpreted that that engineer is also essentially providing a guarantee that the levee is going to perform, and in many cases perform in excess of what it otherwise might be expected to have performed in the event that a disaster has occurred.

I would certainly suggest we have to take a hard look at that. We need to look at whether the certification process is the right way to go about evaluating the safety of a levee system for a particular community. We need to include, as I mentioned before, a comprehensive communication program so that people know and understand the risk that they may be accepting, that they may be living with—and in many cases have lived with for a long time—not knowing what their level of risk truly was.

And we should be looking at it very comprehensively. In many cases it may be wiser to use other kinds of flood reduction systems besides structural systems, such as levees. I would ask if my colleague, Mr. Verigin, might want to add to that.

Mr. VERIGIN. Certainly. Certification was designed to be an activity with respect to flood insurance, not level of levee protection. So the Corps is doing it or not doing it for non-Federal levees is the development I believe that you are talking about.

So the way that I have seen it work in the States in the west that I have been involved with is that where the Corps is no longer doing the engineering studies to provide the certification for non-Federal levees, the communities or the agency has solicited on their own for A&E firms, or with their own forces, to do the work for certification. And so the culminating point of certification is either that you have or you do not meet the requirements for 100-year level of protection. Then that affects the amount of the premium that the homeowner would have to pay behind the levee. It also carries with it some building restrictions if you don't have a

100-year level of protection. This current work that we have done with the committee has been more toward, as Larry mentioned, in the direction of informing people of the level of risk they have irrespective of where they are within that insurance continuum.

Senator MERKLEY. What I hear repeatedly from communities back home is that the Corps was able to provide this engineering certification far more cheaply, efficiently, and they are being forced into a far higher cost of solutions. Should we shift this responsibility back to the Corps?

Mr. VERIGIN. Actually, the Corps in the certification process, they do say that you can hire them to do that certification if a community chooses to do that. I would comment that they have recently—it was a technical letter which I think has gone on to an engineering, an EC, I forget what the nomenclature stands for, but a standard approach that some of their technical evaluations for certification have become—have raised the standard a bit. So it may or may not be something that a community would wish to pursue.

Senator MERKLEY. Mr. Roth.

Mr. ROTH. I don't think it is necessarily something that should be shifted back to the Corps. First of all, it is, as you noted, a very large problem affecting a large number of communities. I think the recommendations that have been put forth by the National Levee Safety Committee, if many of those are implemented, that would provide an appropriate road map for us to follow. Then the work can be done by both the private sector and the Corps to achieve the needs of these communities that are being protected by levee systems.

Senator MERKLEY. Thank you.

Thank you, Madam Chair.

Senator BOXER. Thank you very much.

I would ask unanimous consent to place in the record testimony from the Association of State Dam Safety Officials and the American Shore and Beach Preservation Association, who gave us their views on issues related to the next WRDA bill. Without objection, we will put that in the record.

[The referenced information follows:]

Testimony of

The Association of State Dam Safety Officials

Before The

Senate Committee on Environment and Public Works

On

The Water Resources Development Act of 2010:

Legislative and Policy Proposals to Benefit the Economy, Create Jobs,

Protect Public Safety and Maintain America's Water Resources

Infrastructure

November 17, 2010

Madame Chairwoman, Senator Inhofe, and Members of the Committee:

The Association of State Dam Safety Officials (ASDSO) is pleased to provide this statement for the record on The Water Resources Development Act of 2010.

ASDSO is a national non-profit organization of more than 3,000 state, federal and local dam safety professionals and private sector individuals dedicated to improving dam and levee safety through research, education and communications. We represent the dam safety programs of the states and our goal simply is to save lives, prevent damage to property and to maintain the benefits of dams by preventing dam failures. ASDSO has traditionally focused its attention on improving dam safety yet has broadened that focus to include levee safety. Levees are designed similarly to dams and act as flood control structures in much the same way as many dams. The practice of levee safety and the focus on the public safety aspect of levee safety is of vital importance to ASDSO and our members.

Dams and levees are a critical part of the nation's infrastructure. Dams provide vital benefits such as water supply, hydropower, irrigation and recreation and coupled with levees provide flood reduction benefits to millions of people in the United States. Yet these dams and levees have the potential for failure and tragic consequences. As development adjacent to levees and downstream of dams increases and levees and dams continue to age and deteriorate, they demand greater attention and investment to assure their safety.

The state dam safety programs regulate 86% percent of the 83,000 dams in the National Inventory of Dams. With the exception of Alabama, all states, plus Puerto Rico, have in place regulatory programs overseeing the safety of dams. About half of these same programs have some sort of responsibility of levee safety, but most are unable to

effectively regulate levees due to lack of staffing and resources and clear national and state policy. Many states do not have laws on the books creating levee safety regulatory programs. The states and these programs look to Congress and the Federal government for their continuing leadership and support toward strong levee and dam safety programs.

The Association of State Dam Safety Officials respectfully requests that this committee recognize the enormous value of our nation's levees and dams and the increasing concerns for public safety because of levees and dams. We request that the committee implement the recommendations of the National Committee on Levee Safety (NCLS) that are appropriate to include in a WRDA bill including the establishment of a National Levee Safety Program and the coordination of the existing National Dam Safety Program with the new National Levee Safety Program. We further request that the committee act on the National Dam Rehabilitation and Repair bill.

The Future of a National Levee Safety Program

ASDSO agrees with the assessment of the NCLS that, "The current levee safety reality for the United States is stark— [there is] uncertainty in location, performance and condition of levees and a lack of oversight, technical standards, and effective communication of risks." ASDSO further echoes the committee's recommendation for "reasonable actions and investments in a National Levee Safety Program that turns the tide on risk growth," and recognizes and supports the "need for a broader national flood risk management approach."

The ASDSO Board of Directors has endorsed all of the recommendations of the NCLS and asks the committee to implement the recommendations of the NCLS that are appropriate to a WRDA bill. ASDSO supports the protection of the public by repairing or removing existing deficient levees as soon as possible. Toward that end, ASDSO sees the following NCLS recommendations as the most crucial.

- Conduct an inventory and evaluation of the nation's levees
- Develop national levee safety guidelines including tolerable risk guidelines and a hazard potential classification system
- Establish the National Levee Safety Program
- Delegate and give assistance for the National Levee Safety Program to States and Tribes
- Establish a levee rehabilitation and assistance funding program

Coordination of the National Levee Safety Program and the National Dam Safety Program

There are significant benefits of coordinating the national dam safety and levee safety programs. Recognizing that levee safety and dam safety are critical to public safety and the environment, and that levees and dams share many aspects of design, construction,

maintenance, hazard potential, emergency action planning and security, ASDSO respectfully suggests that dam safety and levee safety be managed by one coordinated combined nation-wide program to be fully successful. As stated in the NCLS report, "Commonalities between levee safety and dam safety are many. In order to maximize efficiencies at all levels of government, build upon existing state expertise and provide consistent messages related to multi-hazard risk to the public, all opportunities to integrate the two should be explored." Many of the state dam safety programs represented by ASDSO also have some responsibility for levee safety, and we anticipate that many more will ultimately become crucial pieces of the levee safety partnership under the auspices of a National Levee Safety Program, especially if combined with a National Dam Safety Program.

WRDA 2010 should combine administration of the existing National Dam Safety Program and the new National Levee Safety Program.

- As part of this effort and recognizing the current differences in the history of regulation, which separates how dams and levees will be regulated in the foreseeable future, WRDA should create a new strategic plan for the National Dam Safety Program to construct efficiencies and to correct deficiencies. But, the new plan shall not create a program where all dams are federally regulated nor required to meet a national safety code through this national program.
- WRDA 2010 should create the National Levee Safety Program, which will apply to all federal, tribal, state, local, regional and private levees within the United States and its territories.
- WRDA 2010 should create a national program for dams and levees that employs sound technical guidance in design, construction, operation, inspection, assessment, security, and maintenance; ensures effective public education and awareness of risks; and, establishes and maintains competent safety programs and procedures that emphasize the protection of human life.
- WRDA 2010 should help to build and sustain strong dam and levee safety programs in all states. The cornerstone of an effective National Dam and Levee Safety Program will be effective state programs following a consistent set of national safety guidelines for dams and standards for levees.

The Dam Rehabilitation and Repair Act

ASDSO requests that the committee add the Dam Rehabilitation and Repair Act (H.R. 1770 and S. 732) as a separate title of WRDA 2010. As stated above, dams provide many advantages to our society. However, they present a potential hazard to people and property downstream as dams can fail catastrophically causing loss of life and millions of dollars in property damage if they do not meet current design standards. One of the main issues that raise the risk for dam failure is the fact that many dams have not been rehabilitated to current standards in decades, and owners do not have the funds to bring these structures up to standards. While owners may be able to provide operation and maintenance support, the funding needed for rehabilitation may be unreachable.

To help address this need, particularly for the most critical, high hazard potential dams, the dam safety community advocates a federally-backed, cost-shared funding source for dam rehabilitation, and where appropriate, removal. The Dam Rehabilitation and Repair Act was introduced in Congress to provide this type of funding assistance ($200 million over five years) for publically-owned high-hazard potential dams. Of the 83,000 plus dams in the National Inventory of Dams, 27% are publicly owned (state, public utility, local government). ASDSO's January 2009 report entitled, "The Cost of Rehabilitating Our Nation's Dams," estimated that $8.7 billion would be needed over the next 12 years to repair publicly owned high-hazard dams.

The bill was originally introduced in the 110th Congress, gained sponsors on both sides of Congress and was passed out of the House of Representatives in 2008. The session ended while the bill was still circulating through the Senate. The bill was re-introduced in the 111th Congress and has sponsors in both the House and Senate.

The Association stands ready to assist the Subcommittee and staff in any way to advance the cause of levee and dam safety. Toward that goal, please contact ASDSO Executive Director, Lori Spragens at 859-257-5140 if we can support the Subcommittee's important work.

Respectfully submitted,

The Association of State Dam Safety Officials

The American Shore & Beach Preservation Association asbpa
Protecting our coastal economy and ecology since 1926

Testimony of the American Shore & Beach Preservation Association
On the Water Resources Development Act of 2010
Senate Committee on Environment and Public Works
November 17, 2010

A. Introduction

The American Shore & Beach Preservation Association is dedicated to advocating for those policies that benefit the communities and resources of coastal America. We do not support or oppose specific water resources projects. However, we do advocate for policies that recognize the importance of water resources to America. What happens along our coasts is inextricably linked to the health and welfare of all 50 states.

The growing backlog of navigation and flood protection work increases the vulnerability of the nation each year. We compel Congress to look closely at the way in which water resources projects have been identified and funded traditionally and determine improvements that will better protect the nation's water resources. We urge you to work closely with the many agencies, NGOs and others who regularly work on these issues to assist in identifying a better way to do the nation's business.

For the past several years, ASBPA has been a fervent advocate of planning and managing water resources projects on a regional basis. Along the coast, there are channel dredging projects that impact adjacent beaches as well as environmental resources. To date, these projects have been planned, managed and funded by Congress individually.

Section 2037 of WRDA 2007 made a major step in the right direction by providing the Corps of Engineers with a regional sediment management authority to accomplish the objectives of coordinating projects and their impacts. However, it is severely limited in that it only applies (a) where there is a Federal navigation project, and (b) where there is sufficient sand available from the dredging of that project to meet the regional water resource planning and management needs. This restriction hamstrings non-Federal interests and the Corps in making sure the multiple purposes of reducing coastal hazards, using adaptive management for existing projects, coordinating new and existing water resource projects to save significant taxpayer costs, and assuring that the impacts of planned or existing projects have a beneficial, rather than a harmful, impact on environmental resources. The restriction contained in Section 2037 also limits

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affected stakeholders from having input in the planning and management of Federal water resource projects.

ASBPA has proposed language for the next WRDA legislation that would correct these problems. We urge the Committee to support these changes.

B. Additional WRDA 2007 Issues

There are a few other issues related to WRDA 2007 and its implementation which we would like to bring to the Committee's attention.

Section 2038: National Shoreline Erosion Control Development Program
This program was established by Section 227 of WRDA 1992. It is designed to test new technologies that will improve and/or reduce the cost of Federal beach restoration projects. There are testing sites in Cape May Point, NJ; Ventura, CA; Miami-Dade County, FL; Hawaii; Jefferson County, TX; two in Great Lakes states; and two more in California.

Section 2038 makes improvements to this program but also moves it under the Section 103 Continuing Authorities Program for small shoreline protection projects. While ASBPA has issues with that decision, the more pressing issue is the lack of implementation guidance for Section 2038. The old Section 227 program apparently remains in force until the guidance is adopted by the Corps. This leaves both the Corps' Coastal Hydraulics Laboratory, which administers the program, local project sponsors, and firms that wish to bid in the peer-reviewed competitive process for designs of new technology in limbo. The changes made in Section 2038 were designed to make this program more attractive to Federal taxpayers and local sponsors. However, they do not exist in actuality. We urge the Committee to take appropriate action to assure that the lack of Section 2038 implementation guidance does not stall this critical program.

Section 2033(e): Centers of Planning Expertise
The Corps established, via an internal direction in 2003, six Centers of Planning Expertise that were intended to provide specialized talent to enhance and supplement the capabilities of districts. Since 2006, local sponsors and Corps Districts have made extensive use of the National Planning Center for Coastal & Storm Damage based in the North Atlantic Division.

Just as the other Centers, what we refer to as the Coastal PCX operates as a virtual center with a "staff" composed of a few top experts in that Division who can call on the expertise of other specialists in Divisions, Districts, and other offices and centers of the Corps throughout the nation. This is critical given the fact that not every Corps district located along the coast can have the staff time or the expertise to conduct all aspects of feasibility studies in a manner that meets the standards required by WRDA 2007 and internal Corps directives that preceded that legislation.

As important as these Centers are, they operate without a budget. The Coastal PCX uses Division funds as well as small amounts from the feasibility studies for which their help is called just to meet travel expenses. The lack of funding also means that the PCX is unable in most

cases to use District experts because their personnel are paid out of the studies being conducted by that District.

We were pleased when Section 2033(e) of WRDA 2007 provided legislative authorization for the Centers of Expertise. Unfortunately, the only "implementation guidance" for this provision was a March 12, 2009 letter from the Assistant Secretary of the Army for Civil Works (ASA(CW)) to the Deputy Commanding General for Civil and Emergency Operations requesting an "update briefing on how each of the Centers is currently operating and an assessment of their capabilities, needed improvements, and further funding requirements."

This lack of effort is symptomatic by Corps leadership to understand the need for these Centers of Expertise. For at least the Coastal PCX, it is a need that goes far beyond their role in the prescribed internal review process. Feasibility studies for beach projects take a minimum of 10 years before internal, let alone, external reviews. The Coastal PCX has been involved in studies ranging to Massachusetts to North Carolina and onto Louisiana, Texas and California. Without their active assistance, the time and cost of repairing mistakes that could have been avoided is daunting to local sponsors at best and a deal-killer at worst.

Unfortunately, not only is Corps Headquarters not fully aware of the role of the Coastal PCX, but Corps Districts are extremely reluctant to ask for their assistance. Local study sponsors also need to know that they can request the assistance of the PCX. The process for explaining to the Divisions and Districts the role of these Centers, the reward they will get when they ask for assistance and the means by which they and/or the local sponsors can make that request should be the meat of the Section 2033(e) implementation guidance, not a letter from the ASA(CW) asking for an update on the Centers.

C. Other Priority Recommendations for WRDA 2010

For the past 15 years, ASBPA has fought Administration policies that have reduced or excluded beach nourishment projects from the President's budget. These policies have led to a situation where Members of Congress make requests to add funding for projects in their states and districts based on requests from their constituents. While there is a process in place to assure that these requests are with the "capability" of the Corps of Engineers, there is no process in existence that enables the Corps to provide Congress with information that would prioritize beach nourishment projects based on factors such as public safety, seal level rise, environmental resources, etc.

ASBPA urges the inclusion of language for the next WRDA legislation that would mandate a report from the Corps that recommends a science-based method of prioritizing beach nourishment projects. The data to do this is readily available to the Corps. However, the Office of Management and Budget will prevent them from providing the information to Congress unless mandated to do so in the next WRDA.

Just over 400 of America's over 84,000 miles of coastline are part of beach restoration and nourishment efforts that are partially-funded by the Federal government. Each federally-funded project brings storm damage reduction, environmental, economic, and public safety benefits. To

plan, "construct", manage and maintain each of these projects on a one-by-one basis is wrong. ASBPA believes that responsible coastal stewardship requires a "Big Picture" view and regional approaches that are implemented at the State and local levels.

Increasing coastal erosion and sea level rise, coupled with periods of East and Gulf Coast hurricanes, West Coast El Nino's, and the rise and fall of the levels of the Great Lakes are reason enough for Congress to take the lead in bringing the stakeholders concerned about the welfare of the Coast together, not just for a meeting, but for a mission to recommend to Congress and the Corps of Engineers the policies that will bring about a national commitment to coastal health. This nation rightly is concerned about the health of our oceans. Since oceans reach our coastal shoreline, dealing with the health of oceans without a parallel effort to deal with the health of our coastal shorelines is harmful to both.

The Corps' planning process is increasingly bogged down in unnecessary internal rules and procedures. This means that studies take far more time and money than they did just a few years ago. Regrettably, all that additional time and money does not result in a project that is more effective. Our observations do not reflect our view of the review processes that Congress and the Corps have adopted since WRDA 2007. Those processes need to be given more time before we can come to any conclusions. We certainly do not recommend that the project review provisions of WRDA 2007 be expanded in any way in the next WRDA bill.

The excessive expenditure of time and money caused by the Corps' planning is undermining the Federal coastal program. Studies that take 10, 15 or more years to reach the final review stage test the fortitude of local sponsors. They come to the Federal government looking for both the expertise and the funding they need. What they find is a process whose frustration must be endured because of the money local sponsors commit before they realize they are in for much more than they bargained for.

Beyond the Corps processes is the problem of the Corps' coastal planning expertise. That agency is losing experienced planners to retirement. At the same time, younger employees find they have a more stable future in the private sector. Congress is simply not providing adequate or consistent study funding which in turn means that District commanders cannot seek and retain the staff they need to meet non-military coastal needs.

Those local sponsors who have Federal nourishment projects in place now face an even more frustrating problem. Congress has in WRDA committed to a 50-year period of shared cost maintenance of the project. The local funds are there, even in these times of fiscal constraint. The Federal funds are not. There are projects awaiting Federal periodic nourishment appropriations from as long ago as 2006. These projects are time bombs. What benefits they continue to offer can be wiped out in a strong storm. If that happens, the Federal government will provide the disaster funding to repair the damages to property that would have cost far less to prevent. And if that happens, there will be a cost to public safety and environmental degradation that no FEMA program can reimburse.

ASBPA urges that the next WRDA address as many of these issues as possible and pledges to work with this Committee to achieve that objective.

Senator BOXER. I also just wanted to thank you, Senator Merkley, for coming. Before you arrived—I am just very optimistic that we can get this done. Senator Inhofe and Senator Vitter I felt were very positive on this, and Senator Cardin, you. I am feeling good about this. At a time when people say, can we work together, there are areas where we can work together. WRDA is a classic case in point.

Very few bills historically that passed the Senate and the House and went to the President and were vetoed were overridden. WRDA was one of those bills that Senator Inhofe and I teamed up to override a George W. Bush veto. We did it because this is such an important program. It is important because as was so pointedly stated by Mr. Roth, as he confronts buying a home, being concerned, we need to address flooding. We need to address the movement of cargo. We need to address safety; we need to address the economy. And all that is done in WRDA.

I think that this S. 3213, which restores that trust fund for its stated purpose, is a very good thing to pull both sides together. I think most of us agree—I haven't checked with everybody, but I think most of us agree—trust funds should be, as Mr. Weakley said eloquently, for the purpose for which they were intended. That is why we set them up.

And if we raid trust funds it is not fair to the people who have paid the fee into the fund. So I think that is going to be a very central piece of our bill, and also levee safety, which all of you have spoken so eloquently, particularly Mr. Verigin and Mr. Roth.

So I am—at a time when people are pessimistic that things can get done, I am optimistic that we can get a WRDA bill done. I am optimistic, from what I have heard from colleagues on both sides. So I want to thank this panel. You have been terrific, very direct, very clear. We really appreciate your testimony today.

The vote has started, so we will now stand adjourned. Thank you.

Let the record show that it is Senator Inhofe's birthday and Bettina Poirier's birthday, as well. That is why they are such good friends, born on the same day.

[Laughter.]

[Whereupon, at 11:07 a.m., the hearing was concluded.]

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