



**Testimony of Leslie F. Harder, Jr., P.E., G.E., PhD.
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HDR, Inc.
Before the House Committee on Transportation and
Infrastructure,
Subcommittee on Water Resources and Environment
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Summary

The National Committee on Levee Safety was formed in October 2008 as part of a directive by Congress in the Water Resources Development Act of 2007. The Committee developed twenty recommendations for a National Levee Safety Program and submitted them in a draft report on January 15, 2009. The recommendations are contained in three major categories:

- Providing Comprehensive and Consistent National Leadership
- Building and Sustaining Strong Levee Safety Programs in All States
- Aligning Existing Federal Programs

On behalf of the American Council of Engineering Companies (ACEC), I strongly urge you to consider legislation to establish the recommended National Levee Safety Program and act on implementing the recommendations contained in the National Committee on Levee Safety's draft report to Congress.

Introduction

Chairwoman Johnson, Ranking Member Boozman, and Members of the Subcommittee,

I appreciate the opportunity to testify before you today about the importance of a National Levee Safety Program to other aspects of our nation's infrastructure, as well as to the economy and the public as a whole. In addition, I will address eight individual recommendations to enhance the program's performance and results.

My name is Les Harder, and I serve as a Senior Water Resources Technical Advisor for HDR, Inc., a national employee-owned architectural, engineering and consulting firm. HDR has nearly 7,500 professionals in 165 locations worldwide. All of them are committed to helping clients manage complex projects and make sound decisions.

I am also an active member of the American Council of Engineering Companies (ACEC); the voice of America's engineering industry. ACEC's almost 6,000 member firms employ more than 500,000 engineers, architects, land surveyors, and other professionals, responsible for more than \$500 billion of private and public works annually. I currently serve on ACEC's Federal Agencies Committee and the Levee Program Working Group, which develops Council positions on legislation and promotes infrastructure issues before Congress, executive agencies, and states.

I have extensive levee engineering experience, have served on numerous state-federal committees on levee seepage design criteria, and was a member of the National Science

Foundation team sent to New Orleans to examine the performance of levees following Hurricanes Katrina and Rita. I have also served on the reconnaissance investigations of the performance of levees following the 2008 Midwest Flood and the 2008 Hurricane Gustav events. I previously served as the Deputy Director for Public Safety and the Chiefs of the Divisions of Engineering and Flood Management for the California Department of Water Resources. I currently serve as the Chair for the Board of Senior Consultants for the Natomas (California) Levee Improvement Program. In October 2008, I was appointed by the Assistant Secretary of the Army to serve as a Private Sector Representative on the National Committee on Levee Safety.

The efforts of the National Committee on Levee Safety (hereafter, the Committee) represent the finest 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 to develop recommendations to improve the safety of the nation's levees. On January 15, 2009 the Committee submitted a draft report containing twenty recommendations for a National Levee Safety Program. On behalf of myself and ACEC, we urge you to consider legislation to establish the recommended National Levee Safety Program and to implement the recommendations contained in the National Committee on Levee Safety draft report to Congress.

We are at a critical juncture in our nation's history – the risk to people and infrastructure is growing at an alarming rate as a result of more than 100 years of neglect to the nation's levee systems. The stark reality of our nation's levee systems, both federal and non-federal, is that they are inadequate and deteriorating, and that we lack sufficient information to predict their level of performance. These levee systems not only serve as protection from flooding for a great portion of our population and ecosystems, but also for much of our country's critical infrastructure. As recent events have shown, the impacts caused by inadequate levees that are unable to withstand ever-increasing severe weather events can have catastrophic long term impact on the public and the economy. The recommended National Levee Safety Program, potentially as part of a broader national flood risk management approach responding to the impacts from climate change (including rising water levels), must be a critical component 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-1800's, 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 any benefit from modern engineering or construction techniques. 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.

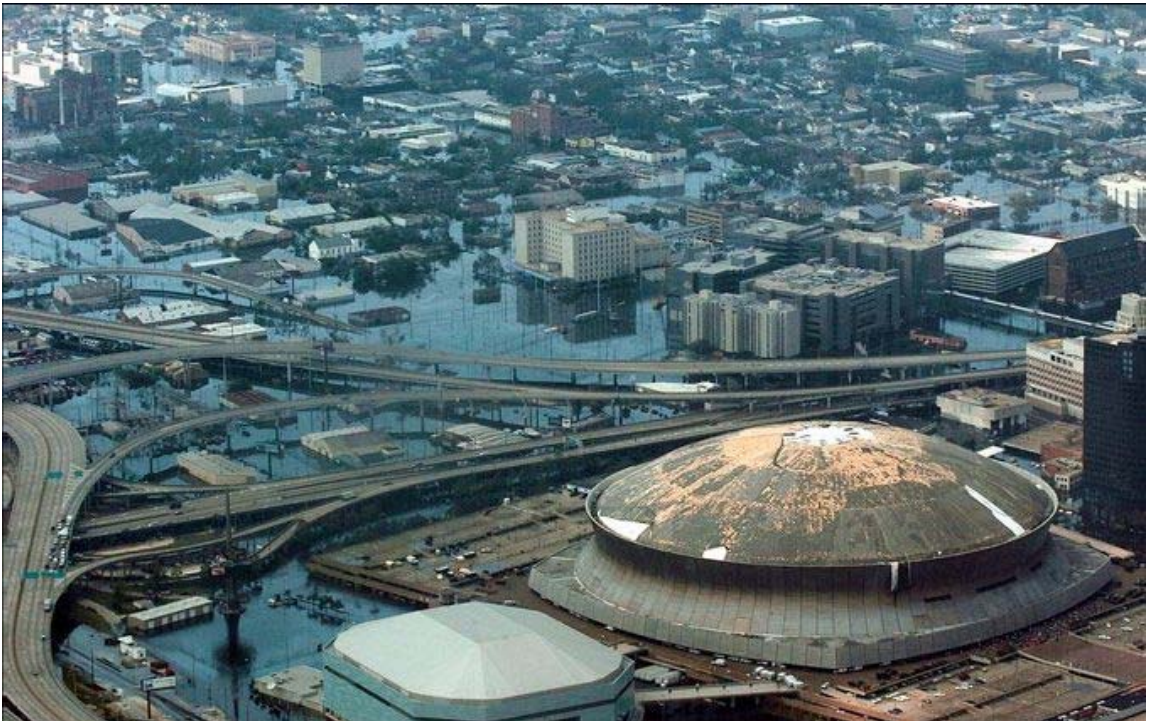


The current levee safety reality for the United States is stark:

- ✓ We do not know where all the levee systems are, what they protect or what level of performance can we expect from them. It is estimated that there are over 14,000 miles of federal levees and over 100,000 miles of non-federal levees across the nation, but we cannot be certain.
- ✓ 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. Levees protect other critical 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.



- 2005 Hurricanes Katrina and Rita – 771 people died and losses totaled \$200 billion due to levee/floodwall failures or overtopping.



- 2008 Midwest floods – Currently \$2.7 billion in federal flood relief approved to aid 2008 victims. This does not include the value of low interest loans and small business assistance as well as the value of crop insurance and private insurance.



Levees only reduce the risk of flooding – they do not eliminate the risk. In addition, in many areas, levees have often inadvertently increased flood risks by attracting residential and commercial development into the floodplain.

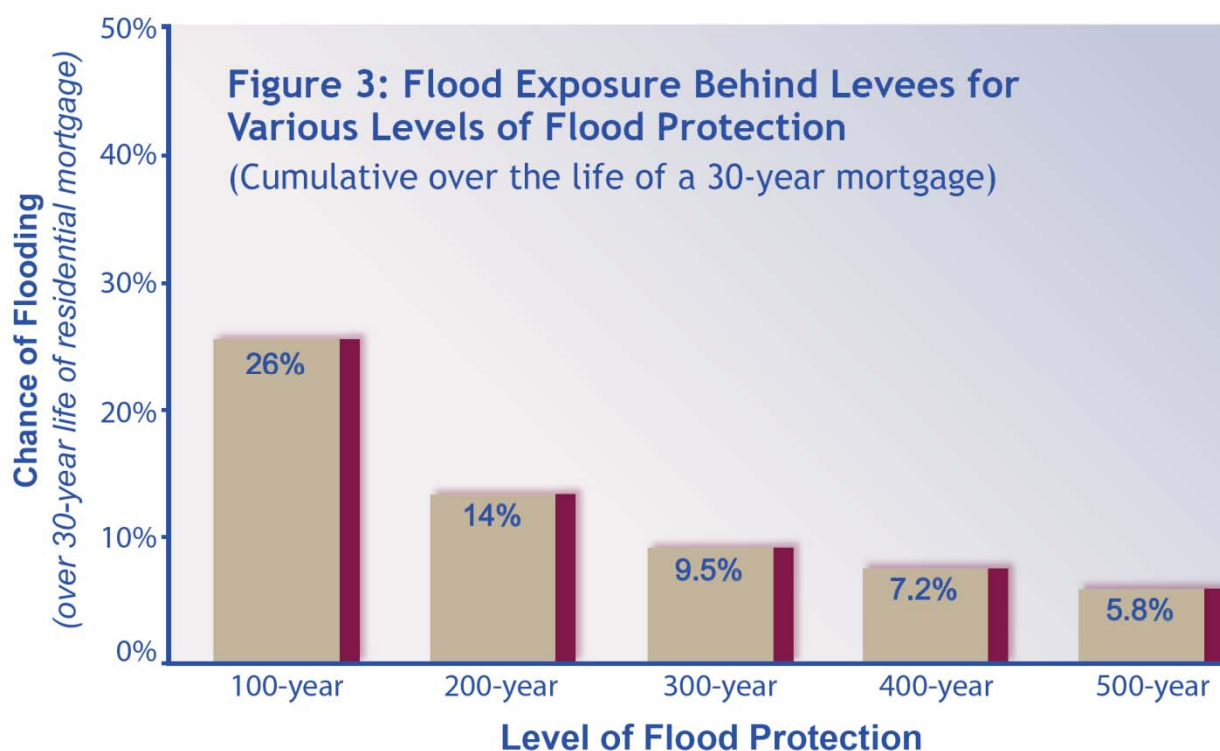
Public policies have led to unintended and detrimental consequences. The National Flood Insurance Program established the one percent annual chance (100-year) flood for actuarial insurance purposes, but this level of flood protection mistakenly is perceived as a levee safety standard, *which it is not*.

The 1986 Water Resources Development Act established new requirements for local cost-sharing of flood control projects constructed by the United States Army Corps of Engineers (hereafter, the Corps). Local communities with limited finances were unwilling to fund levels of protection beyond the minimum certification requirements, which in turn became associated with the 100-year level of protection.

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 won't occur for another 100 years. In fact, over the life of a typical

30-year mortgage, the chance of flooding with a 100-year level of flood protection is actually 26 percent, a dangerously high risk. A 200-year level of flood protection corresponds to a 14 percent chance of flooding over a 30-year period.

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 levee systems are deteriorating over time as a result of long-term settlement, flood damage, and rodent burrowing. In addition, climate change is expected to lead to more frequent and larger storm events, and this will exacerbate our current flood risks.

In recent years, liability issues have placed a terrible burden on both public entities and private engineering firms. Under current law, liability can be incurred by state and local government agencies and engineering firms that provide services for levees and other flood control structures and systems. Unlike most types of infrastructure, the reliability/capacity of levee systems is so low that many levee systems have the likelihood to fail during their design lives. As a result, many public agencies are very reluctant to take on new flood control responsibilities, and engineering firms are reluctant to provide evaluation, design, or construction services. The outcome is that the situation only worsens, putting the public further at risk.

Recommendations of the National Levee Safety Committee

The National Committee on Levee Safety developed twenty recommendations for a National Levee Safety Program and submitted them to Congress in a draft report on January 15, 2009. The recommendations are contained in three major categories:

- Providing Comprehensive and Consistent National Leadership
- Building and Sustaining Strong Levee Safety Programs in All States
- Aligning Existing Federal Programs (Incentives and Disincentives)

Under the category of **Providing Comprehensive and Consistent National Leadership**, the 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 following 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 recommendations are:

17. Explore Potential Incentives and Disincentives
18. Mandate Purchase of Risk-Base Flood Insurance in Leveed Areas
19. Augment FEMA’s Mapping Program to improve risk identification and communication
20. Align FEMA’s Community Rating System (CRS) to Reward Development of State Levee Safety Programs

The recommended program builds upon a shared responsibility. 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.



I would like to focus on eight of the twenty recommendations made in the Committee's draft report, why they are important to the overall success of a national program, and how Congress might implement them.

Develop and Adopt National Levee Safety Standards

While federal and state agencies have varying policies and criteria concerning many aspects of levee design, construction, operation, and maintenance, there are no comprehensive national levee safety policies, standards, or best practices that can be adopted broadly by government at all levels. Consequently, the level of protection and robustness of design and construction vary considerably across the country, despite the fact that floodplains often cross multiple states. The lack of national standards for levees also results in a situation in which licensed professional engineers, levee owners, and governments cannot rely on an accepted standard of care when performing critical services in the design, construction, and evaluation of levees. As a result, this increases the potential for liability for all parties involved. The nation is left in a predicament, with a wide-ranging profile of risk exposure, risk understanding, and public safety.

We endorse the Committee's recommendation that the International Code Council (ICC) be contracted to develop ***Interim National Levee Engineering Guidelines*** (including policies, procedures, standards, and criteria) for levees, canal structures, and related facilities and features within one year following the creation of the National Levee Safety Program. It is anticipated that these interim guidelines would be based in part on existing Corps policies, procedures, and criteria for levees and on U.S. Department of the Interior, Bureau of Reclamation policies, procedures and criteria for canal structures, as modified through the ICC code development process. These interim guidelines should be in place for about four years until a ***National Levee Safety Code*** is established. Federal legislation should be enacted requiring that all federal agencies and all state levee safety programs adopt the National Levee Safety Code once it

becomes available.

Develop Tolerable Risk Guidelines

In order for the nation to better understand the risks associated with living in an area served by levees and then prioritize limited resources, more sophisticated approaches are needed. Not every area or community needs the same level of flood protection. Tolerable risk guidelines can be developed to 1) better enable us to prioritize our public investment for areas where there is both a possibility for damaging consequences and a high probability of levee failure; 2) improve citizen and government knowledge and understanding regarding the benefits of flood risk reduction activities; and 3) enhance the public debate regarding the true benefits and costs of flood risk reduction alternatives. The process for carrying this out should include:

- Assembling a panel of internationally renowned experts in risk management to develop *National Tolerable Risk Guidelines for Levees and Structures Along Canals*.
- Conducting a peer review of the panel's recommendations
- Enacting new federal legislation requiring states to incorporate the guidelines

Mandate Purchase of Risk-Based Flood Insurance in Areas Protected by Levees

Flood insurance is one of the most effective ways to limit financial damages in the case of flooding and to speed recovery of flood damaged communities. It is also a mechanism that can reduce the liability exposure of public and private entities. Currently, many people who live in areas served by levees do not purchase flood insurance because they believe they are protected. Mandatory flood insurance requires individuals living within a floodplain to take individual responsibility and become part of the overall solution.

Even in areas served by well-engineered levees, mandatory flood insurance will increase the risk awareness and emergency preparedness of the public. Because premiums would be risk-based (the higher the flood protection available the lower the rates), communities would be motivated to help improve their levees beyond the current one percent annual chance (100-year) level of flood protection. A similar proposal was contained in legislation proposed in the previous Congress (H.R. 3121).

Design and Delegate Program Responsibilities to States

The National Levee Safety Act of 2007 clearly indicated Congress' intent that state levee safety programs be established and implemented to better manage the critical life safety infrastructure associated with non-federal levees. Because states already have the lead role in overseeing, coordinating, and regulating other elements of infrastructure and the environment, they are uniquely positioned to perform the same role for local and regional levee systems. The requirements of a state levee safety program should include three primary elements:

- Legislating statutory authorities
- Implementing rules, regulations and procedures

- Securing resources for these activities.

Some of the specific activities of a state levee safety program should include:

- Coordinating levee safety activities among local or regional entities within the state
- Receiving and reviewing application packages from entities within the state for grants from the National Levee Safety Program
- Requesting the Corps of Engineers to oversee the inspection of all levees within the State's jurisdiction
- Inspecting or requiring the annual inspection of levees with the state's jurisdiction, as well as inspections after all significant high water events
- Providing information to the national levee database for the levees within the state and providing updates at least annually.
- Implementing a levee risk communication and public outreach/education program
- Adopting the *Interim National Levee Engineering Guidelines*, and when available, the *National Levee Safety Code*
- Requiring that communities develop emergency action and evacuation plans
- Adopting measures as needed to require consideration of non-structural measures associated with any levee related activities
- Obtaining a FEMA-approved Hazard Mitigation Plan
- Providing liaison and coordination on environmental permitting actions

Some of the costs associated with creating and maintaining state levee safety programs should be offset with federally-funded grants. We support the Committee's recommendation that the states be afforded a start-up period to establish state levee safety programs. If at the end of the start-up period, states have not developed a levee safety program, increasingly stringent disincentives (e.g. lower priority for flood control funds) should be applied. At the same time, additional grants and funds should be available if the states develop levee programs that exceed minimum requirements.

Establish the National Levee Rehabilitation, Improvement, and Flood Mitigation Fund

The National Levee Safety Program (NLSP) establishes the minimum effective management program elements 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 in the inventory, inspection, and evaluation processes. States will need financial incentives to manage and maintain their own levee safety programs. Accordingly, we endorse the Committee's recommendation that a *National Levee Rehabilitation, Improvement, and Flood Mitigation Fund* be developed and cost-shared 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. A percentage of the non-federal cost share could be met through implementation of non-structural measures. Such federal assistance should initially be limited only to levee systems that protect existing urban areas with a high damage potential. To begin the program, the fund should be established at a minimum of one to

\$1.5 billion annually. While this amount was what the Committee suggested, the need is actually much greater.

Change “Levee Certification” to “Compliance Determination”

Federal agencies should change the term “certification,” which is used with FEMA’s National Flood Insurance Program, to another term such as “compliance determination.” The purpose of this change would be to better communicate to policy makers and the public that the determination does not imply a guarantee or warrantee of safety from flooding.

Swiftly Address Growing Concerns Regarding Liability

Congress should address the growing potential for public and private liability for future damages resulting from levee failures. It should explore a range of measures aimed at reducing the potential liability of engineering firms’ and government agencies that provide engineering services for levee systems. Without swift action by Congress, there will be increasingly fewer entities willing to take on the responsibilities and work needed to reduce current and future flood risks. Many municipalities have received no responses to requests for qualifications for levee work. A recent survey of engineering firms traditionally performing such work showed no respondents willing to do so in the future without some form of liability mitigation. Liability reforms would help ensure state and local interest in developing state levee safety programs, and prevent much-needed levee repairs, rehabilitation and compliance determination (certifications) from coming to a halt.

We endorse the liability reform measures that were considered by the Committee, in particular:

- Limitations on third-party liability for engineering firms and public agencies providing engineering services for a levee system. Such limitations should:
 - Establish that liability following a flood event would be affirmatively indicated only if the flood event was equal to or less than the design or rated level of flood protection provided by the levee system.
 - Establish that the engineering firm would not be liable for decisions (e.g., level of flood protection provided) made by other parties, such as the levee owner or maintaining agencies; and
 - Apply liability to an engineering firm only for damages caused by gross negligence, recklessness or willful misconduct by the firm.
- Limitations on liability for state and local agencies that sponsor, and then accept, federal flood control projects due to design and construction deficiencies. Since the federal government is responsible for the design and construction work, this would extend the current immunity enjoyed by the federal government to state and local agencies sponsoring the same project.

- Limitation on liability for state and local agencies that, by implementing levee safety programs, provide oversight, funding, or other services for non-federal levees.

We also recommend an additional role for the Commission's recommended National Levee Safety Board to evaluate third-party negligence claims and preclude federal court jurisdiction over claims that the board has deemed without merit.

Develop Comprehensive National Public Involvement and Education/Awareness Campaign

Full public cooperation for a comprehensive National Levee Safety Program cannot be achieved until all parties who live or work in a flood plain understand the current risks they are bearing, what can be done to mitigate those risks, and what risks they will continue to assume. Through the establishment of technical and communications committees and resulting awareness campaign, a realistic understanding could be imparted. Such educational efforts would help to inform the public of the impact of their day-to-day land use decisions, understanding that those decisions must incorporate a tolerance and responsibility for risk. Proper awareness would influence many areas of civic behavior, including a willingness to adequately fund levee improvements and maintenance as well as refraining from seeking legal redress for damage caused by foreseeable weather and hydrological events.

Conclusion

While all of these recommendations may not be within the purview of this Subcommittee, I would be remiss if I failed to address them and their criticality to an effective overall program. Much can and should be done beyond individual short-term fixes to address specific levee shortcomings. Without an overall National Levee Safety Program, actions and investments will remain inefficient and ineffective.

Inadequate programs and funding for national flood risk management have led to information lapses, deterioration of structures, excessive maintenance and repair needs, and catastrophic events. Preservation of human life is the most compelling reason for levee safety and we must do more to insure the safety of our citizens. However, we must also consider the costs of continuing to neglect this critical safety infrastructure. We saw both the human and financial costs of a single flood event on the Gulf Coast in 2005 following Hurricane Katrina. But there are also countless other floods across the nation that have had devastating impacts on our economy. While no definitive costs are available, the Committee has estimated that the nation's direct current flood damage losses may be on the order of five to \$10 billion per year, with indirect costs orders of magnitude higher. These costs will continue to rise in the future. We must not persist in putting lives at risk or diminish our global competitiveness by failing to maintain and improve our nation's levee systems.

The full requirements of comprehensive flood risk management are certainly not going to be met in one piece of legislation; however, an effective National Levee Safety Program will get us closer. Considering all of the ongoing expenditures for infrastructure and other activities that are

dependent on the continued functioning of levee systems, it is both prudent and imperative to provide for reasonable attention to these systems.

On behalf of ACEC and the nation's engineering industry, I want to thank this Subcommittee once again for focusing attention on this important issue and for the opportunity to testify before it. We strongly urge you and the total Congress to take up legislation to create a National Levee Safety Program as soon as possible. I would be happy to answer any questions.