RECOMMENDATIONS OF THE NATIONAL COMMITTEE ON LEVEE SAFETY

(111–34)

HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

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May 18, 2009

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Water Resources and Environment

FROM: Subcommittee on Water Resources and Environment Staff

SUBJECT: Hearing on "Recommendations of the National Committee on Levee Safety"

PURPOSE OF HEARING

The Subcommittee on Water Resources and Environment will meet on Tuesday, May 19, 2009, at 2:00 p.m., in room 2167 of the Rayburn House Office Building to receive testimony from representatives from the U.S. Army Corps of Engineers (Corps), state and local governments, and interested stakeholders.

BACKGROUND

The Water Resources Development Act (WRDA) of 2007, Section 9003, created the National Committee on Levee Safety (Committee) to develop recommendations for a National Levee Safety Program and a strategic plan for implementation of the recommendations. This memorandum reviews the recommendations made by the National Committee on Levee Safety and provides information on the status of the nation's levees.

The report focuses on the protection of human life and property through the encouragement of best management practices and the development of recommendations for the creation of a national levee safety program. Additional goals include promoting public awareness of levee safety programs within states and the residual risk associated with living in leveed areas.

Status of the Nation's Levees

In the United States there are more than 2,000 levees in the Corps Rehabilitation and Inspection program totaling over 14,000 miles in length. While some levees were built by the Corps

and other Federal agencies, other levees were built by non-federal entities with unknown materials and designs. The Corps has the shared responsibility with Federal, state, and local agencies to quantify and report to the public the inherent risk associated with these levees. The Corps has specific authorities within its levee safety program to routinely inspect these levees. The purpose of the program is to ensure that local sponsors perform required operation and maintenance to determine whether or not levees are eligible for the Corps Rehabilitation and Inspection Program. As part of the program, the Corps will undertake emergency one time efforts during a flood to protect a levee and will rebuild a levee that is in the program if it is damaged by a flood event.

The Corps levee safety program lists 114 levees that have received an unacceptable rating from routine maintenance inspections conducted since February 1, 2007. An unacceptable rating means that a levee has one or more deficient conditions that may prevent it from functioning as designed, intended, or required. If the non-federal sponsor does not make repairs necessary to bring the levee into compliance within one year, the sponsor is no longer active in the Corps' Rehabilitation and Inspection Program and, therefore, is not eligible for federal rehabilitation funds to repair damages to the levee following a flood event.

In addition to the 14,000 miles of federal levee systems in the United States, there are a large number of private and other non-Corps levees that are not inventoried and have not been inspected by the levee safety program. The Corps does not have information on the number of levees that have not yet been inventoried, where they are located, their condition, and more importantly what would be the consequences of their failure.

According to figures in the Committee's report, the extent of unknown and undocumented non-federal levees may exceed 100,000 additional miles.

The many challenges facing the nation's leveed areas led to the establishment of the National Levee Safety Committee by Congress. There are no national standards related to levees across all levels of government. As a result, state and local governments have varying policies regarding levee design and construction, as well as operation and maintenance.

Many levees are more than 50 years old. Some were not built by federal agencies and many levees were designed and constructed with now outdated engineering technology. Some levees were originally designed to protect agricultural areas where failure posed a lower level of risk. As populations have shifted, levees that once protected agricultural areas now protect large urban areas. These agricultural levees were not engineered to protect high risk areas. Risk levels in these areas are unusually high because failure of urban levees may result in significant loss of life, property damage, and economic loss.

Levees cannot eliminate the risk of flooding; they only reduce the risk to individuals and businesses located behind them. Levees are designed and built to a specific height and capacity in order to provide a specific level of flood protection. Because both man-made and natural changes occur over time, the level of protection provided by a levee may diminish. In addition, land use changes upstream may affect the hydrological conditions in an area by increasing runoff and reducing the level of protection provided by a levee.

While it is difficult to accurately predict the likelihood and flood stage of future events, factors are present that may make flood events more likely and potentially even more severe. An increase in development in floodplains, behind levees, and within watersheds increases runoff and exposes life and property to increased risk. Additionally, climate change may affect the frequency and severity of storm events.

Recommendations of the Committee

The Committee consists of 16 members, each an expert in aspects of levee safety: a chairperson from the Corps, a representative from the Federal Emergency Management Agency (FEMA), eight state levee safety agency officials, two private sector representatives, two representatives of local or regional governments, and two Indian Tribe representatives.

The Committee recommendations fall into three specific categories that are integral to the creation of an effective National Levee Safety Program. The first category emphasizes the need for leadership to be provided by the establishment of a National Levee Safety Commission. The second category focuses on the creation of strong levee safety programs in all states that will oversee critical levee safety components. The third category requires the coordination and alignment of existing federal programs to increase their efficiency.

The Committee made 20 recommendations (*The full report can be found at* http://www.iwr.usace.army.mil/ncls/docs/NCLS-Recommendation-Report_012009_DRAFT.pdf).

The recommendations of the Committee are summarized as follows:

Comprehensive and Consistent National Leadership

- **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, and delegation and oversight of a delegated program to States.

- **Expand and maintain the National Levee Database** to include a one-time 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.

- **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 National Levee Safety Program is being established.

- **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.

- **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 nonstructural alternatives to flood risk management in a risk-informed context.

- **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.

- **Subject Levee Certifications (Compliance Determinations) under FEMA's National Flood Insurance Program to peer review** to increase confidence in technical determinations of compliance.

- **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 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.

- **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.

- **Provide comprehensive technical materials and direct technical assistance** crucial to the successful implementation of consistent national standards to States, local communities and owner/operators.

- **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 program would include the development of curricula and certification requirements for a Certified Levee Professional program.

- **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.

- **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

- **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.

- **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.

- **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

- **Explore potential incentives and disincentives** for good levee management through alignment of existing federal programs.

- **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.

- **Augment FEMA's Mapping Program** to improve risk identification and communication in leveed areas and consolidate critical information about flood risk.

- **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.

Prior Legislative and Oversight Activity

In the 110th Congress, the Subcommittee on Water Resources and Environment held a hearing on May 8, 2007, on the state of our nation's levee safety programs.

Title IX of the Water Resources Development Act of 2007 (P.L. 110-114) authorized the Committee to "develop recommendations for a national levee safety programs, including a strategic

plan for implementation of that program." The report completed by the Committee and its recommendations are the focus of this hearing.

AGENDA

Mr. Eric Halpin
Special Assistant for
Dam and Levee Safety
U.S. Army Corps of Engineers
Washington, D.C.

Mr. Larry Larson
Executive Director
Association of State Floodplain Managers
Madison, Wisconsin

Mr. Steve Fitzgerald
Chief Engineer
Harris County Flood Control District
Houston, Texas
Testifying on behalf of the National Association of Flood and Stormwater Management Agencies

Mr. David Conrad
Senior Water Resources Specialist
National Wildlife Federation
Washington, D.C.

Dr. Leslie F. Harder, Jr. P.E., G.E., PhD
Senior Water Resources Technical Advisor
HDR, Inc
Folsom, California
Testifying on behalf of the American Council of Engineering Companies

Mr. Andy Haney
Public Works Director
City of Ottawa, Kansas
Testifying on behalf of the American Public Works Association

HEARING ON RECOMMENDATIONS OF THE NATIONAL COMMITTEE ON LEVEE SAFETY

Tuesday, May 19, 2009

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

The Subcommittee met, pursuant to notice, at 2:00 p.m. in room 2167, Rayburn House Office Building, the Honorable Eddie Bernice Johnson [Chairman of the Subcommittee] presiding.

Ms. JOHNSON. I would like to welcome everyone here this afternoon for this hearing, which will address the recommendations of the National Committee on Levee Safety as contained in its report to Congress.

I would like to thank all of our witnesses for joining us and we look forward to your testimony.

In 2007, Congress enacted the Water Resources Development Act, overriding a veto by then-President George Bush. With this legislation, Congress expressed its overwhelming desire to upgrade and maintain our Nation's crumbling water infrastructure. An important piece of the Water Resources Development Act is Title IX, the National Levee Safety Act of 2007. Title IX established the National Committee on Levee Safety and authorized the committee to develop recommendations and an implementation plan for a national levee safety program.

Today's hearing is only the first step in what needs to be a national conversation on how we address flood risk, not only in terms of expectations in our current flood control situation, but also in how we plan for and communicate flood risk in the future. Today's hearing on the recommendations of the committee is a good place to begin the conversation, listening to recommendations of flood control experts and examining any challenges to their implementation.

Hurricane Katrina, the costliest and most deadly hurricane in our Nation's history, served as a wake-up call on the state of our Nation's levees, but no in time to prevent over $100 billion in property damages and a devastating loss of life.

More recently, last summer, breaching of levees and flooding throughout the Midwest resulted in billions more dollars in property damages and loss of several dozen lives. These events reinforce the dire need to address the state of our Nation's levees and floodplains and to create a safety program that will protect the

public and hopefully reduce the risk of future losses in a more sustainable manner.

The United States first began Federal construction of its levee systems after the great floods in the 1920s and 1930s along the Mississippi and Ohio Rivers. These devastating floods spurred Congress to pass the Flood Control Acts of 1928 and 1936 to fund the construction of thousands of miles of robust levees. Many of these systems protected against extreme flooding in the range of 500 to 1,000-year floods.

However, subsequent national policies have encouraged levee construction in the last 30 years to protect only against 100-year flood protection. The reality is that during the life of a typical 30-year mortgage, there is a 26 percent chance that flooding will occur.

Increased development and urbanization have also caused greater risk to our flood control systems. In many areas, levees that were built decades ago to protect farmland are now relied upon to protect the millions of people who have moved into the area. Development in floodplains also increases urban runoff and decreases the flood-carrying capacity of surrounding waterways, placing existing systems under greater stress.

Moreover, the effects of global climate change are likely to cause the sea level to rise and increase the size and intensity of storms which further jeopardize our current levels of flood protection.

In the face of these concerns, it is necessary to reexamine how we protect our communities from flooding and implement more realistic and sustainable safety measures. By latest count, there are roughly 2,000 levee systems operated by the Corps, which amounts to approximately 14,000 miles of levee infrastructure.

However, the quantity, location and condition of non-Federal levees in the United States is currently unknown, although it is estimated to account for an additional 100,000 miles of levee infrastructure. Establishing an inventory of these levees will be a crucial first step to creating a successful national levee safety plan.

Beyond that, we must implement and encourage measures that will address the increased risk to our levee systems and better protect our communities against the devastating effects of flooding. We must create clear national standards, implement greater risk management from all levels of government, and institute adequate inspections and oversight so that we can ensure that the damage and destruction of Hurricane Katrina never occurs again.

I look forward to hearing from our witnesses about the development and implementation of a national levee safety plan that will live up to these goals.

And before I ask Mr. Boozman for his remarks, I would like to ask unanimous consent that the testimony of American Society of Civil Engineers and the Association of State Dam Safety Officials be included as a part of the record.

[The information follows:]

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Statement of

The American Society of Civil Engineers

Before The

Subcommittee on Water Resources and Environment

Of The

House Transportation and Infrastructure Committee

On The

Recommendation of the National Committee on Levee Safety

May 19, 2009

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Madame Chairwoman and Members of the Subcommittee:

The American Society of Civil Engineers (ASCE)[1] is pleased to provide this statement for the record for the hearing on the recommendations of the National Committee on Levee Safety. ASCE also would like to take this opportunity to praise the efforts of the Levee Safety Committee for producing an excellent report under demanding circumstances.

I. ASCE Policy on Levees

There is no national safety program for federal or state levees. There is no dependable catalog of the location, ownership, condition, hazard potential of levees in the United States. Flooding from Hurricane Katrina, which devastated the city of New Orleans in August 2005, demonstrated the need for consistent, up-to-date standards for levees based upon reliable engineering data on their location, function, and condition.

Therefore, ASCE supports federal and state legislation and regulations to protect the health and welfare of the public 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 act should require the federal and state governments to conduct mandatory safety inspections for all levees and establish a national inventory of levees.

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[1] ASCE was founded in 1852 and is the country's oldest national civil engineering organization. It represents more than 146,000 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 Code.

The nation must use all the tools available to it to reduce damages from major storms, including hurricanes, and flooding. 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.

II. Background

Levees play an enormous role in the economic and environmental welfare of the United States. "Levees are broadly classified ... as either urban or agricultural levees because of different requirements for each." U.S. Army Corps of Engineers, Design and Construction of Levees 1-2 (April 30, 2000), http://140.194.76.129/publications/eng-manuals/em1110-2-1913/c-1.pdf.

There is no definitive record of how many levees there are in the U.S., nor is there an assessment of the current condition and performance of those levees. According to a study by the Association of State Dam Safety Officials and the Association of State Floodplain Managers, only 10 states keep any listing of levees within their borders and only 23 states have an agency with some responsibility for levee safety. The Federal Emergency Management Agency (FEMA) estimates that levees are found in approximately 22 percent of the nation's 3,147 counties. Forty-three percent of the U.S. population lives in counties with levees. Many of those levees were constructed decades ago to protect agricultural and rural areas, not the homes and businesses that are now located behind them. American Society of Civil Engineers, Report Card for America's Infrastructure, January 2009, http://www.infrastructurereportcard.org/fact-sheet/levees.

Urban levee systems, because they are designed to protect urban areas, have typically been built to higher standards. No levee system, however, provides full protection from all flooding events to the people and structures located behind it. Some level of flood risk exists in levee-impacted areas. Federal Emergency Management Agency, Levee System Information for Stakeholders, Oct. 7, 2008, http://www.fema.gov/plan/prevent/fhm/lv_intro.shtm.

In August 2005, Hurricane Katrina — one of the strongest storms ever to hit the coast of the United States — brought intense winds, high rainfall, waves, and storm surge to the Gulf of Mexico shores of Louisiana, Mississippi, and Alabama. Communities in all three states suffered severe damage. ASCE, THE NEW ORLEANS HURRICANE PROTECTION SYSTEM: WHAT WENT WRONG AND WHY ES-v (2007).

> [T]he levees in the New Orleans area breached at about 50 distinct locations. At least seven of the major failures were related to breaching of levees containing I–walls. The I-wall failures were particularly devastating because of the heavy residential development and low elevations [the walls] were attempting to protect. The rest of the levees breached when they were overtopped by the floodwaters, which eroded the levee material away.

Id. at 47.

Following the catastrophic failure of major portions of the New Orleans levee system after Hurricane Katrina in 2005, Congress enacted the National Levee Safety Act (NLSA) in title IX of the Water Resources Development Act of 2007, Pub. L. 110–114, Nov. 8, 2007, 121 Stat. 1288 (codified at 33 U.S.C. § 3301). The NLSA established a 16-member Committee on Levee Safety[2] chaired by the Secretary of the Army. The Committee was required to report to Congress by May 2008 on "recomendations [sic] for a national levee safety program, including a strategic plan for implementation of the program." 33 U.S.C. § 3302(c) (1).

The Committee, faced with administrative delays out of its control, could not begin work until October 2008. It filed its preliminary report with Congress in January 2009, eight months after the statutory deadline but only three months after its first meeting. COMMITTEE ON LEVEE SAFETY, DRAFT RECOMMENDATIONS FOR A NATIONAL LEVEE SAFETY PROGRAM (Jan. 15, 2009). The draft report was submitted to the Office of Management and Budget (OMB) for review at the same time, and it was made available to the public on the Internet, http://www.iwr.usace.army.mil/ncls/.

III. CLS Recommendations

The draft report made 20 specific recommendations for establishing and maintaining a national levee safety program. ASCE generally agrees with each of the recommendations. In the interest of brevity, however, ASCE will comment on what it believes are the most significant recommendations.

A. Establish a National Levee Safety Commission

ASCE strongly supports this recommendation. We believe the Commission should be modeled after the Nuclear Regulatory Commission, the Federal Energy Regulatory Commission, and other independent regulatory agencies in the Executive Branch. It should not be established within the Corps of Engineers, FEMA, or another federal department or agency.

The new agency ought to be granted regulatory authority over the nation's federal and state dam safety systems. In other words, Congress should integrate the National Dam Safety Program now lodged in FEMA within the new body, to be called the National Levee and Dam Safety Commission.

The levee safety program should be expressly modeled on the National Dam Safety Program. That program requires the director of FEMA to prepare a strategic plan to establish goals, priorities, and target dates to improve dam safety; and ensure cooperation and coordination with state governments. The program also requires FEMA

[2] The NLSA entitled the body the Committee on Levee Safety. In its report to Congress earlier this year, the Committee signed itself the "National Committee on Levee Safety." Congress has not changed the label, and ASCE will refer to it by its statutory name.

to provide assistance to assist states in establishing, maintaining, and improving dam safety programs and to establish the National Dam Safety Review Board to monitor state implementation (authorized under current law), to monitor the safety of dams in the United States, and to advise the Director on national dam safety policy.

Dam and levee safety programs need to be closely coordinated. In approximately half of the states, the dam safety program and the levee safety program already are united, frequently employing the same staff. For many states, overlaying this program with the dam safety program provides an immediate "home" and orientation to the state of how it can operate. This has the advantage of providing continuous technical oversight of the two programs and allows state officials to make rational budget choices for flood-control and water resources projects.

B. Develop Tolerable Risk Guidelines

ASCE agrees. Assessment of risk is a key engineering function. Congress should insist that the Commission must assess and communicate clearly to policymakers and the public how risk- and cost-benefit tradeoffs will impact levee performance and safety. They must take an active role in formulating public policy and in decision-making at all levels of government.

The level of risk also changes with time, depending on changes in the natural and man-made environment. Therefore, all risk analyses need to be updated as new information becomes available.

Local, state, and federal leaders — in concert with the engineering community — need to embrace a common risk-based decision support tool for planning and decision-making. Policymakers at all levels need to initiate and maintain an honest and open dialogue with all major stakeholders about the risks of living in a hurricane- and flood-prone regions.

C. Change "Levee Certification" to "Compliance Determination"

ASCE concurs. The current FEMA "certification" program for levees, which requires the endorsement of a Professional Engineer, is a technical finding for the National Flood Insurance Program (NFIP). It is not, and was never intended to be, a representation that any accredited levee will provide for the safety, health, and welfare of the public.

In order for FEMA to accredit a levee on its NFIP maps, a Professional Engineer must certify that the system complies with all the requirements established by FEMA at 44 CFR 65.10 (b). Alternatively, a federal agency with levee design and construction qualifications may certify the levee satisfies the NFIP requirements. In either case, the engineer certifies that the levee has been adequately designed and constructed to provide protection against the base flood (a flood which has a one percent annual chance of occurrence, often called the 100-year flood).

There is a vast difference between a document that FEMA uses to prepare NFIP rating maps and a document that is prepared by a Professional Engineer, based on the appropriate standard of care, that assesses the risk to the public safety, health, and welfare posed by a flood-risk-reduction system such as a levee. Certification involves an evaluation of actual foundation conditions and structural integrity, a calculation of current hydrology (flood of record), and a study of historical records. Properly analyzing these data and records requires a high level of expertise as well as extensive effort.

To repeat, the FEMA rule mandating certification of non-federal levees requires a Professional Engineer to attest that the levee is able to protect property behind the levee from a 100-year flood. This might lead the public to believe—erroneously—that the levee could never fail in such a flood or that a 100-year flood is an engineering "safety standard" rather than an artificial construct for insurance purposes. This could cause the engineer to unintentionally be placed in serious ethical and legal jeopardy by appearing to confirm the "safety" of a structure that she had not designed. This is contrary to the ASCE Canon of Ethics and good public policy.

We want FEMA to develop and adopt a hazard-ranking system for NFIP rating maps that is based on either a) the maximum flood that will likely be experienced in an area (the Probable Maximum Flood) or b) a carefully developed plan of community development, land use, building codes, emergency preparedness (especially warning, evacuation, and risk communication), as well as an efficient and orderly system of indemnification for the inevitable losses when levees fail or are overtopped.

D. Provide Comprehensive Technical Materials and Direct Technical Assistance/ Develop a National Levee Safety Training Program

ASCE agrees. The national levee safety program should incorporate the elements of the National Dam Safety Program encompassing federal assistance to the states for to put into practice strategic planning, staff training, acceptable engineering practices, state-based safety standards, and other requirements found in 33 U.S.C. § 467f.

Respectfully submitted,

The American Society of Civil Engineers

Association of State Dam Safety Officials
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Testimony of the
ASSOCIATION OF STATE DAM SAFETY OFFICIALS
Before The
Subcommittee on Water Resources and Environment
Of The
House Transportation and Infrastructure Committee
On The
Recommendation of the National Committee on Levee Safety
May 19, 2009

Madame Chairwoman and Members of the Subcommittee:

The Association of State Dam Safety Officials (ASDSO) is pleased to provide this statement for the record for the hearing on the recommendations of the National Committee on Levee Safety.

ASDSO is a national non-profit organization of more than 2,800 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 and levees by preventing dam and levee 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 downstream development of levees and 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 on 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 the authority to regulate levee safety, but most are unable to effectively regulate levees due to lack of staffing and resources. 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 Subcommittee 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 your support for the recommendations of the National Committee on Levee Safety (NCLS) including the establishment of a National Levee Safety Commission and for integrating the National Dam Safety Program into this commission.

The Future of a National Levee Safety Program

ASDSO agrees with the assessment of the National Committee on Levee Safety (NCLS) that "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." 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 recently voted to endorse the recommendations of the NCLS and the formation of a National Levee Safety Commission and agrees that there are significant benefits of integrating 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 must 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 regulatory 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.

ASDSO strongly supports the formation of a National Levee Safety Commission. We believe the Commission should be modeled after other independent regulatory agencies in the Executive Branch. It should not be established within the Corps of Engineers, FEMA, or another federal department or agency.

The levee safety program should be expressly modeled on the successful elements of the National Dam Safety Program. That program requires the director of FEMA to prepare a strategic plan to establish goals, priorities, and target dates to improve dam safety and to ensure cooperation and coordination with state governments. The program also requires FEMA to provide assistance to states in establishing, maintaining, and improving dam safety programs. Additionally, the program requires FEMA to establish the National Dam Safety Review Board to monitor state implementation (authorized under current law), to monitor the safety of dams in the United States, and to advise the Director on national dam safety policy.

In order to establish an effective national program of levee safety and dam safety, the new agency should be granted similar regulatory oversight responsibilities over the nation's federal and state dam safety framework as provided to assure levee safety. In other words, Congress should integrate the National Dam Safety Program, now administered by FEMA, within the proposed new commission, to be called the National Levee and Dam Safety Commission.

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

In addition, I would also like to enter into the record a copy of the report to Congress on the recommendations for a national levee safety program.

Without objection, so ordered.

[The information follows:]

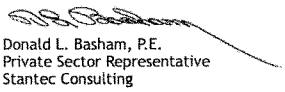
RECOMMENDATIONS FOR A NATIONAL LEVEE SAFETY PROGRAM

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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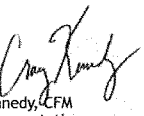

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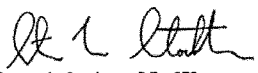

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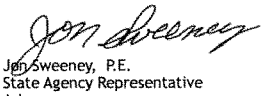

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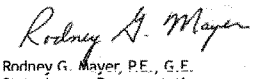

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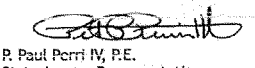

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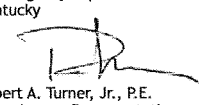

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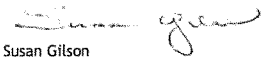

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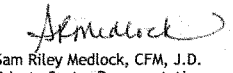

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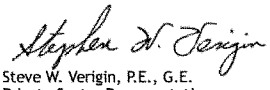

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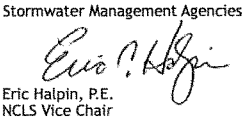

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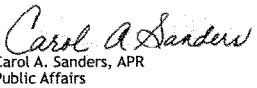

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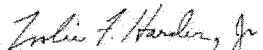

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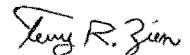

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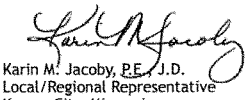

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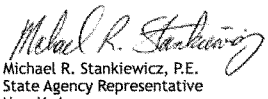

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State Agency Representative
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Cover Photo credit: View of New Orleans after Hurricane Katrina, August 2005

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:

SRA International, Inc.—for professional facilitation and support of the National Committee on Levee Safety, especially Linda Manning (facilitator), Laura Sneeringer, Samantha Levine, Nan Thorn-Clements, Shannon Kearney, Philip Rizzi and Peter Trick.

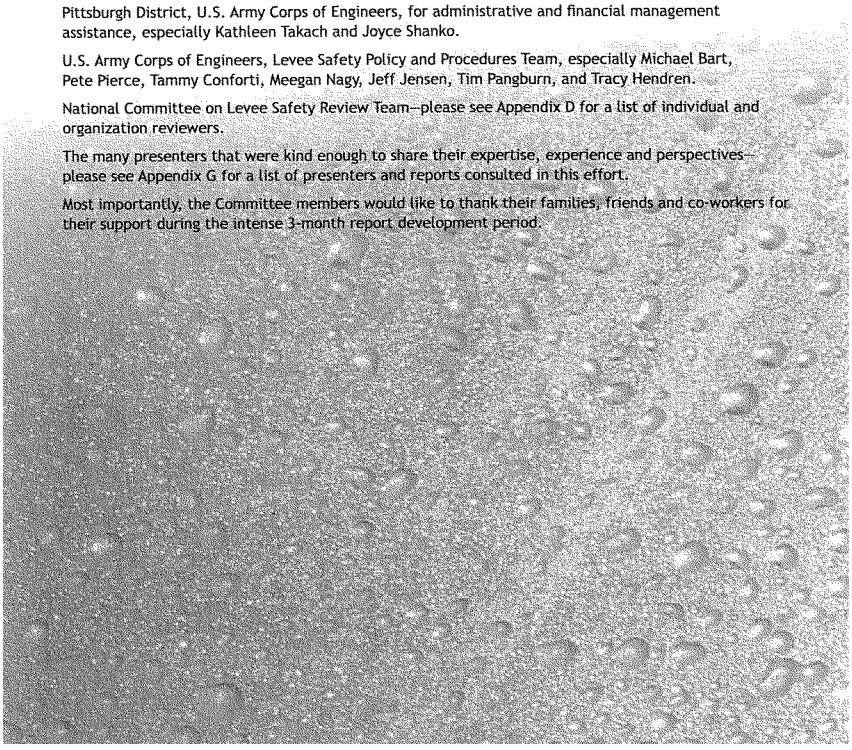
Pittsburgh District, U.S. Army Corps of Engineers, for administrative and financial management assistance, especially Kathleen Takach and Joyce Shanko.

U.S. Army Corps of Engineers, Levee Safety Policy and Procedures Team, especially Michael Bart, Pete Pierce, Tammy Conforti, Meegan Nagy, Jeff Jensen, Tim Pangburn, and Tracy Hendren.

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

The many presenters that were kind enough to share their expertise, experience and perspectives—please see Appendix G for a list of presenters and reports consulted in this effort.

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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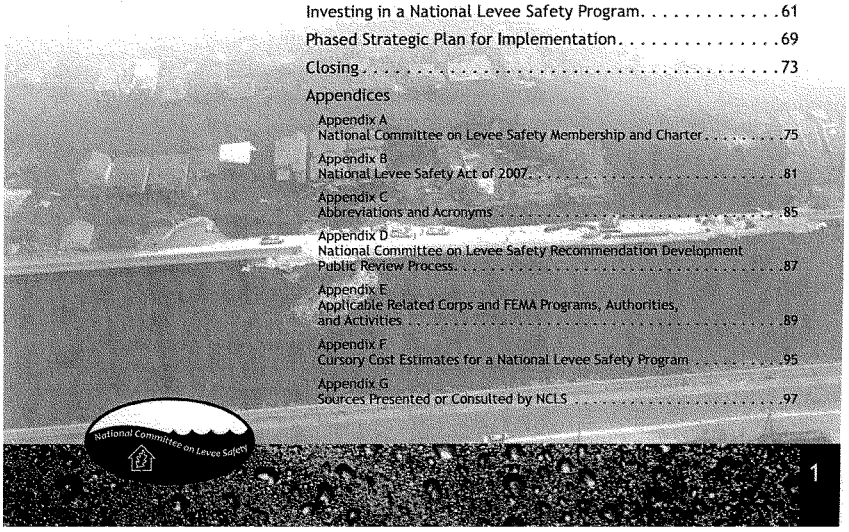


Table Of Contents: Figures and Graphs

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 which is 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.

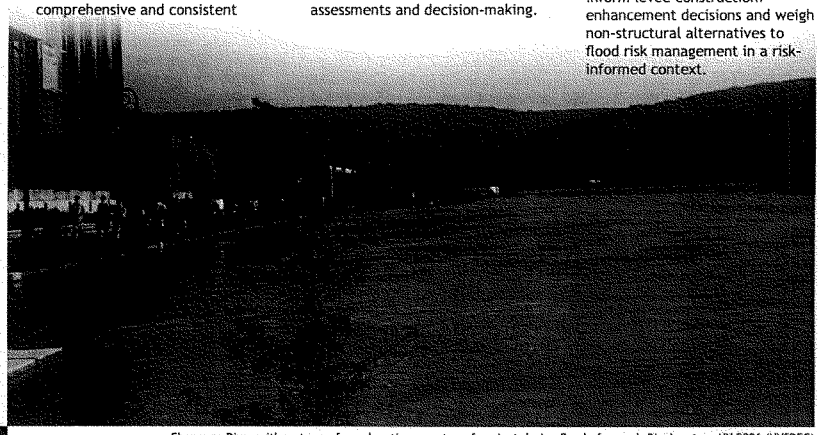
The Committee's recommendations are prefaced by recognition of a need for a broader national flood risk management approach, the benefits of integrating national dam safety and levee safety programs, and call for leveraging levee safety as a critical first step in a national infrastructure investment. 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:

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 (NYSDEC)

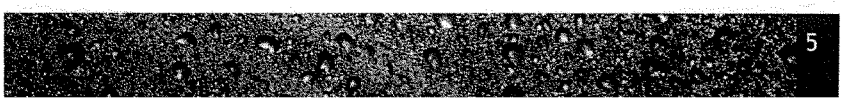
6. **Change "Levee Certification" to "Compliance Determination"** to better articulate the intent that "certification" under the National Flood Insurance Program (NFIP) requirements does not constitute a safety guarantee or warranty. The purpose of this change is to more clearly communicate residual 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 includethe 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 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 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 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 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 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.

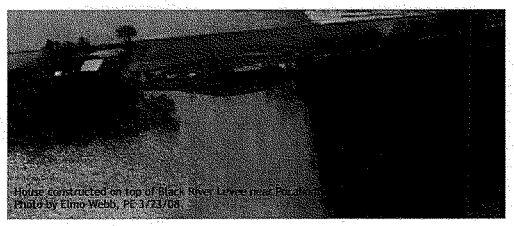
(6) Building public awareness of the residual risks associated with living in leveed areas.

(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 Poplarville, Photo by Elmo Webb, PE 1/23/08

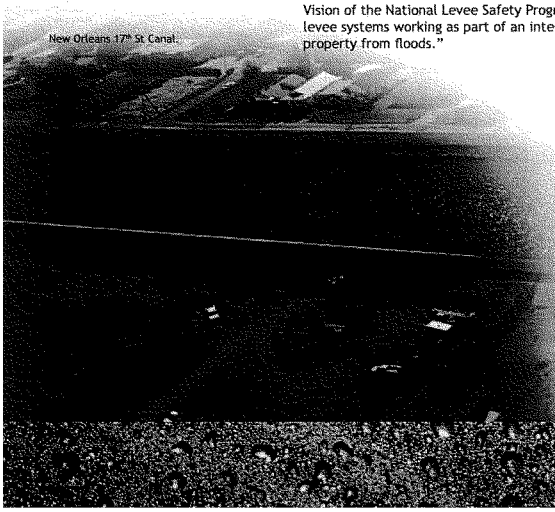
Mission Statement

(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

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:

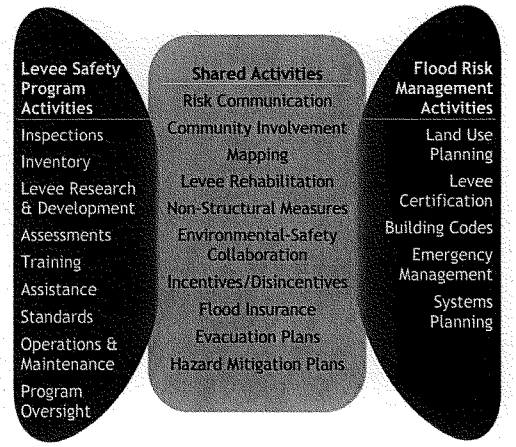
- Employing sound technical practices in levee design, construction, operation, inspection, assessment, security, and maintenance
- Ensuring effective public education and awareness of risks involving levees

- 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

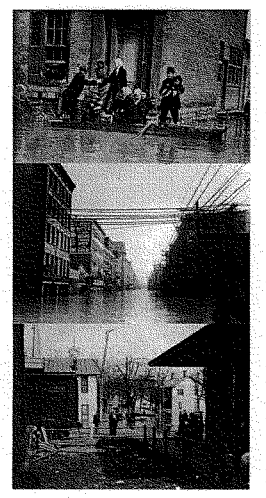
In order to achieve our stated purposes, the above four aspects of levee safety were the Committee's primary focus. The Committee explored other goals and connectivity with related flood risk management elements such as insurance, floodplain management, and evacuation, and included recommendations on 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.
Photo by Elmo Webb, PE 3/23/08

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

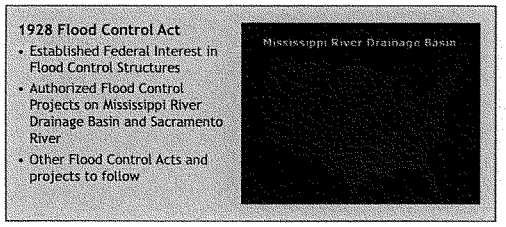
A Long History

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-percent-annual chance (500-year flood) to 0.1-percent-annual chance (1,000-year flood). This trend in robust levee

Figure 2: 1928 Flood Contol Act



construction 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 Federal Emergency Management Agency (FEMA), 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 U.S. 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 U.S. floodplain management, Gilbert White's account may be among the better explanations for the prominence of the 100-year flood in U.S. 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.

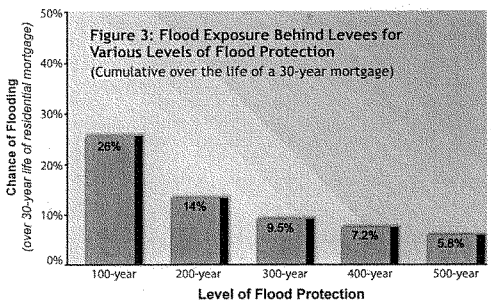
A simplified national policy tended to discourage communities from looking at the flood problem in a community-wide context, considering the whole range of possible floods that would occur.

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.



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,


New Orleans, LA—Hurrican Katrina

"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.

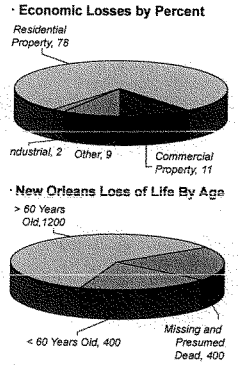
Part of our complacency is related to a misunderstanding of flood risk by decision makers and the general public. Some believe that a 1%-annual-chance (i.e., 100-year) level of flood protection corresponds to a high level of flood protection, perhaps meaning that a flood would not occur for another 100 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*



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.*

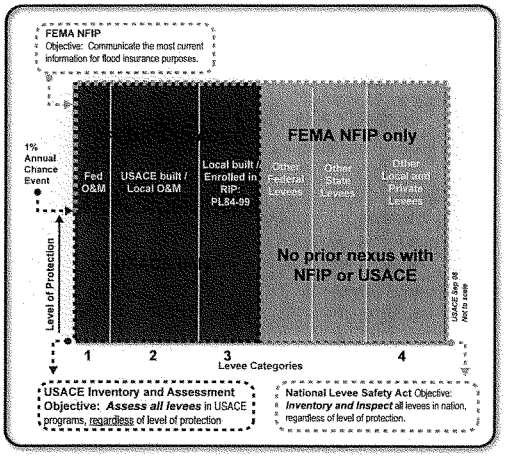
The Current State of Levees and Public Safety

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 total levees in the nation—as many as 100,000 miles or more of levees may exist.
- 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:

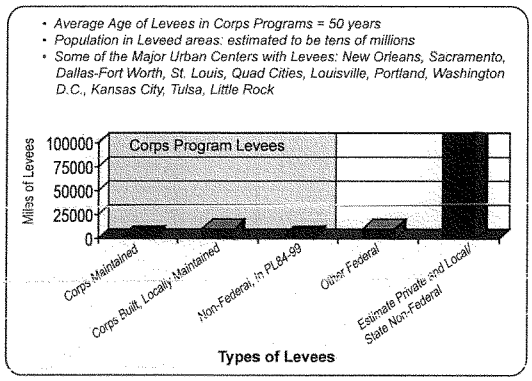
- On average, Corps levee systems currently provide a 6:1 return ratio on flood damages prevented compared to initial costs. Larger, more robust levee systems such as the Mississippi River and Tributaries system provide a 24:1 return ratio on investment. Well-designed, constructed, operated, and maintained 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 News 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 have 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 (e.g. 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

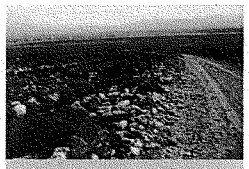
of levees nation-wide and other federal agencies like U.S. Bureau of Reclamation (USBR) are responsible for another 8,000 miles of levee-like structures along canals. Ultimately, levees constitute much more infrastructure that is more integral to communities than do dam infrastructure; but, surprisingly 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 critical services in design,



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.
- The reliability of many levees is commonly not known

Photo: Chino Canyon Levee, Palm Springs, California, 2008 -Courtesy of Riverside County Flood Control and Water Conservation District

construction, and certification of levees. The legal environment—as evidenced in the post-Katrina law suits, appears to be making such work increasingly riskier business propositions in comparison to the fees generated. Together, these experiences are effectively reducing the private sectors' 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

- 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 old 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.

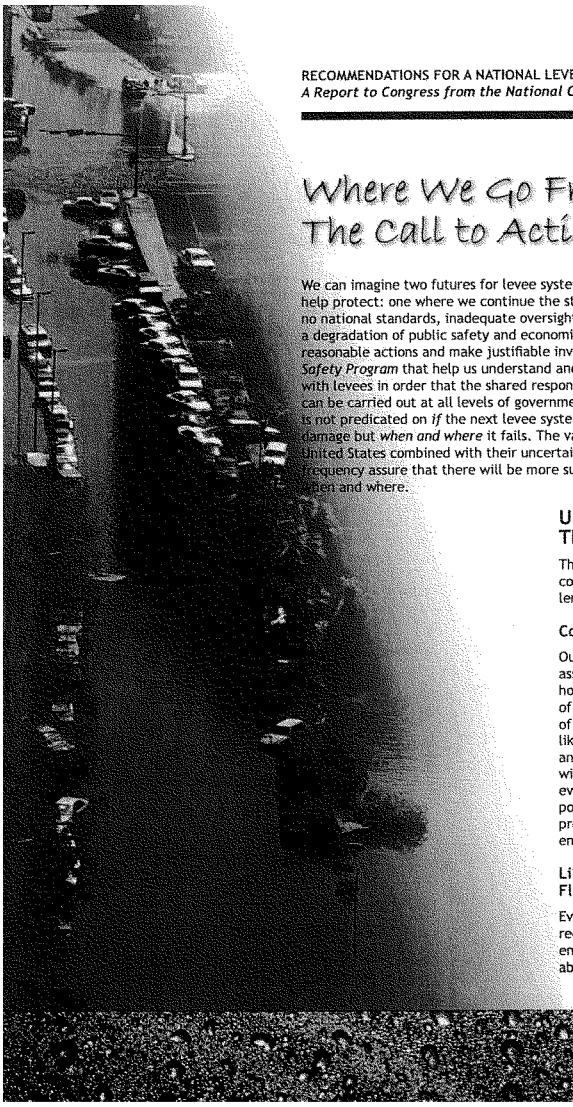
Safety programs can and should provide improved public safety through the close scrutiny of levee conditions and risks posed, and the communication of those findings to decision makers and affected populations:

- Based on a recent survey of states by the Association of State Dam Safety Officials, only 22 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 (U.S. Army Corps of Engineers—2007) or a general lack of rigorous oversight exists (U.S. 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

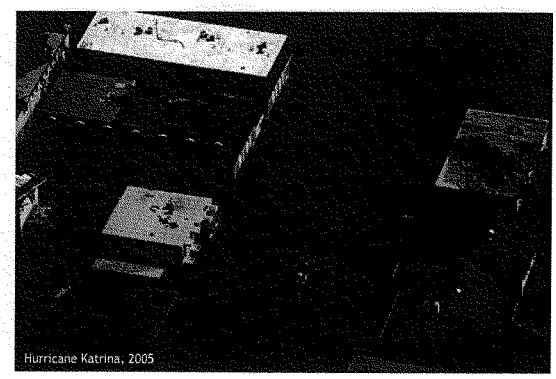
Another key element of risk with levees is how well the levee will hold back the anticipated higher and more frequent flood stages? In short, many levees were not built with modern engineering and tend to become less reliable with time. Imagine a 1950s vintage automobile, parked in a driveway since it 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 moments notice. So, the trend with the levee performance element of risk is toward lower reliability over time, and thus greater risks.

Consequences of Failure

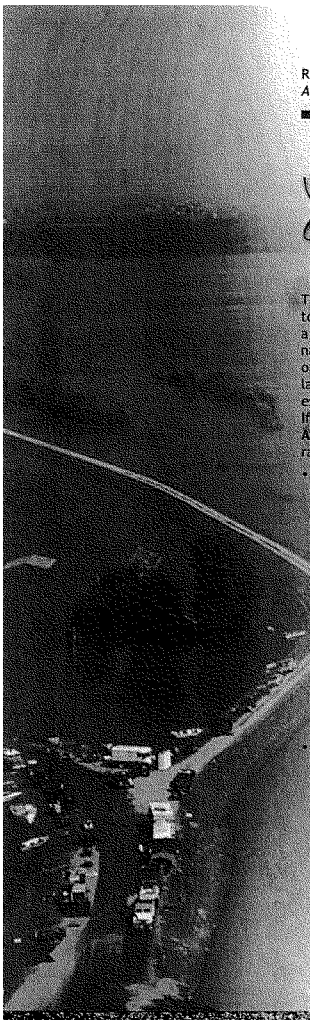
This element of the risk profile is often both the most dynamic and the dominant factor in the escalation of risk for the protected public. Population growth, and the economic development that comes with it, is not only the fastest growing element of risk but is the one that generally has had the least 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, 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, D.C.; 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.

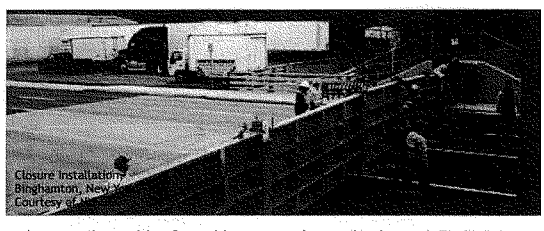
The national response to this all-too-real future will be "Not again! .... How can we be in this position again?" We have the social justification to keep from repeating such disasters—public safety—a key shared responsibility of individuals and all levels of government. We have the economic justifications 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, New York
Courtesy of [illegible]

- **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 (re: 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

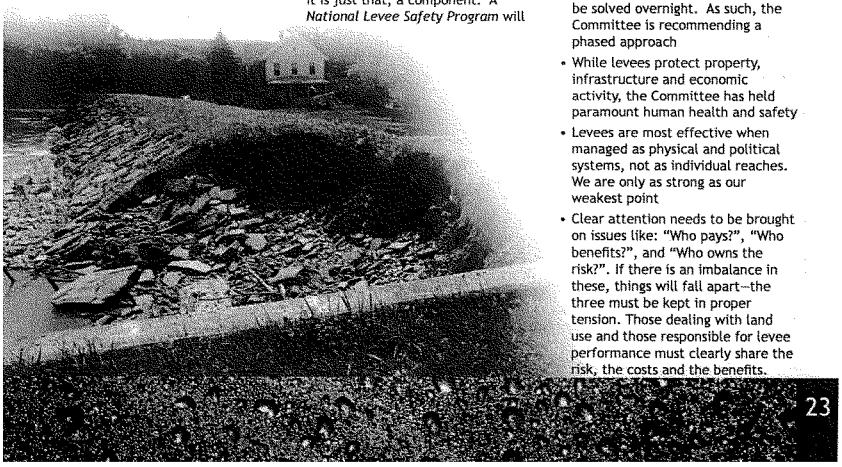
The flood risks that this Nation faces are many and varied. During the past twenty years, the recommendation has been made in a number of nationally-commissioned and peer-reviewed reports for a national strategy to address flood risk management. Even prior to Hurricane Katrina, consistency and collaboration 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:

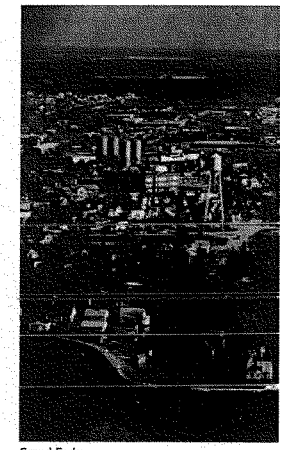
- Levee safety is a shared responsibility. Responsibilities lie at all levels of government and with persons whose lives and property are located behind levees
- Our nation's levee problems took generations to build, so it will not be solved overnight. As such, the Committee is recommending a phased 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.



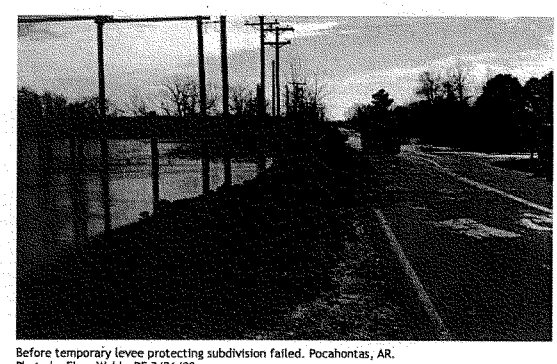
- Commonalities between levee safety and dam safety are many. In order to maximize efficiencies at all levels of government, build upon existing state expertise and provide consistent messages related to multi-hazard risk to the public, all opportunities to integrate the two should be explored; and
- 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:

- **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.
- **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.
- **Alignment of 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.



Grand Forks



Before temporary levee protecting subdivision failed. Pocahontas, AR.
Photo by Elmo Webb, PE 3/21/08

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

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 U.S. 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 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.

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 owners) 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.

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.
- 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.

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.

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

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 2 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

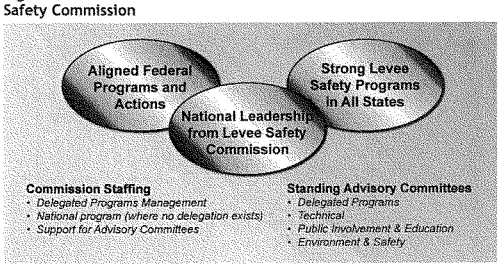
b. National Levee Safety Program placed in an existing federal agency and the Commission serving as an advisory body to that agency for NLSP duties.

***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. 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 State, 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
- National 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's National Levee Database Upon Which Expansion to Non-Federal Levees Could be Based

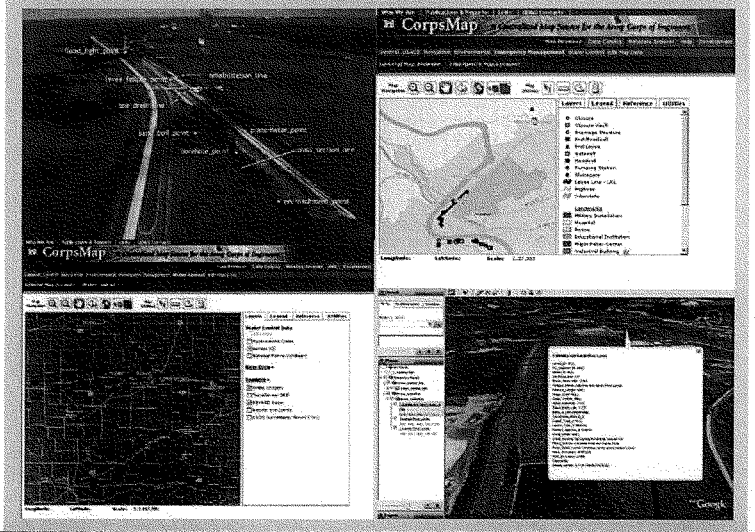


Figure 9: Hazard Potential Classification

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 states.
- FEMA considers shallow flooding in their Special Flood Hazard Areas to be less than 3 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 5 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 which 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.

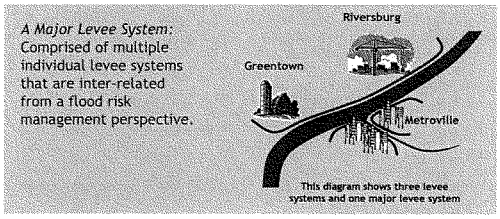
Levee and Canal Structure Definitions

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 which 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 which 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 which 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

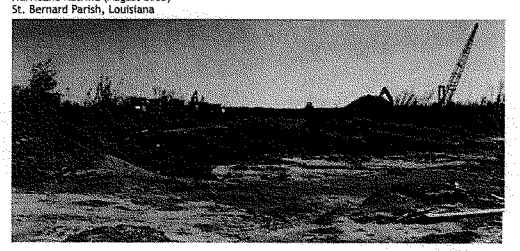
Further, the development and use of national levee safety standards would provide the private sector with a nationally recognized set of standards that, if applied correctly with appropriate judgment, could help establish a standard of care and probably help reduce the exposure of public agencies and 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 U.S. 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.

Levee Damaged Due to Overtopping
Hurricane Katrina (August 2005)
St. Bernard Parish, Louisiana



Step Two (within 5 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*.

Develop Tolerable Risk Guidelines

In order for the nation to better understand the risk associated with living behind a certain levee, 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 questions, *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:

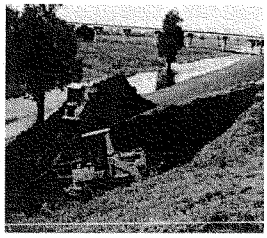
- Economic calculations on the value of a statistical life saved
- People's willingness-to-pay to reduce risk
- State preferences
- Risks that people willingly accept

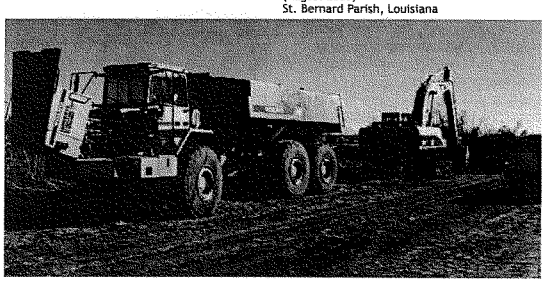
Tolerable risk methodology can help us better tailor our approaches to investments made and benefits accrued in the levee context. A tolerable risk is one that "society can live with so as to secure certain net benefits." It is a risk that may not be broadly acceptable, and is not necessarily negligible; 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 with the purpose to develop *National Tolerable Risk Guidelines for Levees and Structures Along Canals.*
- 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
(August 2005)
St. Bernard Parish, Louisiana

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 scientist 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.

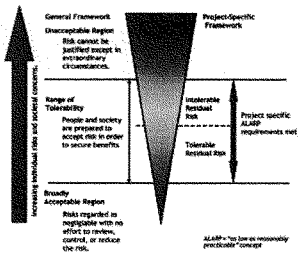
Citation: ANCOLD, 2003

"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 forward 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.

Levee Safety Risk Framework

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

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.

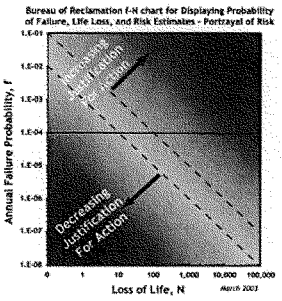
Why is tolerable risk a preferred way of looking at levees?

TRG are particularly important when dealing with a massive national portfolio of (on average) 50 year old levees which do not meet most engineering standards. The shear 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.

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)

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); and
- **Efficiency** -In relation to society's use of resources, that principle, which seeks to gain greatest benefit from the available resources.
- 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 unrelated to any provided services.

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 district 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, USACE, 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 flooding by using terms such as "100-year level of protection". Such terminology has served to confuse the public and in some cases has lead 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.

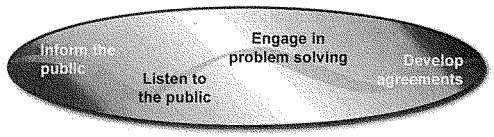
Each individual living in a leveed area is responsible for mitigating flood risk, particularly when it comes to preserving personal safety and the safety of family members. Levee safety is a shared responsibility and relies on involved, informed, motivated citizens, owner/operators, and governments.

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.
- ***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 behind a levee 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

Figure 11: Major Public Involvement Steps



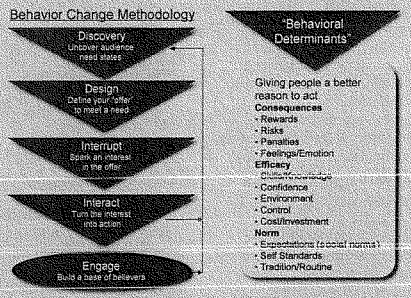
and experts must be engaged to accomplish this. Adequate dedicated funding for this purpose must be provided to ensure success.

- ***Develop the major components of the public involvement and awareness/education program at the national level for implementation primarily at the state and local level.*** 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.

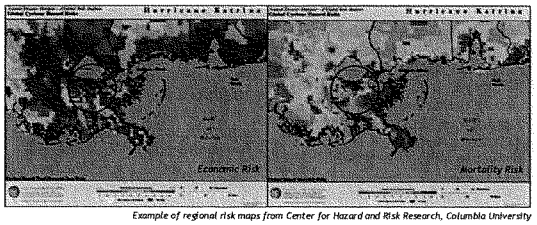
Figure 13: Risk Equation Definitions

Risk = Probability X Consequence

(1)	Loading Event Probability	(3) Loss of Life
(2)	Potential Failure Mode Probability of Failure	Economic Damage Other Consequences
	Release Severity Probability	

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 have 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 on 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 of 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-prong 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 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
Photo by Elmo Webb, PE 3/23/08

- Local training through direct assistance to the states and tribes
- Self-paced training
- 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 Acts. 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.

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.

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

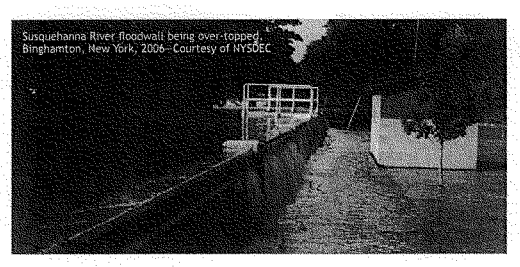
characteristics and integrity, and should consider research initiatives that would look at improved use of helicopter electromagnetic (HEM) and ground-based electrical resistivity surveys.

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 owner, 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 relative 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.



Susquehanna River floodwall being over-topped, Binghamton, New York, 2006—Courtesy of NYSDEC

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 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 consistence 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 and tribes 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.

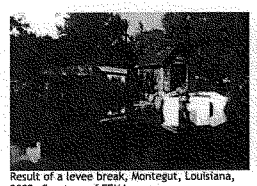
Complimentary State and Federal Levee Safety Programs. In establishing and sustaining state levee safety programs, there are distinct roles for both the Commission (addressed earlier in recommendations) and for the states with delegated levee safety programs. States would operate such programs in conformance with the 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.

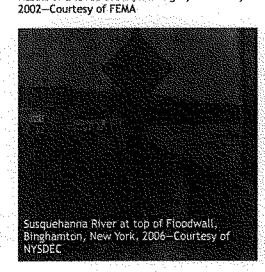
Physical Systems Approaches Multi-jurisdictional programs are potentially a more effective basis for overall management of levee systems that do not lie entirely within any one political jurisdiction. States should be encouraged to cooperate with other state, local or federal entities to implement levee safety program elements for levee systems which 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 which 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 levels.

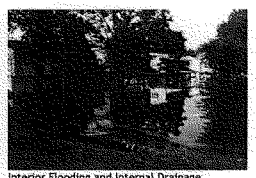


Result of a levee break, Montegut, Louisiana, 2002—Courtesy of FEMA

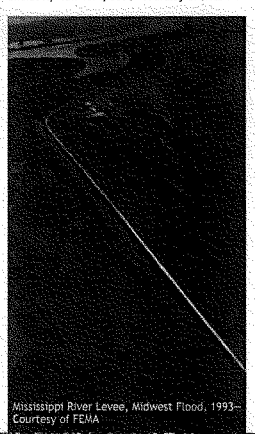
Flood damaged levee, Bainbridge, New York—Courtesy of NYSDEC



Susquehanna River at top of Floodwall, Binghamton, New York, 2006—Courtesy of NYSDEC



Interior Flooding and Internal Drainage, Endicott, New York, 2006—Courtesy of NYSDEC



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

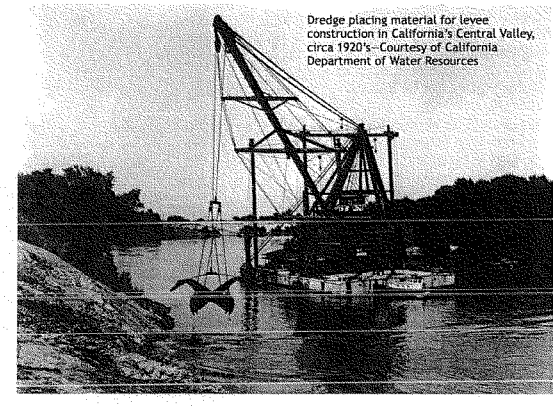
Key Elements of a State Levee Safety Program

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 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 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 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 areas protected by levees 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, New York, 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 levee-protected 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 levee-protected 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 the most rewards to states and communities that are doing the most to manage their levee systems and their flood risk in levee-protected 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 behind levees).

States and communities should be rewarded when they exceed minimum requirements for managing flood risk in areas protected by levees. 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 behind the levee
- Notification to prospective buyers in leveed areas of flood risk behind levees, state's status in the NLSP, and community's status in the NFIP impacting availability of federal flood insurance
- Public notice 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
- 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 behind levees 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
- Require community participation in the NFIP

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.

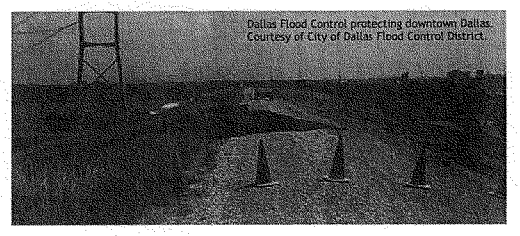
National Levee Rehabilitation, Improvement, and Flood Mitigation Fund

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

- Creating a National Inventory of Levees with Inspection Information
- Establishing Nation Levee Safety Standards
- Requiring Levee Safety Programs in All States
- Requiring inspections and assessments of levees
- Funding research to enhance technical expertise for levees
- Establishing training programs for levee safety
- Educating to public, levee owners and others about the need for strong levee safety programs, and risk.

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



Dallas Flood Control protecting downtown Dallas. Courtesy of City of Dallas Flood Control District.

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.

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 would 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 creation 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 level 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 U.S. 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 which 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 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 la and 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 level 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 authoring 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 activities. 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 (August 2005)
St. Bernard Parish, Louisiana

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 which 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; and 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 have 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 which 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) and is supported by this Committee.

Recommendation #18: Require phasing in 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 set 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 <u>not</u> be required behind canal structures that do not have a significant role in providing hurricane, storm, or flood protection.

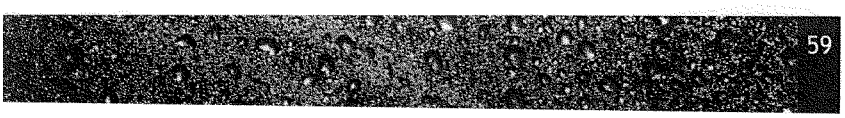
Enhance FEMA Mapping Program to Communicate Levee Risk to Communities

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.

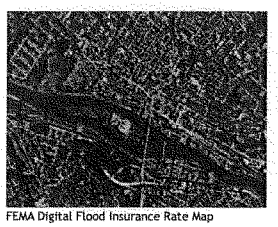
- Identify levee systems, including structures along canals, and associated levee system failure consequence zones. This should be carried out in accordance with the development of the NLD, which will provide additional information on consequence areas behind levees. The completion of this step is dependent 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.

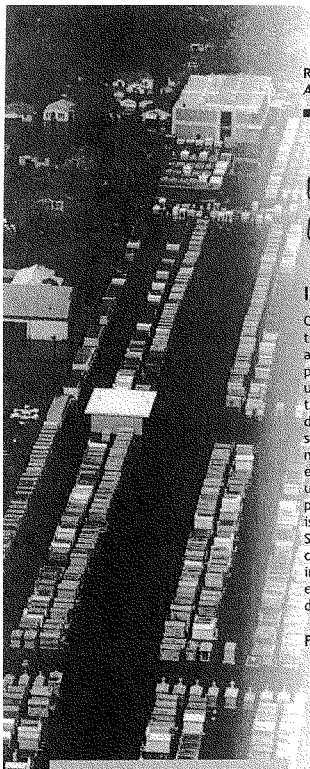
Recommendation #20: The National Flood Insurance Program (NFIP) Community Rating System (CRS) Program should be revised to credit a community based on its state levee safety program and augmented to increase/decrease maximum credits allowed for certain CRS activities, including but not limited to Activity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



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 or tribe 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 U.S. 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.

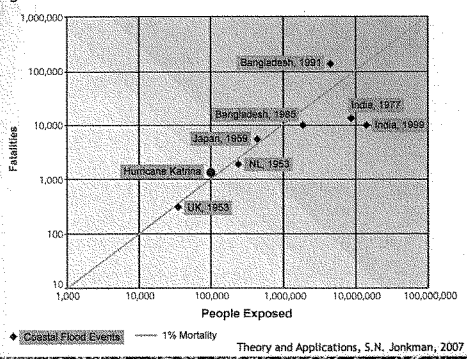
Although the National Levee Safety Program comes with a cost, the overall proposition is: "Pay me now, or pay me even more later"

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.

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*

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

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 nations 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.

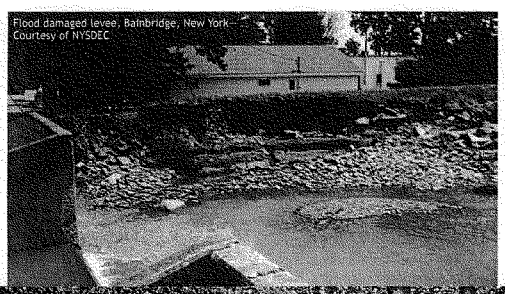
Less than 6 million people currently hold flood insurance policies in more than 20,000+ communities across the United States. More importantly, it is estimated that only 10% of structures behind levees have flood insurance, and of those, most are not covered to the complete value of the property (both 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



Flood damaged levee, Bainbridge, New York
Courtesy of NYSDEC

square miles. Also, the flood was 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-percent-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-percent-annual-chance (100-year) rated level of flood protection, and a 0.2-percent-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

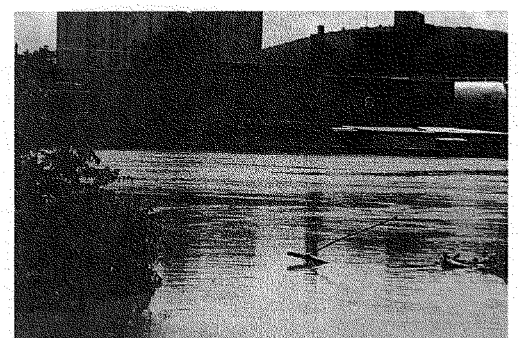
Midwesterners who experienced the Great Flood of 1993—estimated to have been a 500-year flood at the time—may have believed that they would not see another flood of that magnitude in their lifetimes. Following the devastating hurricanes along the Gulf of Mexico in 2005, most Americans probably believed 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 hard hit 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.



[illegible] Top of the Floodwall during flood of record, [illegible] New York, 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 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 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 $6.48 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.

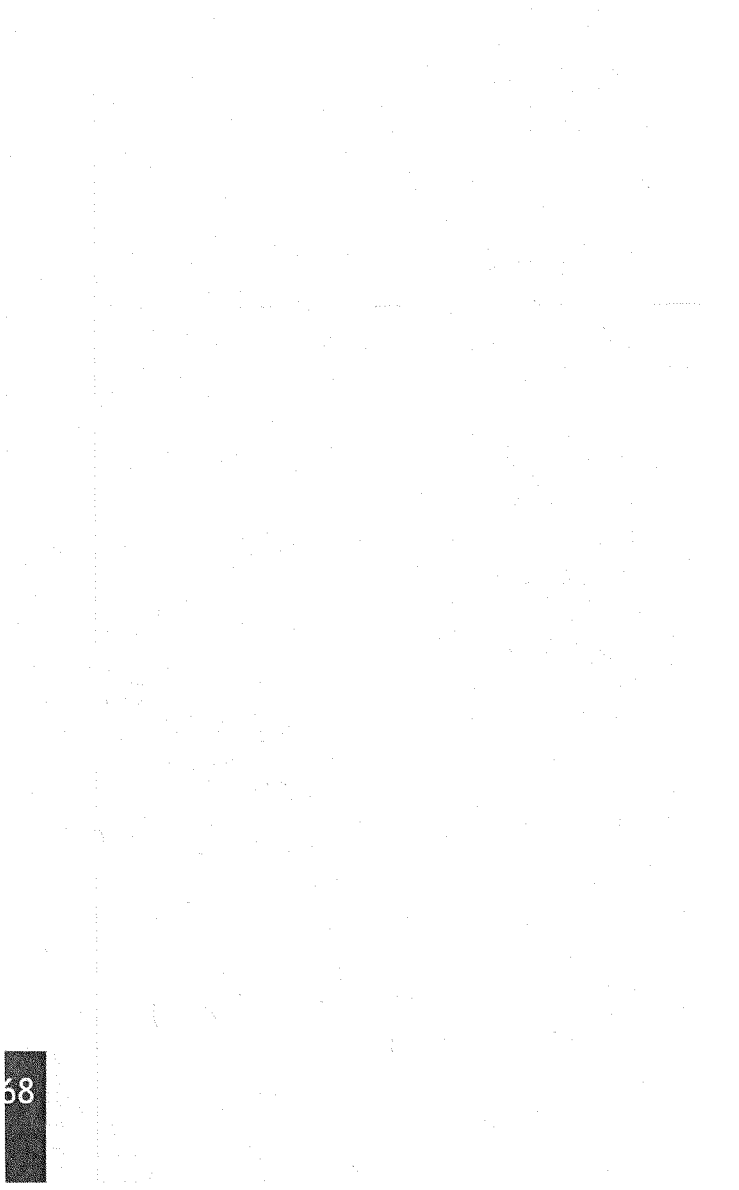
Figure 18: Estimated Annual Costs of a National Levee Safety Program

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)
	$153 M (Federal) $37 M (Non-Fed)	$126 M (Federal) $85 M (Non-Fed)
SUBTOTAL	$190 M	$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)
	$278 M (Federal) $37 M (Non-Fed)	$129 M (Federal) $85 M (Non-Fed)
TOTAL	$315 M	$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, Tribes, 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) indicate 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: Levee in major urban area. Dallas, TX. Courtesy of City of Dallas Flood Control District

Bottom Photo: Golf course levee. Courtesy of Riverside County Flood Control and Water Conservation District

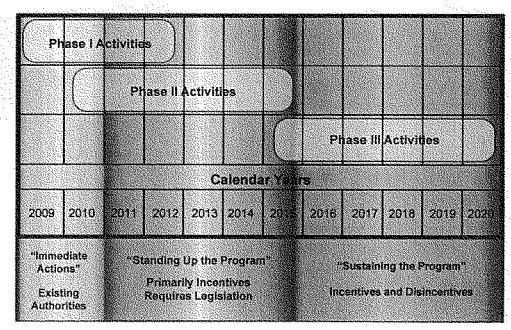
It has taken more than a century of neglect and indifference for our current levee safety challenges to develop and the solutions that are needed cannot simply be put into place overnight. Due to the massive amount of effort in data collection, assessment, education, policies, procedures and management 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 an 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 behind levees.
5. Congress/Commission should authorize and fund the *National Levee Rehabilitation, Improvement and Flood Mitigation Fund.*
6. Commission 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 and tribes 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 Levee Impacted Areas											
Legislate mandatory risk-based flood insurance behind levees											
	FEMA, and where appropriate, the CRS Taskforce, should explore and implement revisions to CRS Activity 620 to incentivize good levee behavior, augment mapping program to better communicate risk, change "certification" to "compliance determination" and conduct peer review										
	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 which is 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

(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, establish 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, Louisiana, 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)

Printed on Recycled Paper

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.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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
U.S.	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


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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 U.S. 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 XX).

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 (http://www.iwr.usace.army.mil/ncls); 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
- U.S. Army Corps of Engineers
- U.S. Bureau of Indian Affairs
- U.S. Bureau of Reclamation
- U.S. Department of Interior
- U.S. Department of Transportation
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Geological Society
- U.S. Housing and Urban Development
- U.S. Small Business Administration
- U.S. Society of Dams

Appendix E— Applicable Related U.S. 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 begin 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 significant. 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 ½ 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 Reasearch 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

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- Association of State Floodplain Managers. 2003. *Community Liability and Property Rights.*
- 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.*
- Association of State Floodplain Managers Foundation. 2008. *Floodplain Management 2050: A Report of the 2007 Assembly of the Gilbert F. White National Flood Policy Forum.* Washington, D.C

- *Charterizing Flood Risk for More Informed Public Involvement.* Version 1. Charles Yoe. September 2006.
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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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- *Public Hazards Communication and Education: The State of the Art.* 2004. Update of Informer Issue 2: Public Education for Earthquake Hazards.
- *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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NATIONAL POLICY PRIORITIES AND THE RECOMMENDATIONS OF THE NATIONAL COMMITTEE ON LEVEE SAFETY

TESTIMONY BEFORE HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,

SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

Submitted by:

First Colony Levee Improvement District

Fort Bend County Levee Improvement District No. 2

Fort Bend County Levee Improvement District No. 14

Fort Bend County Levee Improvement District No. 19

Sienna Plantation Levee Improvement District

Executive Summary

Recommendations for a National Levee Safety Program ("NLSP") have been long overdue. The associated levee districts located in Fort Bend County (the "Association") wishes to applaud the thousands of hours of work, research, study and review by the National Committee on Levee Safety (the "NCLS") to prepare the Recommendations for a National Levee Safety Program (the "Recommendations") that will begin a national dialogue regarding levee safety. In principle, the Association agrees with the NCLS's comments in the introduction to the Recommendations where it states "[t]he current levee safety reality for the Untied State is stark—uncertainty in location, performance and condition of levees and a lack of oversight, technical standards, and effective communication of risks." However, the Association wishes to make certain that not every levee district, governmental entity, or other parties that own, operate, and maintain levees and related flood control infrastructure is painted with this very broad brush.

The levee improvement districts of Fort Bend County that are submitting this written testimony are political subdivisions of the state of Texas, that have the sole responsibility of constructing, maintaining, and operating levees and related flood control infrastructure along the Brazos River in Texas. Levee districts in Fort Bend County have recently completed a massive coordinated effort in which they spent an estimated $40 million in local funds to construct new levee segments, to increase the height of existing levee segments, and to improve other related flood control works to comply with the Federal Emergency Management Agency's anticipated updates to its Flood Insurance Rate Maps for Fort Bend County, Texas based on a recent study of the flow-rate and floodway models for the Brazos River. Because of these efforts, the Association wants to make sure the NCLS and Congress do not develop and legislate an NLSP that is broadly conceived, counterproductive, and detrimental to the true goal of protecting lives and property. There are numerous organizations across the United State, including in Texas, that are responsible for levees and related flood control infrastructure and know exactly where every levee, drainage ditch, outfall structure, flap gate, and other related flood control facility is located, their current condition, and how they are maintained and operated. The Association's levee and flood prevention facilities are maintained and operate in accordance with the highest industry standards and best practices.

While the Association agrees with the many of the Recommendations from NCLS, the Association requests further study to two specific recommendations - Nos. 17 and 18 - prior to any further steps being taken toward implementation.

- **Recommendation #18—Mandate purchase of risk-based flood insurance in leveed areas.** The Association objects to the proposed requirement of mandatory flood insurance for property and structures located behind sound structural levees and other flood control structures, and any proposed mandatory flood insurance requirement that does not take into account the actual risk profile of

each of the many communities that would be subject to such a requirement. If mandated to purchase flood insurance without taking into account the actual risk profile of the community to be insured, residents and property owners may demand that levee districts, governmental entities, or other parties that own, operate, and maintain levees and related flood control infrastructure cease levying appropriate operation and maintenance taxes to maintain and operate their levees and related flood control infrastructure, and instead rely solely on the "protection" of the mandatory flood insurance. Why try to protect from flooding if the resident, property owner, or business owner must pay the same insurance rate as someone who lives where there is no protection from flooding? While flood insurance seeks to provide economic compensation for flood damage, levees and related flood control infrastructure actually protect lives, homes, and businesses from flood damage. The Association requests a comprehensive study and evaluation of such a requirement before adoption of this Recommendation.

- **Recommendation #17—Exploring Potential Incentives and Disincentives for good levee behavior.** The Association believes that disincentives are likely to have little merit in "encouraging good levee behavior." In fact, the levees and related flood control infrastructure that might need the most federal assistance may be the levees that are in the most ruin or may be owned, operated and maintained by levee districts, governmental entities or other parties that are in need of the most assistance in meeting their responsibilities. This Recommendation appears to be arbitrary and vague, and does not seem to take into account the difference in construction and maintenance standards for levees in different parts of the United States. For example, one set of standards for incentives or disincentives for the levees and related flood control infrastructure that protects Midwestern farm land may not be appropriate for levees and related flood control infrastructure that protects New Orleans.

A more comprehensive discussion regarding the background of Fort Bend County levees and the Association's specific concerns regarding the Recommendations of the NSLP can be found in the following pages.

WRITTEN TESTIMONY FOR NATIONAL LEVEE SAFETY COMMITTEE

Background

Fort Bend County is located within the Houston-Sugar Land metropolitan statistical area in southeast Texas. Since the 1970s, Fort Bend County has been one of the fastest growing counties in the United States and has been attracting people from all types of racial and ethnic backgrounds. It is estimated that in 2008 Fort Bend County households alone contributed close to $20 billion in consumer spending to the metropolitan Houston economy. For more than 15 years, Fort Bend County has been in the top 20 counties in the United States for economic excellence and population growth. Its largest city is Sugar Land, which was recently ranked as the nation's third best place to live by CNN/Money Magazine and eighth best place in the nation to raise a family by the guidebook Best Places to Raise Your Family - The Top 100 Affordable Communities in the United States.

Levees Districts in Fort Bend County

Since the late 1970s, major levee systems and other related flood control works have been constructed in Fort Bend County to provide flood protection to new communities from potential flooding from the Brazos River. Levee systems and their related flood control works in Fort Bend County are constructed, operated, and maintained by local government agencies called levee improvement districts and municipal utility districts (collectively referred to herein as "Levee Districts"). Levee Districts are political subdivisions of the State of Texas created to construct and maintain levees and other flood control improvements along rivers; to reclaim lands from overflow from the rivers; to control and distribute the waters of the rivers by straightening or improving the rivers; and to provide for proper drainage of the reclaimed lands that they protect.

Under Texas law, Levee Districts are authorized and empowered to enter into all necessary contracts, and possess the power to purchase, construct, operate, and maintain any improvements necessary to accomplish their stated purposes. The funds used to design and construct a Levee District's levee systems and other related flood control works are obtained through the public sale of tax-exempt municipal bonds, whose issuance is approved by the Texas Commission on Environmental Quality ("TCEQ") and the Attorney General of Texas. Levee Districts then provide for the payment of the principal and interest on the bonds through their authority to levy and collect ad valorem taxes, unlimited as to rate, on all taxable property within their boundaries. The taxes are then paid by homeowners and landowners in the Levee District. Levee Districts also provide for the long-term inspection, maintenance, repair, and rehabilitation of their levee systems and other related flood control works through

annual operation and maintenance tax revenues collected pursuant to their ad valorem taxing authority.

Levee Districts are governed by a three (3) member Board of Directors consisting of qualified Fort Bend County residents appointed by the County Commissioners' Court. In addition to a Board of Directors, Levee Districts employ a team of professional consultants, including licensed professional engineers, professional construction managers, general managers, certified maintenance and operations specialists, attorneys, and professional financial and tax collection consultants to ensure that (i) their levees and other related flood control works are properly monitored and maintained at all times, (ii) their regulatory compliance requirements are satisfied, and (iii) the Levee District maintains a healthy financial condition so that it can carry out its responsibilities. Levee Districts conduct regular monthly Board meetings to review the operation and maintenance of their levee systems and other related flood control works, as well as to conduct their other regular business. In addition to the daily oversight by their professional consulting teams, Levee District directors routinely tour and inspect their facilities to monitor the condition and operating status of their levee systems and other related flood control works.

Fort Bend County Levees and FEMA - Recent Activity

In connection with FEMA's Map Modernization Program, Federal Emergency Management Agency ("FEMA") and Fort Bend County entered into a Cooperative Technical Partners Partnership Agreement to carry out a study to update the Brazos River flood elevations and to update the Flood Insurance Rate Maps ("FIRMs") for the County under the National Flood Insurance Program ("NFIP"). FEMA began its study in 2005 and its preliminary findings were released in late 2006. As a result of the preliminary study, Levee Districts in Fort Bend County were required to construct new levee segments and increase the height of existing levee segments by varying degrees, in some cases by as much as two (2) feet, in a very brief period of time (less than 18 months) to maintain their accreditation by FEMA under the NFIP as providing 100-year flood protection on the new FIRMs, a feat that was accomplished through a massive coordinated effort in which they spent almost $40 million in local funds to construct the required facilities. Despite significant obstacles and a very small window of time, Levee Districts and Fort Bend County accomplished in a little more than a year and a half what might take five or more years to accomplish elsewhere. During this process, Levee District and Fort Bend County representatives worked closely with FEMA to ensure that FEMA's mapping and modeling efforts included (i) the most current data available on conditions in the County and on the Brazos River and (ii) the results of the recently constructed and improved levee segments. Through their cooperative efforts, Levee Districts, Fort Bend County, and FEMA representatives ensured that the Brazos River modeling and mapping process was a joint success.

Concerns with Mandatory Flood Insurance – Recommendation Number 18 of the National Levee Safety Committee

The NFIP was created in 1968 to reduce future flood damage by identifying flood risks, encouraging sound community floodplain management practices, and providing citizens with affordable flood insurance. Fort Bend County has participated in the NFIP almost since its inception. Fort Bend County and its Levee Districts understand the need to undertake sound floodplain management activities designed to reduce threats to lives and the potential for damages to property in flood prone areas. They have been protecting their citizens and property for the last 30 years by constructing, operating, and maintaining first class levee systems and other related flood control works, without any federal assistance. However, Levee Districts in Fort Bend County are opposed to mandatory flood insurance for property protected by levees, dams, and other man-made structures.

As currently conceived, this mandatory flood insurance proposal for property protected by levees, dams, and other man-made structures appears to allow a new form of taxation in the guise of arbitrary insurance premiums levied for revenue, rather than actuarial purposes. If mandated to purchase flood insurance, residents may demand that Levee Districts, after satisfying their debt service obligations, cease levying appropriate operation and maintenance taxes and instead rely solely on the "protection" from flooding provided by the NFIP. Why pay both a tax to maintain a levee system that protects the residents and property from flooding, and another tax (in the form of a significantly high insurance premium) to insure damage done by flooding? If there is no Levee District tax used to maintain the levees, the levee systems and other related flood control works would cease to serve their flood protection functions, thereby increasing the flood risk to protected property. Moreover, such economic burdens would serve as a disincentive for local communities to plan and finance sound community floodplain management practices. Surely it is not the goal of the NFIP or Congress to increase the flood risk to citizens and property or to discourage local communities from providing for the long term development, management, and financing of a community's flood protection needs. While flood insurance seeks to provide economic compensation for flood damage, levees and related flood control infrastructure actually protect lives, homes, and businesses from flood damage.

Levee Districts in Fort Bend County understand that the flood and hurricane losses of 2004 and 2005 left the NFIP in a position where it cannot meet the claims of its policyholders nor pay back the debt incurred from the 2004 and 2005 claims. While the Levee Districts support efforts to reform and strengthen the NFIP, they are concerned with proposals that include provisions similar to those included in the version of HR 3121 passed by the Senate in 2008 that would require homeowners and businesses situated in flood plains behind levees, dams, and other man-made structures to participate in the NFIP by purchasing expensive mandatory flood insurance. Such a provision treats all levees around the country the same, and disregards efforts to build stronger levee systems and other related flood control works. In Fort Bend County, that

means thrusting a huge expense onto homeowners and small businesses that have paid and continue to pay for the construction and upkeep of first-class levee systems and other related flood control works. Requiring mandatory flood insurance that is not actuarially based would result in a significant premiums that would be devastating to Fort Bend County by causing residents protected by Levee Districts to pay what is estimated to be more than $100,000,000 per year in premiums. Even requiring mandatory flood insurance at preferred rates would still require Fort Bend County residents protected by Levee Districts to pay what is estimated to be more than $20,000,000 in premiums. In addition to the direct economic impact of such premiums, mandatory flood insurance that is not risk-based would most likely curb the housing market for new and existing homes in Fort Bend County.

The Levee Districts believe that further analysis is necessary before Congress approves such a far-reaching, one-size-fits-all approach to the NFIP. Levee Districts support Congress taking an approach to reforming the NFIP that would instead direct the Government Accountability Office to comprehensively study and determine the impact on property owners of a mandatory flood insurance requirement for areas protected by levees, dams, and other man-made structures. Such a study would evaluate, among other things, the long-term impact that the mandatory purchase requirement would have on local communities, their economy, and on the cost of home ownership. This approach is consistent with the House version of HR 3121 and with an amendment that was introduced during Senate consideration of HR 3121 and supported by Texas Senators John Cornyn and Kay Bailey Hutchison, but ultimately defeated by a vote of 30-62.

If, after studying the matter, Congress sees fit to impose a mandatory flood insurance standard for areas protected by levees, Levee Districts in Fort Bend County believe that premiums for such coverage must be actuarially based on the true risk profile of the community to be insured. The Levee Districts understand that flood insurance provides very beneficial protection. Many of the residents that live behind levees in Fort Bend County have voluntarily purchased flood insurance. Due to the protection of living in a Levee District, these residents obtain flood insurance while paying a reasonable yearly premium. This is a sound public policy, since these same residents are paying a Levee District tax. In essence, the resident is splitting their flood protection cost between a Levee District tax and a reasonable flood insurance premium. However, if the resident must pay a Levee District tax and a high insurance premium (which ignores the fact the resident already has the first line of protection—a levee system and other related flood control works), the residents and property owners are unfairly prejudiced for living behind a levee.

This Association concurs with the testimony of the National Association of Floodplain State Managers Association ("NAFSMA"), that further analysis is needed in this recommendation before mandating flood insurance without evaluating risk, risk-based analysis, and actuarial pricing for policies. NAFSMA and the Association are concerned about how this proposed mandate would be implemented and its associated

costs and benefits. The current flood insurance program views all flood control structures similarly and does not distinguish between differing risks of participating communities. The current program also fails to acknowledge that flood control structures, like levees, can fail for various reasons or that approximately 25% of all flood insurance damage claims are from areas outside the 100 year floodplain limits. All of these factors need to be taken into account to determine the proper actuarial rate.

Concerns with Incentives and Disincentives – Recommendation Number 17 of the National Levee Safety Committee

The Association believes that disincentives are likely to have little merit in "encouraging good levee behavior." Instead, the Association believes the focus should be on rewarding good behavior and participation in responsible operation and maintenance of levees and flood control facilities. In fact, the levees that might need the most federal assistance may be the levees that are in the most ruin. The Association would welcome incentives for "good levee behavior," since the Association has again taken the most comprehensive, conservative, and precautious measures in constructing their levees and drainage facilities. However, this Recommendation appears to be arbitrary, vague, and does not seem to take into account the difference in construction of levees and maintenance of the levees and drainage facilities across different parts of the United States. For example, one set of standards for incentives or disincentives for the levees that protect Midwestern farm land will not work for New Orleans.

Summary

The Association believes that further analysis is necessary before Congress approves such a far-reaching, one-size-fits-all approach to flood insurance and incentives and disincentives. While some proposals have provided for the implementation of actuarial pricing for policies issues under a mandatory flood insurance program, the Association is very interested in seeing how the risk-based approach and premium formulas would be developed for the NFIP behind levees. The Association concurs with NAFSMA's belief and testimony that a more responsible and effective approach would involve the development of criteria for evaluating the differing types of flood risks that communities face and how to protect against those risks, and the long-term impact that the mandatory purchase requirement would have on local communities and their economies. We urge that such a study of the issues and impacts be completed before such a change is implemented on a nationwide basis. The Association also urges that a study of incentives and disincentives along with further research regarding differing levees and flood control facilities be completed before another change is implemented on a nationwide basis.

Ms. JOHNSON. I now recognize Mr. Boozman.

Mr. BOOZMAN. Thank you, Madam Chair.

Today, the Subcommittee begins its review of Title IX of Water Resources Development Act of 2007, which established the National Committee on Levee Safety and charged it with developing recommendations for a national levee safety program to more adequately address risk in flood-prone areas.

The National Committee on Levee Safety was challenged with coming up with recommendations within 180 days of enactment of a secondary piece of legislation clarifying the provision in the Water Resources Development Act. While this was a steep hill to climb, the committee delivered on its promise.

Sadly, the Office of Management and Budget took longer to review the draft report than it took the National Committee on Levee Safety to actually write the report. Even with this review, OMB made no changes to the report.

Congress asked for an unvarnished opinion and analysis from levee safety experts nationwide. While OMB at times may perform necessary functions of political analysis, analysis of the levee risk in a safety report required by law and intended for Congress is neither warranted nor welcome. This type of meddlesome behavior by OMB and its inattention to infrastructure has left the United States vulnerable to catastrophic flooding.

Recent events have been all but ignored, and catastrophic loss of life could very well happen again. Uncertainty in location, lack of oversight, lack of technical standards, and an inability to effectively communicate risk has left America in a vulnerable state. The national inventory of dams shows that 45 percent of all Federal dams are at least 50 years old, and that 80 percent of them are at least 30 years old.

We know less about the status and capabilities of our levees. There has never been a national inventory of levees. Little is known about the current condition of both Federal and non-Federal levees, including whether these levees were designed to meet current conditions or whether they have been properly maintained by the non-Federal interest.

Over the decades, levees have been built by different entities at different times and to different standards. They have been linked together to provide a protective system, but with such a mixture of conditions the true level of protection may be in doubt.

Over time, development has taken place behind some of these levees so that today may be much more of a risk in terms of lives and economic resources than in the past. The Army Corps of Engineers has authority over more than 2,000 levee systems, comprising more than 14,000 miles of levee infrastructure. However, more than 100,000 miles of levees makes this nationwide.

More people are moving to coastal and riverine areas where the risk is at its greatest. Because of Hurricanes Katrina and Rita, the Federal Government is augmenting State and local recovery efforts with billions of dollars of aid to the Gulf Coast. We do not know where the next hurricane or flood will hit, but we do know that many of our major cities, including parts of Washington, D.C., have a greater probability of flooding than did New Orleans.

For example, the city of Sacramento, California has almost twice as many people as New Orleans, yet it has less flood protection than any other major city in America. Cities like Houston, St. Louis, and Miami also are at risk. We cannot treat citizens of these cities differently unless we have a policy reason that we can explain and justify to our constituents.

There is so much that we do not know about the levees in America that we cannot be sure how safe our cities and towns really are. The National Committee on Levee Safety did an excellent job on its report. While it had only a little time to scratch the surface on the issue of levee safety, the report has provided a great deal of education and enlightenment to the Congress and the Nation.

The report reminds Congress and the Nation that just because people reside behind a levee or other flood damage reduction projects, they are not guaranteed safety, only that their risk of catastrophic loss has been reduced. An important reminder is how we define the 100-year flood event, that a resident has a 26 percent chance of a flood during the life of a 30-year mortgage.

In the 1920s and 1930s, levees and flood structures were constructed to defend against the 500-year or 1,000-year flood event. In 1968, the National Flood Insurance Program established the 100-year flood designation as its risk standard. This may have the unintended consequences of encouraging the construction of flood damage reduction projects to this arbitrary and relatively low threshold. Those living behind 100-year structures are not required to purchase national flood insurance. In fact, less than six million people hold flood insurance policies in more than 20,000 communities nationwide.

Well-designed and well-constructed projects continue to be economically justified because they reduce risk to life and property. However, new projects may also attract development that otherwise would not be there. Effective flood risk management involves multiple layers of defense and governance, a shared responsibility. Levees by themselves are not an effective solution. Raising structures, reestablishing floodplains, providing insurance and building reservoirs are all potential ways of reducing flood risk.

We cannot reduce risk over a few years. This crisis has been building for generations and it will take a combination of long-term and short-term measures to address the levee safety crisis. The American Society of Civil Engineers issued their report card on the Nation's infrastructure a few weeks ago, giving levees the lowest grade of all infrastructure types. They point out that more than 85 percent of the levees are locally owned and maintained, and their liability is uncertain.

Because we do not fully know the scope of the problem, we do not know what it is going to cost to fix it. However, a rough estimate by ASCE is that it may cost more than $100 billion to repair and rehabilitate the Nation's levees.

The Nation has recently been forced to face the fact that some banks and some businesses are just too big to fail. Well, I would submit to you that the potential risk posed by unsafe levees is a risk too big to ignore. We must begin to get an understanding of the scope of the problem and begin to discuss strategies to reduce flood risk in America.

I would like to thank the National Committee on Levee Safety for providing to Congress a reasoned and thoughtful approach to initiate efforts on a national levee safety program. While we may not agree on all of the finer points of their recommendations, I want to congratulate the members of the National Committee on Levee Safety for meeting the challenge of producing an enlightening report.

Thank you, Chairwoman Johnson, for holding this hearing. I look forward to the testimony of the witnesses.

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

We have three votes. The first one is 15 minutes. It is already down to five minutes. And the other ones are five minutes apart. We will not be interrupted any more today for votes that are scheduled. So we are going to recess and come back and go straight to our witnesses.

[Recess.]

Ms. JOHNSON. The Committee will come to order.

And we are going to begin with our witnesses. We have today Mr. Eric Halpin, Special Assistant for Dam and Levee Safety, U.S. Army Corps of Engineers, Washington; Mr. Larry Larson, Executive Director of the Association of State Floodplain Managers, Madison, Wisconsin; Mr. Steve Fitzgerald, Chief Engineer, Harris County Flood Control District, Houston, and he is also testifying on behalf of the National Association of Flood and Stormwater Management Agencies; and Mr. David Conrad, Senior Water Resources Specialist, National Wildlife Federation, Washington; Dr. Leslie Harder, Senior Water Resources Technical Advisor, HDR, Incorporated, Folsom, California, and testifying on behalf of the American Council of Engineering Companies; and Mr. Andy Haney, Public Works Director, City of Ottawa, Kansas, testifying on behalf of the American Public Works Association.

I want to express my appreciation for your being here. We hope to have a very informational session. That is one of the reasons we put everybody on the same panel. We want to get the benefit of your knowledge as completely as we can.

You will be called upon in the order that I introduced you. So now I will ask Mr. Eric Halpin to begin his testimony.

Thank you.

TESTIMONY OF ERIC HALPIN, SPECIAL ASSISTANT FOR DAM AND LEVEE SAFETY, U.S. ARMY CORPS OF ENGINEERS; LARRY LARSON, EXECUTIVE DIRECTOR, ASSOCIATION OF STATE FLOODPLAIN MANAGERS; STEVE FITZGERALD, CHIEF ENGINEER, HARRIS COUNTY FLOOD CONTROL DISTRICT, TESTIFYING ON BEHALF OF THE NATIONAL ASSOCIATION OF FLOOD AND STORMWATER MANAGEMENT AGENCIES; DAVID CONRAD, SENIOR WATER RESOURCES SPECIALIST, NATIONAL WILDLIFE FEDERATION; LESLIE F. HARDER, JR., SENIOR WATER RESOURCES TECHNICAL ADVISOR, HDR, INC., TESTIFYING ON BEHALF OF THE AMERICAN COUNCIL OF ENGINEERING COMPANIES; AND ANDY HANEY, PUBLIC WORKS DIRECTOR, CITY OF OTTAWA, KANSAS

Mr. HALPIN. Madam Chair and Members of the Subcommittee, I am Eric C. Halpin, Special Assistant for Dam and Levee Safety

with the U.S. Army Corps of Engineers and a registered professional engineer. I am pleased to be here today and have an opportunity to talk to you about my role as a Vice Chair of the National Committee on Levee Safety and our report to Congress on a national levee safety program.

Although I am here today discuss the committee's report, it must be clear that the committee's recommendations do not represent an Administration position. In a letter dated May 7, 2009, the Army noted that an official policy review by the Administration would use the findings in the committee's report to inform its final review. The Army also noted that the Administration expects to complete its review this fall.

Our Nation has experienced an increase in risk to people and infrastructure as a result of aging infrastructure. The history of the United States is full of lessons, both successes and failures of levee systems and their maintenance. The devastating floods of the 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 the 1960s.

So the report from the National Committee on Levee Safety includes recommendations and a strategic plan on a national levee safety program. The committee is a diverse group of professionals, mainly from State, local and regional governments, private sector, including some from the Federal Government that have worked diligently at representing national interests in levee safety.

I would like to preface the committee's recommendations by recognizing a few comments up front. A, the need for a broader flood risk management approach in the Country; B, an opportunity to take the National Dam Safety Program and the emerging national levee safety program and integrate them, an opportunity for leveraging levee safety as a critical first step in the national infrastructure investment dialogue.

The committee also recognizes that the levee systems commonly share the same space as water conveyance and critical ecosystems and habitats, and working with these interests is vital in effectively managing flood risk. The report for a national levee safety program embraces three main concepts: the need for new national leadership via a levee safety commission; the building of strong levee safety programs in and within each of the States; and the foundation of well-aligned Federal agency programs.

In all, there are 20 specific recommendations in the report. In the interest of time, I would like to highlight just a few: Establish a National Levee Safety Program that would oversee an inventory and inspection of all levees; develop national levee safety standards and a comprehensive national public involvement and education awareness campaign to better communicate risk; forge collaborative studies for the environmental and safety issues; and establish a Levee Safety Grant Program to assist States and the local and regional governments.

A second major point is to build and sustain strong levee safety programs in and within all States. Strong levee safety programs would initially be highly incentivized to qualifying States by providing technical assistance and training, critical data on levee in-

spections and inventory, Federal grants for startup and sustainment of State levee safety programs; and a levee rehabilitation improvement and flood mitigation fund targeted at communities with high risk levees.

The last major point is to align Federal programs that are associated with leveed areas by providing incentives to communities to exceed the minimum program requirements and benefit from lower risk flood insurance rates to policyholders who live in leveed areas.

Another aspect of alignment is to require mandatory risk-based flood insurance.

So a national levee safety program is not just a cost. It may be a long-term investment in public safety and economic prosperity. With the growing development and consequences in almost all areas behind levees, the benefits of a strong levee safety program are only going to increase over time. So not only does the concept of levee safety fit within the national infrastructure needs by protecting bridges and roads, 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, water and sewer treatment plants from frequent flooding.

So we view the report as a beginning, not an end, to addressing the issue of levee safety, and we look forward to working with you and the other stakeholders while the Administration conducts its policy review.

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 are beyond the original accelerated pace of the report, but are an important part of moving forward with a national levee safety program.

This concludes my statement, Madam Chair. I appreciate the opportunity to testify today on the ongoing efforts of the National Levee Safety program. I would be pleased to answer any questions you may have.

Ms. JOHNSON. Thank you very much.

Mr. Larson?

Mr. LARSON. Thank you, Madam Chair and the Committee.

ASFPM is grateful to this Committee in fact for its leadership in exploring what we consider to be a very important issue in the Nation's economic and sustainable future.

ASFPM believes there are a few issues that contribute to our national levee problems. I will just briefly mention some of those. You have already seen them in the testimony.

First of all, we think communities and States erroneously think that flooding is a Federal problem, and it is not. We don't really know how many miles of levees there are and their condition. Current FEMA and Corps policies do not work together. In fact, they have increased our levee risk over the years. We have lost huge amounts to the Nation's natural functions and resource because levees typically are on the edge of the river or our estuaries. Risks behind levees are increasing, as we have talked about and residual risk is not clearly understood.

I put up on the PowerPoint chart that I would like to show you and talk about just briefly. What this shows, actually General O'Reilly from the Corps of Engineers helped develop this chart. It

his concept. What we are seeing on the left side of the chart, if you start out with all flood risk that you are facing, there are a number of measures that you can take to buy down that risk. As you can see, it talks about doing zoning, building codes, outreach, evacuation planning, flood insurance and levees.

Flood insurance in fact does reduce that individual risk because it reduces consequences. When I talk about risk, I am not just talking about the probability of flooding. Risk is the probability times the consequences. So the more you have of consequences, the bigger your risk.

Some of the best long-term solutions we like to advocate for reducing flood risk include avoiding flood risk areas, especially deep floodplains and coastal storm surge areas. Secondly, to use nonstructural approaches because they have smaller long-term costs. Third, if we use levees at all, set back those levees so that we protect some of those functions and we decrease the pressure on the levees. And if we are going to put Federal dollars in, we ought to be talking 500-year levees.

Why hasn't this happened in the Nation? Let's talk about the two agencies I mentioned. FEMA has a policy, and Mr. Boozman talked about this, it says 100-year levee, now behind it you do nothing, no flood insurance, no regulations, no nothing. So even if the Corps had a positive benefit cost ratio, and typically the community opts for the low one because that buys them what they want. Ironically, we would fare better if the whole Nation had 99-year levees because then we would have essentially the same level of protection, but we would also have some of the other measures of insurance, regulations and some of the other things that would help give us backstop.

From the Corps' standpoint, this is where we get into what is currently a disincentive for good behavior. We use Federal taxpayer money to build 65 percent to build the levee. When the levee fails or over-tops, we use the taxpayers' money to either rebuild it with 80 percent or 100 percent Federal money. So I am the mayor of a local town. You are going to help me build this levee, and I am going to have this development behind the levee. I am getting all the tax benefits from that increased development, but when the levee over-tops and fails and when we have a disaster, you, the Federal taxpayer, are going to come in an bail me out. Gee, I wonder why I take those steps?

With those kind of policies in place, we are not going to solve this problem.

So before we can fix the levee problem, we need to change some other things, too, like some of these programs I just talked about: mandatory insurance behind levees; change the 100-year standard in FEMA; the Disaster Relief Act; the Corps' Public Law 84-99 Program.

From the standpoint of the committee report, we support a number of the recommendations that Eric just talked about. But also we would say on the commission that establishing a commission with a broader view of flood risk, and then with this levee sub##group that can proceed on some of these actions that Eric talked about would make more sense. If we only deal with levees,

and not with the broader issue of flood risk, we fear that we are going to be fiddling while Rome burns here.

Eric talked about the incentive, the strong State programs, and those are all good things. These aren't new ideas you are hearing from us. These have been in every report you can see about levees since 1982.

So standing up these next steps, Congress may want to consider standing up a broad flood risk committee, having a levee sub-group that proceeds on some of these items we talked about, of State capability incentives, engineering standards and the rest.

So that if we can move on those areas, and at the same time try to decrease those incentives that create bad behavior, I think we are going to make some progress.

I thank the Committee again for the opportunity to testify.

Ms. JOHNSON. Thank you very much.

Mr. Fitzgerald?

Mr. FITZGERALD. Thank you, Madam Chairwoman.

NAFSMA represents 100 members, mostly large urban agencies, and about 76 million citizens. Our members are on the frontline every day reducing loss of life and property damage from floods. NAFSMA members also deal directly with increased populations in helping to guide design of low flood risk neighborhoods, many of which will be built behind existing or future levees.

I am going to start with four general observations on the recommendations.

First, Mr. Halpin, I applaud you and the entire Committee who represented the breadth and depth of levee experience in the United States from all levels of government and the private sector. It is especially important that Bob Turner from St. Bernard Parish is on the committee. He experienced first-hand the consequences of major flooding behind a levee system. Their parish was devastated by Hurricane Katrina, with only five buildings not flooded.

Second, while this report focuses on levees, many of its ideas, approaches and recommendations are applicable to the broader issue of flood risk management. As stated in the report, improving levee safety will be most effective if it is conducted within the context of a national flood risk management program.

And third, levee safety is a shared responsibility. Responsibilities lie at all levels of government, and with persons whose lives and property are located behind levees.

And fourth, while everyone may not agree with all of the recommendations, it is paramount that implementation of the ones that we can agree on begin as soon as possible.

Now, I would like to talk about the recommendations. We divided them into three groups: those that need to be implemented as soon as possible; those that will take longer and should be implemented next; and the ones that need further study.

Thirteen of the recommendations should be implemented as soon as possible. They address expanding the levee inventory, adopting a hazard classification system and national levee safety standard, providing technical guidance, removing liability barriers, and delegating responsibilities to the States, augmenting existing FEMA programs, and funding.

One in this group is particularly important to the NAFSMA members who are currently trying to maintain the integrity of their existing levees. Conflicting regulatory and environmental agencies views are resulting in long delays or inability to perform the needed infrastructure maintenance, such as removing trees. NAFSMA concurs with the Levee Safety Committee recommendation that acceptable operation and maintenance practices need to be developed in coordination with environmental agencies so lives and property can be protected, and significant environmental resources are not impacted.

There are five in the implement next group. They include developing tolerable risk guidelines, public education and awareness, levee safety training, research and development, and exploring incentives and disincentives.

And finally, there are only two that we identified as needing further study. The first is the establishment of a National Levee Safety Commission. It would focus exclusively on levees, unlike the current situation where levee issues are spread between the Corps and FEMA. It is probably the smart thing to do to develop a strong national program. However, some NAFSMA members are skeptical of another layer of government.

The other one is the mandatory purchase of flood insurance in leveed areas. Although NAFSMA agrees that participation in the National Flood Insurance Program helps reduce the impact of financial damages on individuals and businesses and raise awareness in the participating communities, it does not change their flood risk.

We also understand that actuarial rates would be applied. We are interested in seeing how the formulas would be developed where levees can fail for various reasons and consequences can vary greatly. NASFMA believes that a thorough evaluation of the long-term impact that the mandatory purchase requirement would have on local communities is needed. NAFSMA agrees with the House approach in the bill approved last congressional session calling for a study of these impacts to be carried out before Congress mandates such a change.

In closing, NAFSMA recommends continuing to utilize the experts and practitioners on a levee safety committee to ensure effective and timely implementation of the National Levee Safety Program, to reduce flood risk, loss of life, property damage, and recovery cost.

Thank you for giving us this opportunity to make this statement.

Ms. JOHNSON. Thank you very much.

Mr. Conrad?

Mr. CONRAD. Thank you, Madam Chairwoman, Ranking Member Boozman and Members of the Subcommittee. The National Wildlife Federation greatly appreciates the opportunity to share our views on the recommendations of the National Levee Safety Program.

We also want to compliment the prodigious work of the committee in assembling this report on a quite compressed time schedule. This is a very broad subject. The report provides many important insights as to conditions confronted by the Nation, States and communities faced with reliance on aging and in some cases poorly constructed levees. Yet we are concerned that the report fails in

some fundamental ways to adequately approach current and future risks associated with levees.

Madam Chairwoman, the report traces a history of an aging, constantly deteriorating, and often poorly designed, constructed and maintained stock of levees in environments that are in many cases facing growing flood risks, which has led us to the point of rapidly increasing risks and costs of flood-related damages. It begins to frame out how a series of often poorly coordinated Federal programs, combined with quite serious public misperceptions about risks involved, have driven to a dangerous over-reliance on levees, too often to the exclusion of other critical hazard mitigation approaches.

When combined with the growing risks associated with global warming and climate change, changes in snow pack and runoff, more frequent and more severe storms, increasing sea levels and erosion along coasts and population increases, and major ongoing changes in intensifying land uses and urbanization that are increasing flood risks, it is clear that the risks and costs of flooding to many communities and society as a whole are rising alarmingly.

Madam Chairwoman, a the broadest level, our concerns with the proposal fall into three categories. The scope of levee safety in the proposal is too narrowly defined to assure flood risk reduction over the long term. Protection and restoration of the environment and implications of climate change, sea level risk, and changes in watersheds are given too little recognition.

And finally, too great an emphasis is placed on the Federal Government to resolve problems that should properly be led by State and local entities.

As the Federation reads it, the committee has principally defined the focus of levee safety to assessing and managing the condition of the levees themselves, rather than placing them in the full context of the floodplains in which they are located. We believe it is unwise to approach the Nation's levees as divorced from what is happening in their floodplains. The Federation believes that absent viewing levees in their full context, the narrow focus may lead to compounding costs and increasing risks, rather than the opposite.

Another extremely critical concern is failure of the committee's proposal to clearly include among responsibilities of the commission and States to identify and consider environmental factors in developing broad levee safety plans. Congress gave important new direction in WRDA 2007 in a new national water resources policy that added critical new criteria and considerations such as focusing on sustainable economic development, seeking to avoid the unwise use of floodplains and flood-prone areas, and protecting and restoring functions of natural systems. Yet these are essentially unreflected in the committee's proposed levee safety program.

Without question, enormous ecological damage has been caused by excessive reliance on levees as primary, and sometimes only flood damage control strategies in many areas. In some regions, millions of acres of riparian wetlands, riparian lands and floodplain lands have been cut off, drained and divorced by levees from their natural connection with rivers and estuaries. As a result, we are now witnessing not only enormous adverse environmental effects, but also growing flood risks and costs from the losses of natural

flood control systems, and the program needs to be revised to address that.

We are concerned that the effectiveness of the Levee Safety Commission or a key agency assigned such leadership would be limited without the establishment of an overall strengthened and coordinated Federal approach to water resources that should be built on regional and watershed concepts. The committee recommended this, but offered no basic proposal to address it.

There is a strong question whether the Levee Safety Commission or individual Federal agency could cause the called-for substantial alignments of Federal flood hazard mitigation and environmental programs sufficient to serve as a major motivator for States to develop strong levee safety programs.

The Federation and a number of other members of the National Levee Safety Committee Review Team made strong recommendations that revitalization of a Cabinet level U.S. Water Resources Council could be the best means to help focus the resources of the numerous Federal water-related programs to convince States to actively engage not only in levee safety, but also in a desperately needed effort to reduce flood risks through a full range of tools and risk reduction means across the Nation.

Finally, we want to say we are greatly concerned that the committee has recommended the Federal Government should essentially presume responsibility for much of rehabilitation costs for urban levees by flatly recommending a 65 percent Federal/35 percent non-Federal cost share. We believe it is entirely premature to make such a recommendation. At this stage, we do not know what the total costs may be and we have not fully explored the range of cost share and financing options that may be available.

Again, we greatly appreciate the opportunity to present the views of the National Wildlife Federation regarding the recommendations of the National Levee Safety Committee. We believe that the committee, however, has fallen short in a number of key areas which if not addressed would greatly hamper the effectiveness of moving forward with levee safety.

Thank you, and I would be happy to respond to any questions.

Ms. JOHNSON. Thank you very much.

Dr. Leslie Harder?

Mr. HARDER. Chairwoman Johnson, Ranking Member Boozman and Members of the Subcommittee, I very much appreciate the opportunity to testify before you today about the importance of the National Levee Safety Program.

My name is Leslie Harder, and I currently serve as the Senior Water Resource Technical Advisor for HDR, Incorporated, a national employee-owned architectural engineering consulting firm.

I am also an active member of the American Council of Engineering Companies, ACEC, whose 6,000 member firms employ more than 500,000 engineering professionals across the Nation. And I am one of the members of the National Committee on Levee Safety whose recommendations you are now considering.

In short, as the Chair and Ranking Member have very well summarized, 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 our levee systems.

Now, I have a little handout that I made, hopefully you have it up there, to emphasize certain points. If I could turn to the second page, on the second page there is a photograph of a dredge taken about 100 years ago constructing one of the levee systems in California, which actually is part of the Federal flood control system today. This is the technology and the techniques that actually constructed many of the levees that now currently protect us across the Nation. And even though this may be 100 years old, even the more recent levee construction a few decades ago are not a lot better. They are basically long piles of loose dirt.

Well, what do we know about these long piles of loose dirt? So on the next page, we do recognize they are integral to our communities. They are critical for the protection of people, property and other infrastructure. Now, the Chair and the Ranking Member did a great job of summarizing what we don't know about all these levees, the over 100,000 miles that we don't know exactly where they are at, their unknown integrity. We do know one thing: they are aging and they are deteriorating.

We also know that there are no national standards or approaches, and there are liability issues. And these liability issues are burdening our current flood risk reduction efforts.

On the next page are the 20 recommendations that the committee put together. On behalf of ACEC, the engineering community supports all of these recommendations. They are all important. Now, the ones in red I have chosen to highlight today in the following pages.

So the first of these to highlight is the need to develop a common set of levee standards. We do not have common standards for criteria today. Different Federal agencies use different standards. The States use different ones. It will be necessary to base our future investments and priorities using common standards and common language. So the Committee has recommended the development of interim guidelines and eventually over a five-year period, a national levee safety code.

On the next page is a recommendation for developing tolerable risk guidelines. These are basically the guidelines for target levels of protection of risk for different communities. Not every community needs the same level of protection. A small town in California does not need the same level of protection that New Orleans does, for instance.

On the next page is mandatory risk-based flood insurance. I probably can't say enough how much this is needed. There are so many reasons for this. First of all, it is probably the fastest way to speed financial assistance to flood victims. It will limit financial damages to public agencies and the taxpayers. It will improve understanding of flood risks and the need to take individual responsibility. Risk-based premiums will motivate the public to improve flood protection. And regardless of the level of protection any community has, everyone who lives behind a levee at some point will have a fair amount of risk.

Next page is design and delegate State levee safety programs. The committee recommended such programs. It is clearly an intent of Congress to have them. States are uniquely positioned to oversee and coordinate such activities. And we believe that the primary im-

plementation of a national program for non-Federal levees will be through State programs.

On the next page, national levee rehabilitation and improvement mitigation fund. Most of our recommendations are associated with the basic due diligence of managing critical infrastructure. But after we begin looking at our levees, we are going to find lots of deficiencies and they will be pervasive. And so we need a fund to rehabilitate them, and this is what is intended as a cost shared grant program. Now, we are always concerned about costs, but if we don't do something like this, our inaction will be that we as a Nation will be paying a lot more later.

On the next page is the recommendation to replace the term "certification" as it is used with FEMA's National Flood Insurance Program. If we replace it with something like "compliance determination" or NFIP determination, it would avoid the misperception by policy makers, the general public and liability insurers that this is a warranty, which it is not.

On the next page, addressing the liability issue. When Congress originally tasked the Corps of Engineers to begin constructing flood control projects, it recognized that it could not afford to build these projects and also be liable for them. So Federal immunity against liability was built into the process. And today, that Federal immunity is being challenged. But State agencies, local agencies and the private firms that serve them do not have any such protection at all. And as a result, both in the private sector and public sector, engineering organizations are reluctant or unable to provide engineering services because of the liability.

And States and local agencies are reluctant or even refusing to sponsor new flood control projects for fear of acquiring new liability, which they cannot afford. The National Levee Safety Program cannot achieve success without resolving this issue.

And then finally, we certainly endorse the need for a public involvement education and awareness campaign.

In conclusion, on behalf of ACEC and the Nation's engineering industry, I want to thank the 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.

And I, too, would be happy to answer any questions.

Ms. JOHNSON. Thank you very much.

Mr. Haney?

Mr. HANEY. Chairwoman Johnson, Ranking Member Boozman, Members of the House Subcommittee on Water Resources and Environment, thank you for the opportunity to present this testimony.

I am Andy Haney. I am the Public Works Director for the City of Ottawa, Kansas. Ottawa has a population of approximately 13,000 residents. It is protected on both banks of the Marais des Cygnes River by levees totaling approximately 4.6 miles in length. This levee system was constructed by the United States Army Corps of Engineers. Recently, I represented the American Public Works Association as a member of the review team for the National Committee on Levee Safety.

Flood control systems, which include levees, are among the infrastructure that APWA members plan, design, build, operate and maintain. I submit this statement today on behalf of the more than 29,000 public works professionals who are members of the APWA.

The recent recommendation to Congress by the National Committee on Levee Safety is to establish a National Levee Safety Program and to require mandatory risk-based flood insurance in leveed areas. The economic impact of these recommendations for the Federal Government has been under review by the Office of Management and Budget, but the economic impact on local governments and on our citizen taxpayers may not be receiving the attention that is necessary and warranted.

While some issues brought forward by the public works community were addressed by the National Committee on Levee Safety, a significant portion of our feedback seems to have been overridden by other interests.

APWA would like to offer the following recommendations which we believe would greatly improve the creation and implementation of the National Levee Safety Program.

Initially, place a moratorium on the schedule relating to provisional accreditation letters now being taken on levees that are affected. This would provide for a reasonable period of time for elected and appointed officials nationwide to discuss this issue in depth with appropriate Federal agencies, their citizens, local businesses, and other stakeholders before initiating efforts towards levee compliance determination.

Additionally, this would allow a more thorough understanding of the needs of the Federal Government to institute the policy change and for local governments to assess and address the impacts that may result.

Next, publicize the anticipated cost to property owners for insuring properties against flood damage. Include information related to what cost reduction for that coverage may result if a property owner is, "protected by a compliant levee."

Next, we suggested to the National Committee on Levee Safety that the administration of the National Levee Safety Program should be retained by the U.S. Army Corps of Engineers. The Corps could promulgate rules related to when and if a program could or should be delegated below the Federal level based on reasonable criteria. The Corps should be augmented with the appropriate budget, staff and equipment to accomplish this as a routine function.

To supplement the effort, the Corps could retain consultants to complete assessments and other work throughout the districts. We believe the results would be far more standardized and significantly reduce overall costs than if the project is undertaken by individual communities.

Next, and significant, is to modify the threshold of lives at risk as a determinant of Federal financial aid availability. The focus on human safety is the highest priority stated in the report. We agree. And the report indicates the emphasis should be placed where there is a risk of 10,000 lives if a levee fails. That threshold of danger to human lives will likely exclude smaller communities with respect to receiving any Federal funding to improve levees. Even the

larger cities may have difficulty attaining that 10,000 lives threshold.

However, inundation of the levee-protected area of our town, as just one example, will possibly affect that number of jobs due to the business center being within the levee-protected area. The economic loss could become devastating, and there should be some means of incorporating that economic loss in the formula.

We also think that other associations should be brought in that have an interest, for instance, the National League of Cities, the National Association of Counties, and U.S. Conference of Mayors.

Our levee system since it was built has been locally, not federally, funded. We have paid for all of the maintenance and we have maintained it religiously. As a member of this review committee, I have determined that not everybody has done that. But there needs to be some measure of that taken, and I think we need to take more time.

Chairwoman Johnson, Ranking Member Boozman and Members of the House Subcommittee, thank you for conducting the hearing and inviting us to present our concerns and our recommendations for the public works community. APWA stands ready to be a resource as this goes on.

Ms. JOHNSON. Thank you very much.

I would like to ask Mr. Halpin a couple of questions, then I will move it on to Mr. Boozman and some of the other Members.

Mr. Halpin, in your testimony you state that this report will advise the Administration in its official policy review. Who is participating in this review? And has the policy review begun?

Mr. HALPIN. Yes, Madam Chair. The Office of Management and Budget is conducting the clearance review of this and coordinating with other Federal agencies. That started in February and will continue, even though the report has been forwarded by the Army to Congress. They expect to finish that in the fall.

Ms. JOHNSON. This was all Federal agencies involved in the floodplain or management development?

Mr. HALPIN. Ma'am, I am not privy to all the agencies that have been coordinated with.

Ms. JOHNSON. OK. Thank you.

Mr. Boozman?

Mr. BOOZMAN. Thank you, Madam Chair.

Mr. Fitzgerald, what are your concerns about the recommendation for expanding the National Flood Insurance Program to require property owners and businesses in levee areas to buy the insurance? Is the insurance, if you can help me a little bit, is it the same if you have a 100-year levee versus a 500-year levee? How does that work?

Mr. FITZGERALD. I think that is one of the unknowns is how would that work. There are a lot of questions about how those rates would be determined. In addition, you know, FEMA is in the flood insurance business and I think that has been their primary focus. With levees, you are going to get into other kinds of risk having to do with the structural integrity of the levee, consequences, the number of people behind it. There are more things involved in determining those rates and how that would be determined. So we

feel like we need to take a look at that and get an idea of what that would do in those areas.

Also, there may be some areas that are at just as high of a risk than behind levees within our floodplains. And so there could be a consideration of looking at where are the highest risk in communities, not just behind leveed areas.

Mr. BOOZMAN. Right. Very good.

Let me ask this of the panel. At the October 20th, 2005 Subcommittee hearing, the former head of the Dutch agency that builds flood control projects told the Subcommittee that in The Netherlands, the government made a political decision to provide a certain level of flood protection, and then directed the engineers to design projects to meet that level of protection.

In the U.S., we instead ask the engineers to decide what is technically feasible, economically justified, and environmentally protective, and then we authorize the levels of protection to meet these criteria.

Can you contrast? Can you comment on the Dutch system versus our system? Whoever wants to jump out.

Mr. HALPIN. Sir, I will take a shot at that.

One big difference between the Dutch system and the U.S. system is the majority of their country is in a very flood risk-prone area on the North Sea below sea level. It would be like having our Country look like New Orleans. So you would have to be careful about legislating a level of protection based on a Country that is much larger and much more diverse than The Netherlands.

That being said, there is something to be said for the commitment of a nation to establish a level of flood protection in legislation that is essentially around an extreme event.

Mr. BOOZMAN. But that really points out too the difficulty of kind of a one size fits all in our Country.

Mr. Larson, only 10 States maintain a levee inventory and only 23 States have an agency with levee safety responsibility. Why are the States unwilling or unable to address the public safety risks associated with the levees?

Mr. LARSON. I think you will see that a number of States used to do more in both levee and dam safety. I used to run a dam safety and levee safety program and a floodplain management program in a State myself.

As I pointed out earlier, we are seeing this evolution of people thinking the Federal Government is taking over floods and flood damages, and we are going to solve the problem at a Federal level. As a result, as governors and State legislators, come time for them to put money into their dam safety and levee safety programs, they are saying, well, this is a Federal problem; this is one thing we can cut because the Federal Government is taking care of it.

I think that is leading us in the wrong direction, which is why the incentive scenario is to turn it around so that we start to reward those States that do a better job. The reality is they are going to have to be at the State level. The solutions to this really aren't engineering. We know how to engineer a levee. We always did. We always do. But the reality is what is causing our flood risks to increase is the land use and the other uses associated with levees. And land use is really in our Constitution only the purview of the

States, not the Federal Government. So we have to get the States involved in this if we want to solve this problem in the long run.

Mr. BOOZMAN. I am done, Madam Chair, but would you like to comment, Mr. Conrad? You were nodding.

Mr. CONRAD. Yes, I was nodding. I think part of the point that I was trying to make in our testimony and in my summary is that risk is building up because there is an awful lot of perception that, oh, the Federal Government will somehow take care of me here, either with levees and then bigger levees and then bigger levees, or disaster assistance and insurance that I can purchase very cheaply even if the risks are very high.

So I think that is really a fundamental problem that we have in this area. We have seen a huge amount of additional development over the last several decades in floodplains in rather dangerous locations. We are beginning to kind of catch up with that. We really need to stay on top of that. We need to do these inventories. We need to develop plans, and we need to engage the public in thinking through how to manage this risk.

But fundamentally, we need much better floodplain management, and we need to do that with Federal incentives and disincentives, and work with the States and local governments to make that happen.

Mr. BOOZMAN. Thank you, Madam Chair.

Ms. JOHNSON. Thank you.

Mr. Hare?

Mr. HARE. Thank you, Madam Chair.

My district covers West Central Illinois, and I go almost from the Wisconsin border with the Mississippi River down almost to St. Louis. So a number of levees and levee systems, and I have seen a number of them, particularly last year, fail. And you know, there is an Upper Mississippi River comprehensive plan that has been signed off on by the governors, et cetera.

Part of the problem of what the levee people are telling me, for example, the Sny Levee District, is saying that when the levee fails, they have to go back to their levee district because the Corps isn't, you know, the Corps can do only what the Corps can do, and then they have to come up with $1 million on their own. And these are people who have just been, you know, hit pretty hard and they have to try to figure out some way of being able to rebuild this levee system.

I would like to know, you know, from the panel's perspective. I understand that the comprehensive plan, if we did it, would run about $6 billion to bring it up to those type of levels where, Senator Durbin and I were sandbagging, and he said, Phil, either 200 years has gone by awful fast or we just did this eight years ago.

And so I am trying to see what maybe the panel's opinion is in terms of what do we do? Do we build these things back up? Because we are going to be spending a tremendous, and rightfully so, we are going to be spending a lot of money on flood relief for people who have been wiped out. I have the town of Gulf Port that is no longer a town. It is gone. You go down there and you look and it is basically been wiped out.

And some farmers tell me, well, some people say that is only agriculture on the other side of that levee. When it breaches, that

farmer whose got thousands of, hundreds of thousands of dollars invested in equipment, it is his whole life, and it puts him at risk.

So I would like to know from maybe your perspective what do we need to do here? Because these levees are going to fail. Some of them are going to be decertified. People can't get insurance. I mean, you know, what do we need to do here? Do we need to rebuild these things? Or what are we going to do? Because this is an area, it is going to flood again. The question is not if, it is when. Are we going to have another 200-year flood next year?

So I would be very interested just maybe to get opinions from you folks in terms of what, you know, where do we go? What do we do? And anybody is welcome because I am sort of stuck here and I am looking for some help.

Mr. CONRAD. Well, I think the Country confronted this to some degree right after the Midwest flood, and we did something a little bit different. We, with my organization and I think some of the organizations represented here, recognized that there are a variety of solutions to deal with flood issues. And if we only focus on levees, that is not good, actually.

After the Midwest flood, there were many, many buildings, 10,000 buildings in the nine upper basin States that had been so badly damaged they were bought out using some Federal support, either 75 percent or 50 percent depending on which States you are talking about, support to do buy-outs and relocations. And buildings and people were relocated to higher ground.

So I think that with cases like Sny Levee or others, I don't know all the details there, but we need to think on the long term where we are going with this. What are those long-term costs likely to be if we continue to battle Mother Nature and lose? And so that is why a broader national flood risk management and environmental—these are environmental issues, too—about where we occupy and where we don't, what we are doing with the land. There are number of farming activities that can go on as long as there aren't residences there and an enormous amount of equipment, would still be productive.

So there are a lot of things we can do like that. We just have to think of it on a much broader level than just levee or no levee kind of thing.

Mr. HARE. Mr. Fitzgerald?

Mr. FITZGERALD. Yes, and I am a civil engineer and I kind of think in more simple terms. I think it appears to me we are almost in a triage situation of, where is the next failure going to be? Where are we going to have the next flooding with the levees? So it seems like doing an evaluation and inventory of all the remaining levees that are not Federal would be a really good thing, so we can start anticipating where that next problem may be. Putting our resources toward those locations would be a good first step while we are working toward the longer term solutions like Mr. Conrad was saying.

And we local sponsors or local entities also agree that flood risk management is really the bottom line. We need a really good flood risk management program, and levees are just part of that. A lot of us local areas, levees aren't our first choice. They are our last

choice a lot of times. They are not our first choice. Some people think they are, but they aren't.

But I think doing the inventory and putting our resource to those areas that need the help most would be a good first step.

Mr. HARE. Thank you, Madam Chair.

Ms. JOHNSON. Mr. Cao?

Mr. CAO. Thank you, Madam Chair.

I represent the City of New Orleans, and in the last three years we have had Katrina, which is a 500 level storm; Gustav, which is a 100 level storm. And during both of those storms, my house got flooded.

My question to you is, the people of my district constantly live under the threat of hurricanes and floods. And I want to know what would be the most effective and cost-effective means of protecting the New Orleans metropolitan area and whether or not The Netherlands model would be a feasible option.

Mr. LARSON. I didn't hear the last part of your statement. Whether what would be feasible?

Mr. CAO. The Netherlands model.

Mr. LARSON. Oh. Well, The Netherlands succeeded, well, I shouldn't say they succeeded. So far, they have held back the sea. What they gave up, however, was a fishery. So in the Gulf, you have to ask yourself, do we want to protect the City of New Orleans at the expense of our seafood, which as I understand provides, what, 30 percent of the seafood to the Nation out of the Gulf Coast area? So it is a balancing act. Like we always do, we are balancing one set of economics and one set of social issues and the cultures for another.

Can we rebuild all of New Orleans and maintain it there, at the same time we are losing the wetlands that protect it? If we build a levee around the entire Gulf, what do we give up instead in order for that to be accomplished?

These are not easy issues and there are of course huge cost issues. No easy answers, and while everybody is working through this problem right now, those solutions are probably going to be very long term.

At the same time, we see the climate change and the sea level rise, all those of things that end—of course, you have the added disadvantage of subsidence in New Orleans. So you are really caught between the rock and the hard place to ask yourself, what parts of this city can we help be here 100 years from now? What are the solutions so that we can still maintain what has to be here? Those are very difficult choices that are not going to be very easy despite how much money we throw at them.

Mr. CAO. So basically you are saying that there is no cost-effective solution to protect the area?

Mr. LARSON. Maybe if you say, are we going to put a wall around it and protect it, is it going to be safe.

Mr. CAO. No. I am asking you a question of whether or not, what would be the most cost-effective and the most feasible way to protect the area.

Mr. LARSON. Well, and that is what some of the studies are looking at now. And I think what we are hearing a lot of is at the same time we provide some levee protections for portions of the city, we

need to also do those things that will help rebuild the wetlands in front of New Orleans so that we have more natural protection—those sorts of things. We are going to have to figure out what does that mean in the climate change, sea level rise scenario.

So I haven't seen anybody showing me what the cost-effective solution is yet, and there are a lot of studies going on on it. So I don't really know the answer, but it is not going to be easy.

Mr. CAO. So I guess this is for the panel, in addressing the issue of the levees, obviously you have to work in conjunction with coastal restoration and other issues. And how are we going to come up with a plan that can comprehensively work in conjunction with the various issues in dealing with protection? Because it seems to me that we are just addressing one issue at a time, and that it might not provide the people with the adequate protection that they require, especially the many residents who live along the Gulf Coast.

Mr. CONRAD. Congressman, this has been a situation that has been developing for a long time nationally, that our water decisions are being done in a sort of stove-piped way. You are right. We are just kind of focusing on one thing at a time and not the whole system. I think that there are efforts now being made to see the Louisiana coast as a system, as very natural. It is a dynamic system. It was literally levees for navigation that wound up cutting off the sediments for the coastal Louisiana wetlands that have been the principal cause of damage to the wetlands, which are part of nature's protection for coastal Louisiana.

So we need to look at this as a system, and I think we would recommend on a national level that we find some mechanisms to look at water resources among multi-departmental ways. I made the recommendation of a reestablishing a Water Resources Council that we used to have and we don't have now, that would bring the agencies together to talk about these things in that much broader frame.

Mr. CAO. Yes, sir?

Mr. HARDER. I support a lot of what was just said. At the end of the day, as you well very much know, the Corps of Engineers is currently spending many billions of dollars to repair previous damage and also upgrade the system around New Orleans. In total, I believe it is probably on the order of $15 billion just for this one city. And so that will certainly lead to improved flood protection compared to what it was prior to Katrina.

And perhaps all these other endeavors associated with environmental restoration will also provide some long-term benefits as well and they ought to be pursued. But at the end of the day, the city will remain vulnerable to some extent, and there needs to be probably recognition of that and by the community, and that individuals are prepared for that either through emergency action plans, evacuations to reduce the potential for loss of life, purchase of flood insurance for speedy recovery when such a thing happens, and communication of risks so that people understand really the nature of the environment they live in.

Mr. CAO. Thank you.

Ms. JOHNSON. Thank you very much.

Ms. Titus?

Ms. TITUS. Thank you, Madam Chairman.

If you addressed this while I was out of the room, I apologize. But I would like to shift the geography a little bit to the west. As you know, levee breaches can happen even in the desert. About a year and a half ago, a 30-foot section of a levee broke in an irrigation canal out from Fernley, Nevada. That is 30 miles from Reno. Eight hundred houses were flooded; 3,500 people had to be evacuated. It was kind of a disaster for the State to deal with.

Now, I know that a lot of desert States are kind of like Nevada, but I haven't heard much about what is being done there to look at levees. There is an article that was in the New York Times on the 29th of March and it discusses how the United States Bureau of Reclamation owns that canal and they rented it out, or it is under contract with the Truckee-Carson Irrigation District. After the flood and after it was determined that the district had been defrauding the Federal Government, getting more water than they were entitled to, which they are now under indictment for, the Bureau shut down the canal for inspections and has broadened the review to include other systems it owns throughout the west.

I would ask you if you know where that is today? If you know about the review of other systems in the west, starting with Mr. Halpin, and maybe Mr. Larson. And if you don't know about it, why not? And what can we do to have better cooperation among agencies as we move towards a national inventory and a plan, which you all seem to advocate? And maybe Mr. Conrad could add to that in light of what he has suggested about the Water Resources Council.

Mr. HALPIN. Ma'am, this is Eric Halpin. The legislation, called the National Levee Safety Act, specifically called us to look at this issue of what would be included as a levee and what wouldn't be. And it did guide us in the direction that structures along canals were something we need to look at. We did look at that closely. We understand the sensitivities of that issue, and the committee decided that structures along canals that might be used for irrigation or other purposes should be covered under the National Levee Safety Program.

So the structures along canals share many of the common characteristics of levees, not all of them, so not all of the recommendations apply to such structures, but you will see them included under the definition. And until such time, because of the public safety mandate, until such time that other safety programs cover such structures, we believe they belong under the National Levee Safety Program.

Ms. TITUS. Do you know where that review is of the systems throughout the west? Is that moving forward? Or do you have any results yet?

Mr. HALPIN. We have no results. I am not familiar with the review you are talking about other than what we covered under the committee.

Ms. TITUS. Okay.

Mr. LARSON. I think the Bureau of Rec is undertaking that review, Madam. At the same time, I want to move to your other question because until they respond, we won't know what they found out in that review. But your question kind of is why don't the Federal agencies talk to each other. This is a common problem.

It is not only Federal. You will find the same thing at State, even at larger local communities. As we see reduced budgets, one of the first things you cut out is the ability to talk to somebody else because you are worried about your own stovepipe.

This is why we think that some flood risk group that is almost a Cabinet-level type of thing is necessary so that we do get the buy-in from agency to agency, because despite what Eric or the Corps of Engineers might want to do in this area, they need the cooperation of the Bureau of Rec, and if the Bureau of Rec says we are not going to do it, somehow Congress needs to say, yes, you are; we will all work together on this, and here is an oversight structure that will allow you do to that.

That is why we think that is extremely important.

Mr. HARDER. I am Leslie Harder. Just to extend or add to Eric Halpin's testimony, the committee did agree with Congress that embankment structures along canals should be included as Congress intended as a definition of levee. There are important differences of how they are operated and maintained, but there is no other regulatory environment that is available at this point in time. And the extended inventory and database that the committee has recommended also would extend to include such structures, and it is part of our recommendation.

Ms. TITUS. OK. Thank you.

Mr. CONRAD. I think it has been said here. The National Wildlife Federation agrees that there is a need for a regulatory scheme to look at irrigation canals. It does seem to fit with this kind of framework. And I completely agree with what Larry Larson said about the need for an overarching communications system to be set up among agencies.

Ms. TITUS. Thank you, Madam Chairman.

Ms. JOHNSON. Thank you very much.

Mrs. Napolitano?

Mrs. NAPOLITANO. Thank you, Madam Chair.

There are many questions. I will probably have to submit some in writing.

But Mr. Halpin, the stability and protection of the California delta, you know, I am a California Representative, is crucial to maintaining the California water supply. And the Army Corps has focused its work on securing the levees for the safety of the population, especially in the floodplain area, which also needs to be secured to prevent seawater from mixing with the fresh water.

But what are they doing to protect the Bay Delta and strengthen these important levees, given that some of them are private and some are Federal, for the safe drinking water and protection of the breadbasket, the farmland that is there?

Mr. HALPIN. Ma'am, we recognize that is a critically important area of the Country, for the whole Country, but some of the issues in the delta levees have to do with our authorities, where we have them and where we don't have them. So I think some of the non-Federal levees that you are talking about down in the delta are not ones we currently have authorities for. The State of California has one of the most robust levee safety programs of any State, so I think you are seeing some very positive actions there in regard to those levees.

Mrs. NAPOLITANO. Well, but given the State budget, I don't think that is going to be coming to fruition real soon. So do you have any suggestions?

Mr. HALPIN. I don't think you can see the Corps of Engineers activities change very much without a change in authorities.

Mrs. NAPOLITANO. Do you work in concert with your California counterpart?

Mr. HALPIN. Yes, we do.

Mrs. NAPOLITANO. Okay. I would love to have a kind of conversation with you because I am very interested in what their governance issues are going to be.

To Mr. Harder, what would be your recommendations for retrofitting the Bay Delta, the levee which is really, well, it is critical.

Mr. HARDER. Thank you for the question. In my former life I used to be Deputy Director for the California Department of Water Resources.

Mrs. NAPOLITANO. I thought I recognized you.

Mr. HARDER. And was intimately involved with some of those issues. As you very much well know and have alluded to, over 1,000 miles of levees in around the San Joaquin Delta are very vulnerable. Only a small portion of them are actually Federal levees. The vast majority are non-Federal.

California's drinking supply, California's economy depends on those levees. And basically, most of California's drinking water goes through that delta. So those levees are not just for flood control. They are actually for California's economy and the Nation's economy. So they are critically important, as you have drawn attention to it.

They are very vulnerable. They are very weak. They have failed probably 170 times over the last 100 years or so. And of course, they are very vulnerable to a future earthquake.

The current operation of the delta and maintenance of those levees is not sustainable either for the environment or for water demands. And as you know, there is an effort underway to try and basically come up with a more sustainable system for both of them.

Over time, probably they are going to have to be able to sustain only part of the delta in the future. And I think this points to not only a governance structure for the delta, but also the importance of a State program, a State levee safety program that takes into consideration not just, you know, inundation flood control, but all the other aspects as well, whether it is water supply or the environment.

And that has been part of the recommendations by the National Committee on Levee Safety, is to develop strong State programs. Much of the work that needs to be done, while all of it is shared, a lot of it has to be done at the State level.

Mrs. NAPOLITANO. Is that in conjunction with the Governor's Task Force?

Mr. HARDER. Yes, and the Bay Delta Conservation Plan efforts and other efforts that are going on there.

Mrs. NAPOLITANO. Well, the sad part is that those levees, if they were to fail, it would contaminate a lot of the valley, which feeds quite a bit of the Nation with fruits, vegetables, et cetera. And so it is critical for us.

Given the unpredictability of Mother Nature, as one of you stated just a minute ago, is that the 200, 500, 100-year flood, whatever, might happen tomorrow. Again, the flood insurance question is something that bothers me because when we went to Louisiana after Katrina and there were signs all over the insurance companies were negating claims to help some of the homeowners. Never mind the flood insurance, these are the actual residents of the affected homes.

Is there anything being done to be able to ensure that they don't cherry-pick or that they do have insurance aside from flood insurance?

Mr. CONRAD. Well, pretty much the only game in town across the Nation for flood insurance is through FEMA's NFIP program. Very few insurers want to offer flood insurance and almost all that is sold is through the FEMA program.

FEMA currently offers a variety of rates. They have a mandatory rate if you are mapped into the 100-year floodplain. You can also buy flood insurance if you are outside the mapped 100-year floodplain and in that case you get a preferred rate which is about one quarter of what you would have to pay if you were mapped within the 100-year floodplain - called the Special Flood Hazard Area.

So there is already a procedure in place through FEMA to have variable rates. And if we built on that and go forward so that everybody living behind the levee takes the responsibility, and purchases flood insurance, they will be better off in the long run. They will get speedier, faster financial assistance in case of a flood. It will relieve some of the taxpayer burden and it will better communicate risks.

Mrs. NAPOLITANO. Well, thank you.

Madam Chair, I totally agree that we need to consider having a Water Resources Council so that the agencies can speak to each other—or Mr. Chair—and be able to come to some understanding of what is necessary and how the funding is going to have to be provided to ensure the protection of those areas.

Thank you.

Mr. BAIRD. [Presiding] I thank the gentlelady.

I will recognize myself for five minutes.

Thank you, gentlemen, for your testimony today. I am sorry my colleague from Louisiana is not here. The reason is that, as many of us voted for billions and billions of dollars for levees in New Orleans, I was chagrined when the Governor of Louisiana earlier this year took it upon himself to challenge the legitimacy of funding for volcano observatories. Well, if one lives in New Orleans, levees matter. They matter to my district. But we live below a volcano that has killed more than 60 people, the only one that has done so in the continental U.S. ever. And so observatories matter to us.

How much has been spent on levees in the New Orleans area? Does anybody have a sense of that?

Mr. HALPIN. Sir, I can't give you an up to date current total right now. We could get back to you with that exact answer. But the overall program for the Corps of Engineers in restoring the levees down there right now to their currently authorized level is about $15 billion.

Mr. BAIRD. Fifteen billion, with a B?

Mr. HALPIN. Yes, sir.

Mr. BAIRD. Let the record show that the disputed amount for volcano observatories is about $18 million, with an M, million versus $15 billion. And as important as those levees are to New Orleans, observatories are rather important to our area.

When we build levees, the Corps constructs them, to what extent is the maintenance of the levee factors into future budgets? In other words, you know, we estimate the cost, but do we then say, okay, so we are now burdening either the Federals or the locals with some anticipated maintenance fee for the foreseeable future? How does that get sorted out?

Mr. HALPIN. Sir, the cost for maintenance and operation of the levees right now, since the Water Resources Development Act of 1986, said that was a local sponsor responsibility. So that is recognized in the development of the project and development of operations and maintenance and manual plant, but that is a responsibility of local governments.

Mr. BAIRD. But the local governments tend to come to us, quite understandably, and say can you get an earmark in the next WRDA or the appropriations bill to repair our levees. Is that a fair assessment? I can tell you existentially and phenomenologically it is for me. What is it for you?

Mr. HALPIN. It varies quite a bit across the Country, sir.

Mr. BAIRD. But it is not uncommon for local folks who maybe perhaps have the obligation to maintain levees to—yes?

Mr. HANEY. If I may, sir, I am one of those. And we have since the levee was built approximately in 1960 in our town, there hasn't been a Federal maintenance dollar spent, earmark or otherwise, on our levee.

Mr. BAIRD. Good for you.

[Laughter.]

Mr. HANEY. Not that we didn't ask.

[Laughter.]

Mr. BAIRD. Yes, please, Mr. Fitzgerald?

Mr. FITZGERALD. Yes, I just wanted to say that the local sponsors in the NAFSMA organization understand their obligations. We all understand the obligations, and we do work with the Corps of Engineers when they are developing their economics analysis for levees and provide feedback on what some of those operation and maintenance costs are.

But I think over time through the deterioration or aging of these levees, as was mentioned earlier, as we know sometimes the costs can outweigh what the locals can come up with sometimes. And so we come asking for help at the State or the Federal level. So I think that is just probably more systemic of the older systems, and not maybe the newer systems.

Mr. BAIRD. Mr. Larson?

Mr. LARSON. I think what Steve has talked about in Kansas is that there are good levee districts and communities that take care of their levee. On the other hand, there are lots of them that don't. I think it is important that we all back up and say that building a levee to begin with was the community option. There are other options: relocate people out of the flood plain; elevate; the rest. But that community chose to have a levee, and committed when the

Corps of Engineers built it that we will undertake the operation and maintenance.

We are all seeing now when we do build the levees, we need to make sure that those obligations on the part of the local sponsor are a lot more, and maybe even bonded ahead of time, those sorts of things, so that we know that there is assurance that that operation and maintenance will occur, so that the Federal taxpayer is not once again asked to do the same thing over and over and over again.

We talk in the flood insurance program about repetitive flood claims for structures. We also in the Nation have repetitive levee claims. We have levees that fail over and over and over, and the Federal taxpayer is rebuilding them. So it is important that we try to tighten that scenario so that those who make that option, choose that option have the opportunity to do what they said they would do.

Mr. BAIRD. Well said. I would concur with that.

Please, Dr. Harder?

Mr. HARDER. I would concur that most local agencies understand that when they support a Federal flood control project and accept it from the Federal Government, they have agreed that they will maintain it to Federal standards on their dollar. Many of these agreements go back decades, if not 50 years, with the completion of various projects.

The complexity of maintaining these levees has become more challenging with time. Many of these levees are deteriorating more. They have more than just routine maintenance that is needed. They have all sorts of deficiencies that have to be done.

And also, and this is not a hit against my buddy here, but the Endangered Species Act has made complying with the requirements associated with those regulations a lot more challenging for a local government or a local maintaining organization, which sometimes is just like a handful of people. And as a result, one thing ends up giving. Either the environment ends up giving, or the maintenance ends up giving.

This is a conversation we need to have in terms of what is the proper maintenance level. And then when we formulate future projects, is to better incorporate those things in what the actual maintenance is going to have to end up being like.

Mr. BAIRD. A point well taken, Dr. Harder.

I think one of the things we need to do is better provide that informed consent up front. Where it is very frustrating is the levee gets constructed. Once the levee is there, then houses and business property gets sold that is now protected by the levee. So people build there. And they build with some anticipation that somebody else has to then foot the cost of protecting the land that they bought in, knowing they bought in what would otherwise be a flood area. And to some extent, then boucing it back to Uncle Sam and saying, okay, now the Feds have to somehow pay for this, while the locals have benefitted, but have not incorporated that into their property tax, somehow needs to change, in my judgment.

If the Feds are going to build a levee with the local sponsor assumption that it is their maintenance responsibility, then it is their maintenance responsibility and those who choose to build in that

area protected by the levee ought to have some surcharge in some fashion, it seems to me, to cover that, if that is the terms of the agreement.

If we want to change that, okay, but we shouldn't be building levees with a false assumption. I would hope in some way in the future we can—and that includes, by the way, the City of New Orleans, Louisiana, in my judgment. And if we want to change that rule, okay, but let's at least be honest about where that funding will come from and who is benefitting and who is paying for that cost.

So Mr. Boozman, do you have any comments or questions?

Mr. BOOZMAN. No. Thank you, thank you very much, Mr. Chairman.

Thanks to the panel. This has been a very interesting and I think a very informative day, and we appreciate your taking the time to be here. Thank you.

Mr. BAIRD. I thank the panelists.

And with that, the record will remain open for the customary two weeks for people to offer additional comments.

With that, the hearing stands adjourned.

[Whereupon, at 4:12 p.m. the Subcommittee was adjourned.]

OPENING STATEMENT OF
THE HONORABLE RUSS CARNAHAN (MO-03)
HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

Hearing on
Recommendations of the National Committee on Levee Safety
Tuesday, May 19, 2009
2167 Rayburn House Office Building

Chairwoman Johnson and Ranking Member Boozman, thank you for holding this hearing to review the recommendations on improving our nation's levees made by the National Committee on Levee Safety.

As a nation, we will forever remember August 29, 2005, the day the levees broke and gave way to the devestating effects of Hurricane Katrina. This storm was one of the deadliest and costliest in our nation's history, and yet most valuable in terms in of raising our awareness and consciousness to the status of our nation's levee and flood protection system.

As seen over the course of history, it is apparent that we face many challenges in evaluating, restoring and improving our levee system. Just last year, in my home state of Missouri several levees broke due to the flooding of the Mississippi River and there is a high probability that many more will fail due to climate change, future flooding beyond the design of the levees, and the passage of time if something is not done to fix our aging levee infrastructure. Moreover, there are thousands of miles in levees that are inadequate, deteriorating and whose performance and whereabouts are unknown. Congress has recognized these challenges and the urgency in improving our levy system and started taking proactive steps by enacting, over the President's veto, the Water Resources Development Act of 2007, which established the National Levee Safety Committee (the Committee).

The Committee has been charged with researching and recommending ideas and solutions to increase awareness of flood safety and our levee system, increase flood preparation, and creating and establishing national standards for the levee program. Today, the Committee has submitted many recommendations that aim to improve various aspects of our levee system. While all of these recommendations are not perfect, it is important to note that this is a starting point and that the recommendations provide some guidance for implementing fundamental changes to our nation's levee system and ensuring the safety of those that reside behind the levees.

We, the local, state, and federal government, have a shared responsibility in ensuring levee safety and that our levees operate for their intended purposes: reducing flood risk,

loss of life, property damage and recovery costs. I sincerely believe that these recommendations and today's testimony will lead to a meaningful dialogue on levee safety, which will ultimately lead to creating new legislation improving our levee system.

In closing, I want to thank our witnesses for joining us today to share their expertise and suggestions on our nation's levee system. Finally, I look forward to working with the Committee and Congress as we work to restore and improve an important part of our national infrastructure and ensure the safety of the American people.

Statement of Rep. Harry Mitchell
House Transportation and Infrastructure Committee
Subcommittee on Water Resources and Environment
5/19/09

--Thank you Madam Chairwoman

--The United States has more than 2,000 levees measuring more than 14,000 miles collectively in the Army Corps of Engineers' Rehabilitation and Inspection Program.

--114 of these levees, however, have received unacceptable inspection ratings.

--This means, among other things, that if the non-federal sponsors of these levees do not make necessary repairs, these levees will potentially lose their eligibility for federal funding to repair levee damage following a flood.

--In addition, according to the report by the National Committee on Levee Safety we will be discussing today, there may be more than 100,000 additional miles of non-federal levees that, as of now, are not documented. As a result, the federal government cannot currently ensure that they will provide adequate protection from floods.

--I look forward to hearing from our witnesses about how we can meet these and other challenges facing our nation's levees.

--I yield back.

Statement of David R. Conrad

Senior Water Resources Specialist

National Wildlife Federation

Before the

Subcommittee on Water Resources and the Environment

of the

House Committee on Transportation and Infrastructure

U. S. House of Representatives

For hearings on

Recommendations of the National Committee on Levee Safety

May 19, 2009

Washington DC

Good afternoon, Chairwoman Johnson, Ranking Member Boozman and Members of the Subcommittee. I am David R. Conrad, Senior Water Resources Specialist for the National Wildlife Federation, the nation's largest conservation education and advocacy organization with our more than four million members and supporters and affiliate conservation organizations in 47 states and territories. The National Wildlife Federation greatly appreciates the opportunity to share our views on the proposal for a National Levee Safety Program developed by the National Levee Safety Committee (" NLS Committee") established by Title IX of WRDA 2007. The Federation has a long history of active involvement and concern regarding the nation's flood damage reduction and floodplain management programs. It is critical to note the choices our nation makes at this juncture and from here forward regarding how we approach levee safety are of immense importance and consequence. We greatly appreciate the Subcommittee's decision to hold hearings on this important subject today.

The Federation wishes to compliment the prodigious work of the NLS Committee in assembling this Report on a very compressed time schedule. This is a very broad subject. The Report provides many important contributions and insights as to the conditions confronted by the nation, states and communities faced with reliance on aging and in some cases poorly constructed levees. Yet we are also concerned that the Report fails in critical ways to adequately approach current and future risks associated with levees.

History and Context of Using Levees for Flood Damage Reduction

As the NLS Committee notes, we are now at a critical point in history – we are witnessing "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 a social fabric that are in a particularly vulnerable state."

The Committee's report notes that over this hundred-year period there have been waves of levee construction with differing philosophies and regulatory and professional viewpoints regarding levees' construction and uses. In the early 20th Century many levees were built especially for lower-risk agricultural uses. This was often accompanied with greater public recognition of the likelihood of failures. In the 30's through the 60's the

nation launched a binge of large levee building on rivers and in coastal environments that placed high faith in our abilities to engineer water systems. This also induced large populations and property development into floodplains and placed them at risk of flooding in the event of structural failure or overtopping from large floods. In addition, many communities began to convert older agricultural levees to levees for urban use. Many communities were led to believe levees were fail-safe solutions to flooding and they could be fully relied upon. In addition, the levee binge was accompanied by huge environmental alteration and damage, cutting off and draining large amounts of natural floodplains, riparian lands and wetland habitats, adversely affecting many of the major wildlife resources of the nation, and with what we now recognize as all too often having devastating and lasting environmental effects.

The Committee's report touches on the extremely unfortunate and peculiar interplay between the standards and requirements of the National Flood Insurance Program (NFIP) and the Corps of Engineers flood control financing -- and we would add project planning procedures -- that added up to conditions particularly since the 1960's that fostered an explosive level of growth in heightened-risk floodplain development, and where many communities sought levees with only the minimum 100-year (1% annual chance) levels of flood protection in order to avoid the mandatory flood insurance purchase requirements for their residents and requirements for land use and building controls for floodplain-located construction. There are many other examples where programs' interactions have fostered unwise and risky growth in flood prone areas.

When combined with the growing risks associated with global warming and climate change, changes in snow pack and runoff, more frequent and more severe storms, increasing sea-levels and erosion along our coasts, and population increases and major and ongoing changes in intensifying land uses and urbanization that are also increasing flooding risks, it is clear that the risks and costs of flooding to many communities and to society as a whole are rising alarmingly. Certainly where many levees are involved, a wide range of problems for now and for the future must be seriously addressed.

National Wildlife Federation Concerns Regarding Proposed National Levee Safety Program

Madam Chairwoman, at the broadest level our concerns with the current Levee Safety Committee proposal fall in three categories –

- the scope of levee safety is too narrowly defined to assure flood risk reduction over the long term;

- protection and restoration of the environment and implications of changing climate, sea-level rise and changes in watersheds are given too little recognition; and,

- too great an emphasis is placed on the federal government to resolve problems that should properly be led by state and local entities.

We strongly agree with the Levee Committee's emphasis on completing a national inventory and assessment of levees, providing for vigorous public education on risks and public involvement in mitigating risks, establishing and improving standards, development of a National Levee Safety Code, and developing and distributing technical materials and training for states, community officials and the private sector. Regardless of what mechanism is chosen to lead a national levee safety program, these are critical elements that are well defined in the proposal and need to be done.

We urge the Subcommitee to give additional attention to the following concerns in the event it may wish to proceed with a response to the Levee Committee's recommendations:

Scope of Levee Safety is too narrowly defined. As the Federation reads it, the NLS Committee has largely defined the focus of levee safety to assessing and managing the condition of the levees themselves, rather than placing them in the full context of the floodplains in which they are located. We believe it is unwise to approach the nation's levees as divorced from what is happening in their floodplains. The Federation believes, and we and other Reviewers raised these concerns repeatedly as the Committee began to lay out its proposals, that absent viewing levees in their full context, the narrow focus may lead to compounding costs and increasing risks rather than the opposite. It is essential to assess and understand the long-term risk management and cost implications of whatever choices are made to manage and reduce risks associated with levees. The Report acknowledges that most levees are destined toward degradation over time and the costs of

maintenance and rehabilitation are often extremely high. So if anything, every levee should be viewed from the standpoint of what its role should be among the range of risk reduction strategies available and in the context of all relevant factors in management of the floodplains involved. For instance, we now know much more clearly that New Orleans levees cannot and should not be viewed outside the context of what is happening to Louisiana coastal wetlands that are seriously degrading and now resulting in increased storm surge risk from increasingly intense hurricanes. Levees must clearly be viewed within the context of long-term development trends and how these will or should be managed in their floodplains and in their larger watersheds.

Failure to acknowledge or address levees' impacts on environment. Another key concern is the failure of the Committee's proposal to clearly include among the responsibilities of the Levee Safety Commission and requirements of States to identify and consider environmental factors in developing levee safety plans. Congress gave important new directions regarding water resources development in Section 2031(a) of WRDA 2007 by setting a new "National Water Resources Policy" that states:

"It is the policy of the United States that all water resources projects should reflect national priorities, encourage economic development and protect the environment by –

- ***Seeking to maximize sustainable economic development;***

- ***Seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and***

- ***Protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems."***

By emphasizing investments supporting sustainable conditions, avoiding unwise use of floodplains, minimizing adverse impacts and vulnerabilities, and protecting and restoring functions of natural systems and mitigating impacts to natural systems, Congress has added critical new criteria and considerations that would be relevant in many instances to levee safety planning, yet these are essentially not reflected in the Committee's proposed Levee Safety program. These are serious omissions that undermine the

potential effectiveness of a Levee Safety program. Certainly there are many ways through inventories, consultations with a broad range of agencies, coordination of programs, and establishment of incentives and disincentives, where such policies could be implemented effectively through a well-designed Levee Safety program, but thus far we believe the proposal falls far short of the mark.

Without question enormous ecological damage has been caused by excessive reliance on levees as the primary and sometimes only flood damage control strategy in many areas. In some regions millions of acres of wetlands, riparian and floodplain lands have been cut-off, drained and divorced by levees from their natural connection with rivers and estuaries. As a result we are now witnessing not only enormous adverse environmental effects, but also growing flood risks and costs from the losses of natural flood control systems. The NLS Committee's Report itself acknowledges:

> "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." (NLS Committee Report, p. 20)

After the 1993 Great Midwest Flood, Congress made substantial funding available for successful buyouts of floodplain lands damaged by levee failures. These voluntary purchases of frequently flooded levee districts were much applauded and improved both environment and public safety conditions. We believe an effective Levee Safety program should be equally designed to seek out where such multiple public benefits can be accomplished by bringing together environmental, public safety and other critical objectives, such as dealing with increased threats from climate change, yet the proposal thus far fails to clearly and affirmatively make these necessary connections.

Effectiveness of a National Levee Safety Commission would be limited without support of a strengthened, coordinated federal approach to water resources.

We are concerned that the effectiveness of a National Levee Safety Commission or the efforts of any agency that might be assigned the key leadership in developing a National Levee Safety program would be limited without establishment of an overall strengthened and coordinated federal approach to water resources that would be built on regional and watershed-based concepts. The NLS Committee recognized this concern, but offered no basic proposal to address it:

> "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." (Committee Report, p. 23)

There is a strong question whether a National Levee Safety Commission or an individual federal agency could cause the called-for substantial alignments and realignments of existing federal flood, hazard mitigation and environmental programs sufficient to serve as a major motivation for States to develop strong Levee Safety programs of their own.

The National Wildlife Federation and a number of other members of the NLS Committee Review Team made strong recommendations that revitalization of a cabinet-level U.S. Water Resources Council could be the best means to help focus the resources of the numerous federal water resources-related programs to convince states to actively engage not only in levee safety but also in a desperately needed effort to reduce flood risks through a full range of tools and risk-reduction means across the nation. We were disappointed that the Committee did not directly address these concerns. Developing a Levee Safety Program could be a direct project of a revitalized Water Resources Council or the Council could become a principal federal support for researching, developing and implementing key recommendations of a National Levee Safety Commission.

Other key concerns for a Levee Safety Program.

Responsibility for levee safety must be directed principally to those benefiting from the structural projects themselves. It is premature to recommend a high Federal cost-share program for levee rehabilitation.

As we have stated, the Federation strongly supports recommendations for continuation and expansion of levee inventories, public education, updated assessments, development and implementation of standards, and implementation of incentives and disincentives to promote levee safety and promoting strong state levee safety programs. We are concerned, however, that the NLS Committee has recommended the federal government should essentially presume responsibility for much of the rehabilitation costs for urban levees by recommending a 65 percent Federal, 35 percent non-Federal cost share. This is without knowing what the total costs may be and without fully exploring the range of cost-share and financing options that may be available. We believe it is premature to make such a recommendation. It would be critical to first estimate the potential cost of this program because once established, such a cost-share would likely become the standard, expected approach for levee rehabilitation in the future. We believe it would also be critical to consider what other sources of funding could be made available to fund such projects. For instance, there has recently been considerable private-sector interest shown in rehabilitation projects. The Federation further believes this type of investment would be particularly appropriate for establishing a sliding-scale type cost-sharing arrangement, based upon a range of other flood risk-reduction methods and plans that are employed by communities as part of a larger risk-reduction plan.

Waivers of liability should not be granted.

The Federation would be opposed to granting of waivers of liability associated with levee inspection and construction. Any levee structures carry with them potential for major damage and loss of life, and it is critical that all those involved with their construction and management carry out their responsibilities with utmost care. The Federation believes development and implementation of rigorous professional codes, standards and procedures would be the best means of managing liability issues responsibly.

Mandatory risk-based flood insurance and establishment of basic land use and building code requirements should be required for all residual risk properties behind levees and below dams.

We strongly applaud the NLS Committee's recommendations that the National Flood Insurance Program's mandatory flood insurance purchase requirements and appropriate land use and building code requirements should be developed and implemented in natural floodplains behind levees and below dams. Recent history has made abundantly clear that levees do not eliminate risk of flooding and the failure in the past to require risk-based flood insurance is a major contributor to devastation of communities and large and increasing disaster assistance costs. Stronger standards should also be established to protect critical facilities such as hospitals, schools, public buildings, wastewater treatment facilities, and critical transportation systems as part of levee safety planning. NFIP flood hazard mapping should be expanded to much better communicate potential risk and to include identification of natural and beneficial functions of floodplains to support broader floodplain management planning.

Urge full review and updating of the P.L. 84-99 program. The Federation also strongly agrees that a number of current federal flood-related programs should be reviewed and better aligned to avoid promoting high-risk floodplain development and reduced levee safety. Among the programs listed by the Committee, the National Wildlife Federation believes it is long overdue for Congress and the Administration to review the P.L. 84-99 program, particularly regarding levee rehabilitation, to assure consistency with modern policies and programs.

National Levee Safety Committee Review Team Comments. During the Review Team meetings and in subsequent written comments a range of entities made comments similar to those of the National Wildlife Federation. We have appended this testimony with the Federation's December comments on the Draft Report. The comments describe in further depth our concerns and the rationale for our recommendations. We would suggest the Transportation and Infrastructure Committee may wish to request and review the Review Team comments as an additional background source for its deliberations on these matters.

Conclusion.

Again, we greatly appreciate the opportunity to present the views of the National Wildlife Federation regarding the recommendations of the National Levee Safety Committee. The Committee has made a number of important findings and recommendations which deserve serious consideration. We

believe, however, that the Committee has fallen short in a number of key areas that need critical attention, which, if not addressed would greatly hamper the effectiveness of moving forward with improving levee safety. We hope the Committee on Transportation will give attention to these additional concerns as it considers any further action on these important matters. Thank you for your consideration of our views.

National Committee on Levee Safety (NCLS)
Review Team Feedback Form

DIRECTIONS: The Committee would like your feedback on their draft recommendations. The associated Review Team compilation document and presentations from the Dec. 12, 2008 meeting provide more detailed information. **Please send your responses to terry.r.zien@usace.army.mil (and copy laura_sneeringer@sra.com) by December 22, 2008.** Since the NCLS is working on a very quick-turnaround time, a quicker response is appreciated. The Committee will take your feedback into consideration, but due to the limited timeframe, responses will not be provided.

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Initial Overall Comments:

The National Wildlife Federation appreciates the opportunity to comment on the National Committee on Levee Safety's proposed Outline and December 12, 2008, Draft recommendations for a National Levee Safety Program (NLSP). We applaud the Committee for the major effort made thus far to begin to address these difficult national issues.

We are concerned, however, that thus far the Draft is not incorporating elements and perspectives the Federation believes will be crucial to the ultimate success of a NLSP. In particular, our concerns about the report include:

- the need to considerably broaden the viewpoint of the Draft from a focus principally on levee structures to a viewpoint that includes the full context of the affected floodplains and present and future land uses that must be managed in these areas;

- the need to recognize and respond to the ongoing environmental impacts of many levee systems, the external changes affecting levee systems, and the need for creative responses to these impacts and changes. Plans should include expanded use of non-structural approaches to floodplain management and flood damage reduction, application of the best available climate science and up-to-date science of sea-level rise, expanded use of voluntary buyouts and relocations and increasing elevations of flood prone properties, active restoration of natural floodplains, wildlife corridors and fish and wildlife habitat, expanded use of open-space floodplain zoning, and planning based upon reasonably foreseeable "future conditions," including future impacts of land use changes and watershed developments on floodplain functions. The report must better recognize the growing need for environmental management and ecosystem restoration, which, in many cases have become major and increasing concerns related to levees and other structural flood control systems;

- the need for a much stronger system of incentives and disincentives for the States to engage in a levee safety program and for levee owners and affected communities to become much more involved in levee safety, flood hazard mitigation and wise floodplain management. This will require significant adjustment and modification of a range of current national flood damage reduction, floodplain management, disaster assistance, hazard mitigation, levee repair, natural resources management, ecosystem restoration and other programs. While we appreciate the Draft's listing of potential areas of adjustment, the Federation urges the Committee to develop a set of specific recommendations that taken together will provide the necessary encouragement for states and local communities in to engage in much more serious actions to improve levee safety, wise floodplain management, protection and restoration of important natural resource values, and to protect people and property by truly reducing flooding risks and costs;

- the need for a governance structure that can address levee safety and floodplain management related issues in a multi-agency and multi-Departmental water resources policy framework. The Federation believes either a National Levee Safety Commission or a single lead agency approach may fall short of bringing the necessary engagement and broader focus of federal programs needed to address these issues. The Federation urges the Committee and the new Administration to further consider providing funding for the U.S. Water Resources Council or similar body, working with stakeholders, as an alternative structure to address levee safety issues in the necessarily broader context we have described above. This was raised by several commenters in the December 12th Review Team session.

- the need for greater clarity of responsibilities for levees. Those who construct and own levees should be responsible for them. While the Corps of Engineers can serve as a center to inventory the nation's levees, levee owners must be responsible for the more costly and detailed geotechnical assessments by professionals qualified to conduct them. The Federation would not support waivers of liability or granting immunity from liability for levees. Waiving potential liabilities is not the way to "incentivize" wise, safe and prudent behavior.

Other General Comments:

The Federation is quite concerned with a statement in the Draft Outline for a Plan for a National Levee Safety Program, which defines the *vision* of the National Levee Safety Program as *"An informed public and reliable levee systems working as part of an integrated approach to protect people and property from floods"* and then narrows the focus of the Committee's plan and recommendations (paraphrased) to: 1) technical issues related to levees, 2) public education and awareness of levee risks, 3) development of levee safety programs that emphasize protection of human life, and 4) implementing governance solutions and incentives that encourage and sustain effective levee safety programs at all levels of government.

The Outline then goes on to say: *"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 mitigation elements such as insurance, floodplain management, evacuation, and building codes;* ***and while the Committee believes it is critical that such elements be considered in the larger context of a systems approach they are beyond the scope set out in the Levee Safety Act."*** (emphasis added)

Such a statement of intention largely excludes one of the most critical problems facing the nation as it relates to growing flood risk and confronting the problem of having failed in many instances to properly consider the larger implications of the use of levees in natural floodplains and, over time, failure to manage the mounting risk associated with land uses associated with a poorly identified and often inadequately regulated inventory of deteriorating levees. Further, the scoping of this exercise largely ignores the already large and mounting set of environmental problems increasingly identified with traditional "flood control" strategies where the use of levees and other structures has divorced water resources from their floodplains with costly ecosystem impacts and losses of ecologically and economically important natural functions that we are finding to be enormously expensive to restore or replace.

At the October 31 Review Team workshop the Federation raised our serious concerns associated with viewing development of the National Levee Safety Program with such a narrow scope, and we particularly noted in our oral comments to the Review Team and Committee members that we believed failure to fully incorporate the new *National Water Resources Planning Policy* spelled out by Congress in Section 2031(a) of WRDA 2007 would make it considerably more difficult later in the process to shape a modern levee safety strategy. Others also expressed concerns on the narrow scoping.

We also raised our concerns that current science has identified with high probability that global warming will be accompanied with more intense storms and floods, wider variations in hydrologic patterns, and accelerating sea level rise, and that these factors need to be accounted for up front in any longer-focused national levee safety program strategy.

Congress' new policy states: ***"National Water Resources Planning Policy. It is the policy of the United States that all water resources projects should reflect national priorities, encourage economic development, and protect the environment by – (1) seeking to maximize sustainable economic development; (2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems."*** (Section 2031(a), WRDA 2007)

This is a broad policy that should be used to guide development of a new National Levee Safety Program as well as other projects and programs now and in the future. Direction for the NLSP guidance should not be limited only to Title IX. We believe that at present, the

draft proposal is focused almost entirely on levee structures and is failing to adequately consider and incorporate related lands, waters and natural resources in a broader strategy of reducing risks and vulnerabilities of existing and future development and properly protecting and restoring functions of natural systems and mitigating unavoidable damages to natural systems.

For the above reasons and others discussed in the following answers to questions posed by the Committee, **we would recommend that the National Levee Safety Committee request additional time to broaden the scope of the Committee's proposal to align it more closely with the new national policy, to incorporate consideration of climate change and sea-level rise factors and broaden the view of floodplain management as critical elements of the Plan. Further refinement is needed in developing meaningful recommendations that will engage States, local governments, levee owners and the public in actively managing levee systems and associated lands to better protect the public and the environment.**

NWF Responses to Committee Questions:

Components of a National Levee Safety Program
Which is preferable: fewer, but stronger, state programs or requirements for every state to have a levee safety program?

Ultimately, a national levee safety program should be designed to be delegated to the States, with the assistance of national data collection, aggregation and assessment, development of federal standards and establishment of incentives and disincentives to promote appropriate public safety and wise environmental management. The States are probably in the best position to effectively direct overall improvement of the safety of levees, while also educating the public about flooding risk and managing and reducing the growth of flood-related risk from unwise development in floodplains.

The delegated programs should be strong programs, well-incentivized through substantial linkages with a range of federal programs for disaster assistance, flood insurance, and flood-related infrastructure, and potentially others, particularly focusing on linkages with a) the minimum requirements and standards necessary for federal program participation, and b) a sliding-scale of levels of federal cost-sharing for the benefits of federal programs, based on ratings of states' and communities' efforts to control, manage and reduce flooding risks.

State programs should be designed to increase public safety to a high level in the long-term, as well as the short term, and to protect and increase the quality of the nation's environment and to take fully into account longer-term factors, such as impacts of global warming, climate change, sea-level rise, and land-use development and other changes in watersheds that may affect flood-related and ecological safety.

Finally, the direction of a National Levee Safety Program and implementation by delegated State programs should be aimed at actually, and in aggregate, reducing flood risks and damages and the devastating human-related impacts from present-day levels, locally, regionally and nationally. It should not simply be aimed at dampening the rate of increase of

damages and casualties. This we believe unfortunately appears to characterize most current flood-related programs.

Are minimum qualification requirements reasonable compared to benefits/incentives?

No, NWF believes the minimum requirements outlined in the 12-12-08 draft will not be sufficient nor will the benefits/incentives proposed will be sufficiently compelling to motivate most States, local governments and levee owners to address many critical levee and flood-risk-related problems in a timely fashion. Nor will most be motivated to take significantly greater responsibility for managing flood-related risks of ongoing and future floodplain development. NWF, first, believes that basic requirements should include substantial floodplain management planning, and participation in the NFIP. Second, as we stated above, there must be greater and more meaningful linkages with other current flood-related programs to result in positive consequences for embarking on improvements in flood-risk safety and wise floodplain management efforts and substantial and motivating negative consequences for failure to do so.

Are the lists of incentives and disincentives meaningful? Are there any incentives or disincentives you would add or remove?

Establishing a system of effective incentives and disincentives that engage the key constituencies involved with levee systems and floodplain development must be central to the Committee's efforts. However, the 12-12-08 draft fails to develop and recommend a proposed set of meaningful federal program changes to create and strengthen incentives and disincentives to motivate the involvement of States, local governments, levee owners and present or prospective floodplain residents toward risk management and wiser floodplain management. *This is a key and major weakness in the NLSP, so far.* NWF appreciates that the Committee has attempted to identify a number of the possibilities, but we believe the document is seriously lacking for substance here.

The Table on page 31 speaks volumes as to why federal programs have generally failed to turn around the explosive levels of growth of risk-prone floodplain development, especially in urbanizing and high-growth areas. The Table shows that as currently structured, the CRS incentives are principally aimed the benefiting only property owners in the NFIP community (i.e. reducing the *flood insurance rates* for homeowners or businesses located in regulated floodplain areas). Other than requiring the most basic (and generally too low) minimum standards for community NFIP participation and providing modest compliance and repetitive-loss mitigation assistance, the NFIP does not for the most part aim its incentives or disincentives at levee owners, local communities, regional-level governments or the States. Thus, local governments or States, *who actually hold the legal powers and responsibilities to control where and under what conditions building can take place in floodprone areas*, have little stake in exercising those controls for flood safety purposes or for environmentally-wise floodplain management. This is especially the case for lower-probability, high-consequence flooding events such as avoiding or managing risk associated with levees. The NFIP-CRS benefits only go to individuals, which is generally not motivating to local elected officials, or motivating only to the extent the measures chosen are easy to implement (e.g. maintaining flood-related information on file at the local library, for instance). There is not enough

consequence for many communities to take on the more difficult jobs of careful floodplain management or management of flood risk in areas behind levees or below dams, such as flood-risk avoidance, establishment of permanent open space, strict zoning, significant restrictions on fill, or more strict building elevation requirements.

At present, from the perspective of local and State governments, the benefits of most Federal disaster assistance and flood-related programs generally promote, rather than discourage development or redevelopment in and around floodplains, and they are blind as to whether the governments involved are lax or vigilant regarding levee safety and floodplain management. The benefits flow to local governments and states at the same levels (often extraordinarily high levels -- ranging from 65 to 100 percent federal cost-shares), whether or not they engage in wise floodplain management, risk-reducing building practices above minimum levels, or levee safety management.

The NFIP-CRS, again, encourages mitigation, but its direct monetary benefits flow almost entirely to individuals. The Community rating system (the actual rating of communities' actions for planning and implementing risk management measures), which is *potentially an extremely important risk-mitigation and floodplain management tool*, only affects individual premium flood insurance rates, and currently does not apply to any other federal mitigation programs that are important to States and communities. So the CRS's potential for motivating communities located behind levees or communities facing floodplain development pressures, to take meaningful actions, is mostly unrealized.

The Federal disaster assistance and other mitigation-related programs, in addition, are not aligned with wise flood plain management or levee safety. Public Assistance (PA), Individual and Family Assistance (IFG), Hazard Mitigation Grants (HMGP), Mitigation Planning grants, Flood Mitigation Assistance Grants (FMA), Severe Repetitive Loss grants (SRL), Pre-Disaster Mitigation Grants (PDM), various federal agencies' disaster loan programs, and the Agriculture Department crop insurance program should be reviewed for the means of alignment with levee safety and floodplain management. Making availability of the benefits of these programs contingent on State adoption of a levee safety program and other hazard mitigation measures would be a key incentive for risk management.

Among the most critical programs that should be reviewed for alignment is FEMA's **Stafford Act Public Assistance Program**. Because this program provides major disaster assistance for public infrastructure impacted by natural disasters, the management of which, in turn, can have major impacts on community development and redevelopment and therefore existing and future flood-related risks, the Federation urges the Levee Safety Committee to explore how thoughtful modifications in this area could serve to motivate greater levee safety and floodplain management actions at the local and state levels. Establishment of a sliding scale of federal cost-shares for disaster aid, based on community rating principles and with even modest steps, based on community achievement in flood risk management could make a major difference in risk reduction and future costs of disasters. A similar analysis should be made on how to best align the **Corps of Engineers flood control and flood damage reduction programs**, first, potentially by requiring state adoption of levee safety program responsibilities as a basic eligibility requirement, and, second, establishment at the federal

level of a sliding-scale system for flood control project cost-shares, based on community rating of flood risk and floodplain management measures implemented.

Critical in addition, we strongly urge the Committee to **carefully review the Corps of Engineers P.L. 84-99 program for modifications and to make recommendations** for updating the program in light of current conditions and experience and to align this program with levee safety principles, the evolving National Flood Insurance Program and new national floodplain management policies, including WRDA 2007. This 1946 program generally assumes that damaged levees should be immediately repaired to their pre-flood condition, generally at 80-100 percent federal expense. In light of the growing problems of climate change, changes in watershed land uses and hydrologic conditions, changing growth patterns and increasing urbanization impacts on flood-related problems, and the importance of emphasizing local responsibility, **there is no current flood-related program in greater need of review and updating than P.L. 84-99**.

Particularly in light of the need to conduct further analysis and make concrete recommendations in this area, we would strongly urge the **Committee to request additional time beyond the 15th of January target date** to identify, further review and make recommendations for key areas and programs to better align incentives and disincentives for improving levee safety and floodplain management in any ultimate proposal made to Congress.

Do changes to the NFIP, CRS and other federal programs dilute the effectiveness of those programs? Is the return on modification positive?

As described in the previous answers, NWF believes there is much room for greater program alignment among the flood damage reduction, disaster assistance, natural resources management and hazard mitigation programs. We strongly support the NFIP reform to **accurately map and require risk-based, actuarially-sound flood insurance in floodplains for all structures located behind levees and canals and below dams**. Additionally these areas should be **subject to floodplain management ordinances to manage future risks**. Such mapping should also be required to **use best available climate science and incorporate reasonably foreseeable future conditions within watersheds to improve the accuracy of floodplain maps**. Ideally, maps should also include identification of **estimated 10, 20, 50, 100, 200 and 500-year flood zones, as well, to give residents a clearer picture of the relative risks they may be facing**. NWF also believes some **CRS-creditable practices should be considered for addition to basic community participation requirements** – essentially a strengthening of the basic NFIP mitigation program.

We have serious doubts that using NFIP surcharges or manipulating CRS credits to help fund levee safety activities would be successful, and could actually be harmful to the purposes of these programs, particularly if they are perceived as inequitable among the policy holders. As we have discussed above, we believe that **aligning a number of other federal aid programs, through a combination of eligibility thresholds, community rating and using sliding cost-shares has much greater potential to create the right**

combination of incentives and disincentives to encourage States and communities to join in an effective levee safety and broader flood-risk and floodplain management program.

Are there other federal programs with which the National Levee Safety Program should align?

Besides the programs we have listed in comments above, we would urge the NLSP to explore aligning with the Army Corps of Engineers **aquatic ecosystem restoration programs,** greater use of **non-structural flood damage reduction** through a number of existing authorities, and a **range of federal and state environmental programs** that could be used to assist in improving levee safety in a variety of ways. Examples are: **Coastal Louisiana** – it is increasingly apparent that maintaining and restoring coastal wetlands and marshes seaward of urban levees is a key element in protecting urban levee integrity from erosion from storm surge during hurricanes. A national levee safety strategy needs to consider where changing conditions surrounding levees may be reducing their reliability. Similar, but less dramatic, situations exist around a number of the nation's bays and estuaries. In Vermont, the Agency of Natural Resources is developing **fluvial process-based river management standards** to manage erosion rates using increased understanding of natural stream processes. Such standards could assist in developing future national levee reconstruction standards to reduce costs of maintenance and rehabilitation from erosion impacts. More research is also needed to help States and communities decide where and under what conditions **levee setback strategies** should be employed, particularly after disasters or when levee failures occur, to improve public safety, environmental conditions and, in some cases, create public recreational and other amenities. After the 1993 Mississippi River Floods, **a combination of federal authorities was used to buyout a number of frequently flooded agricultural levee districts where levee systems were removed and lands restored to wetlands, reforested bottomlands and to provide natural floodplain functions**. Just as studies have been conducted regarding NFIP repetitive loss properties, it may useful to evaluate **"repetitive loss levees"** to help identify where cost-effective mitigation efforts might be focused.

Do you have any substantial improvements or considerations for the Committee on the components of a National Levee Safety Program?

Two comments. **First, a much greater and more explicit environmental focus regarding levees and levee systems is needed.** The Federation urges the NLS Committee to view and discuss the safety of the stock of levees from a broader perspective than we are seeing in the December 12th draft. **The draft's only discussion of environmental factors at this point is potential changes in procedures to approach and streamline environmental permitting and levee maintenance. This is a woefully narrow viewpoint.** It fails to recognize a much larger set of environmental problems associated with levees (in fact, a major reason that permitting has become so complicated and at times contentious). That is how the extensive past use of levees, dams, drainage of wetlands, channelizations, and other structural manipulations in a large number of watersheds has so altered and degraded the healthy functioning of aquatic-based ecosystems that we are now seeing large-scale ecosystem deterioration and failures, increasing numbers of species sinking into threatened and endangered status and a growing

need for large-scale and costly ecosystem restoration projects. The environmental damage has been so great that these projects are now identified as among the leading reasons why North America's freshwater species are disappearing at rates five times faster than land based species, and as quickly as rainforest species.[1] Again, we can often trace many of the basic causes of these ecological failures to the development of the levees in the first place. Besides the safety related aspects, a National Levee Safety Program has to incorporate procedures for evaluation of a) the continuing need for, b) future prospects for, and c) the environmental as well as economic costs and benefits associated with each levee and each levee system that must be reviewed and evaluated, and what other alternatives may be available and achievable if the existing levee cannot meet the safety and environmental performance requirements that should be expected.

Second, and this is something of a corollary to the above, a new National Levee Safety Program must be designed to assist residents, levee owners, local and state governments and the federal government to consider levees *within their geographic context*, not simply as structures existing apart from their surroundings. The common joke is that there are two kinds of levees, those that have failed and those that are going to fail. By their nature, levees are virtually always in the process of deteriorating and degrading. If a large number of levees in the long run are indeed likely to fail, and if, at the same time they are likely to continue to require substantial reinvestment even just to extend their original expected capability, then developing and extending public awareness of the myriad of factors, equities and responsibilities which accompany the occupation and use of natural floodplains must be at the heart of the Levee Safety Program. Also at the heart of the program must be strategies to halt and reverse increases in risks associated with existing levees. In a number of instances, simply making levees "safer" may not be enough to avoid large-scale catastrophic losses or tragic failures that result in deaths. Long-term costs and benefits to society of the use of levees must be carefully evaluated case-by-case to determine the best investments that should be made going forward to protect public safety and the environment. There is a cascade of new information regarding likely future impacts of climate change and sea-level rise, for instance, which must be fully incorporated in levee and floodplain-related planning and decisionmaking.[2] The Federation believes the Draft fails to adequately capture these broader viewpoints and thus far focuses too exclusively on the physical structures themselves.

Common Set of Standards

Do you have any substantial improvements or considerations regarding the common set of standards?

The Federation agrees with the idea that, overall, a Hazard Potential classification system should be relatively simple to be useful and understandable by the public. A three level

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[1] Ricciardi, Anthony and Rasmussen, Joseph B., "Extinction Rates of North American Freshwater Fauna"; *Conservation Biology*; 13 (5), October 1999, at 1220.

[2] National Wildlife Federation, "Heavy Rainfall and Increased Flooding Risk: Global Warming's Wake-up Call for the Central United States", 2008. see also National Wildlife Federation, Increasing Vulnerability to Hurricanes: Global Warming's Wake-up Call for the U.S. Gulf and Atlantic Coasts, 2008, summarizing recent science reports of IPCC, CCSP and others re increasing flooding risk from climate change factors.

system may make sense. At the same time, we are troubled to consider flooding of up to a thousand people as a 'Low Hazard Potential' situation, even if only at less than three feet.

Other considerations in establishing a classification system should include the extent and likelihood that critical life-safety infrastructure would be impacted (this is noted on page 14), whether other critical facilities would be impacted (such as schools, public buildings, utilities, critical transportation arteries), situations where evacuations are difficult, where economically critical impacts would be felt (e.g. major employment disruptions), whether the flooding might involve flowing water (instead of primarily stationary -- e.g. flashfloods or high levees or canal structures, which also might complicate rescue efforts), where flooding could occur under cold conditions with elevated human exposure and hypothermia risk, or where considerable time might elapse before a flood would subside (through pumping or runoff).

The Federation supports the idea in assembling data for the national levee and canal inventory database ("NLD") to collect data on past performance of levees and canal structures, the historic consequences of failures and records and costs of flood fighting, repairs and rehabilitations. It is possible that a Levee Hazard Potential classification could take into account some elements of a levee's past history or predictable trends, as well (e.g. history of multiple failures, chronic seepage problems, dangerous river bends or known weak points, known likelihood of imminent or future land use changes and urbanization, etc.).

The Federation does not support the idea of establishing national "tolerable risk guidelines." At this stage most of the nation's flood-related programs have the effect of shifting the burden of risk from those who take the risks to those who are not taking the risk. Even the NFIP includes significant subsidies and cross-subsidies that have this same effect. This shifting of the burdens of risk has had the further effect of encouraging more and more people to enter into risky situations, such as building in floodplains with minimum or no mitigation and relying on flood control structures to "protect" them. While a vigorous discussion of such risks is both long overdue and absolutely necessary, the focus needs to be on adjusting our national flood damage reduction, floodplain management, disaster assistance, hazard mitigation, levee repair and natural resources management programs to better control the risk and to direct the responsibilities for and costs associated with the risks towards those that are benefiting from taking the risks. Unless and until we make the significant set of adjustments that are needed in the present system, it is entirely premature to attempt to identify a justification scheme for "tolerable risks." We urge that this recommendation be excluded from the Committee's final report.

Communicating Risk

What would best inform our discussion about how to change behavior regarding residual risk?

As discussed in the previous answer, the best way to change behaviors is to make sure the responsibilities and costs of locating development in floodplains are clearly placed on those who benefit from locating there. While it is important to develop more and better tools to help people understand the risks and to make wise and informed decisions (including much more informative and accessible flood hazard maps; mandatory, risk-based, actuarially-sound flood insurance requirements for residual risk areas; stronger land-use and building controls

standards that people can understand; levee hazard potential classifications; targeted public education; etc.), it is every bit as important to place the responsibilities in all the related programs where they properly set the incentives and disincentives that encourage the most responsible behaviors.

Do you have any substantial improvements or considerations regarding the communications and outreach program for governments and affected communities?

Generally, see our answer above. We urge the Committee to emphasize the importance of an active and accelerated effort to develop the national levee inventory and an accelerated and expanded national flood hazard map modernization effort that includes the mapping of residual risk areas below dams and behind levees and canals (as well as other flood risk areas). These are foundational tools for insurance, flood hazard mitigation and informing the public regarding flood and levee-related risks. While we believe the Committee fully recognizes these programs' importance, it is critical for the Report that everyone recognize that these tools still have far to go before they can realize their huge potential to help the public.

Governance Model

Would creating an independent commission have advantages over embedding a National Levee Safety Program in an existing federal agency?

This will be an important and possibly complicated decision for Congress and the Administration to make. The Federation can see good reasons to propose a governance body with a broader perspective. A disadvantage of locating the National Levee Safety Program in a single federal agency clearly would be that there are a substantial number of other federal agencies that have important stakes in the Program and there would be inevitable difficulties of bringing the broader focus and perspectives to bear from a single agency.

As expressed in our previous answers to the Committee's questions, the view of the National Wildlife Federation is that the perspective of the National Levee Safety Program reflected in the 12-12 Draft must be substantially broadened beyond a focus primarily on safety of structures to include floodplain management considerations, land use and building controls affecting future risks, disaster assistance and post-disaster recovery policies, considerations of climate change and future conditions, and protection and restoration of the environment.

We urge the Committee, in addition, to consider an option, mentioned in the December 12th Review Team workshop, that in the event the Administration or Congress should seek to fund and reactivate the U.S. Water Resources Council, this would be an appropriate body to help coordinate and manage development of the National Levee Safety Program. Each of the key agencies and Departments with programs bearing on levee-related issues has membership in the Council. In addition, numerous public and professional reports have recommended its revival. Such a body would have the stature and capability to bring numerous elements together to address complicated levee safety issues, along with broader policy concerns such as floodplain management, coastal policies, science and research needs, climate change and sea-level rise considerations, hazard mitigation,

infrastructure policies, disaster assistance and environmental protection and restoration.

What are the benefits of combining a National Levee Safety Program with a dam safety program under a single governance structure? If it is beneficial, why?

While these two programs need to be coordinated, the Federation views the tasks associated with levees as considerably broader and therefore believes it would appear to complicate, rather than simplify the tasks to place them within the same structure.

Are there other programmatic structures or ideas to consider?

Do you have any substantial improvements or considerations regarding the governance model?

Liability

Do you have any substantial improvements or considerations regarding the Committee's recommendations on liability protections?

The Federation would not support waivers of liability or granting immunity from liability for levees. We do not believe waiving potential liabilities is the way to "incentivize" wise, safe and prudent behavior. We would support the concept of establishment of Standards of Care for engineering services by professionals and changing nomenclature in the NFIP from "certification" to "compliance determination" for levees. These could potentially improve overall performance and increase public awareness of risks and responsibilities.

Levee Rehabilitation Act

Do you have any substantial improvements or considerations regarding the Committee's recommendations on establishing a National Rehabilitation, Improvement and Flood Mitigation Act?

The Federation does not support this recommendation. As our comments indicate above, the Federation believes the Committee's proposal, thus far, is too narrowly scoped and fails to address hazard mitigation and risk reduction, land use issues, floodplain management more broadly, incorporation of climate change and sea-level rise factors, increased need for environmental protection and ecosystem restoration, and other key factors. We are concerned with the notion of generically authorizing potentially enormously costly measures that could ultimately run into the hundreds of billions of dollars with an assumed 65 percent federal cost-share. Much more consideration must be given as to defining and evaluating the problems involved before deciding the responsibilities in this manner.

Strategic Implementation Timeline

Do you have any substantial improvements or considerations regarding the Committee's strategic implementation timeline?

As we stated elsewhere in these comments, we urge that the Committee seek additional time to address the broader set of issues that we have described in these comments and to be in

a position to make recommendations to Congress and the new Administration that can further refine options and approaches to address these issues. The Federation looks forward to continuing to work with the Committee on these matters in the future.

Attachment 2, NWF
Testimony 5-18-09

AWRA

EWRI

NATIONAL WILDLIFE FEDERATION

FOURTH NATIONAL WATER POLICY DIALOGUE

In September 2008 the American Water Resources Association (AWRA), the Environment and Water Resources Institute of the American Society of Civil Engineers (EWRI/ASCE), and the National Wildlife Federation (NWF) brought together water resource experts from the public and private sector, congressional staff, and federal agencies to review the results of three National Water Policy Dialogues conducted by AWRA in 2002, 2005, and 2007 at the request of 10 federal water resource agencies. The purpose of the September Dialogue was to identify the challenges that would be faced by the incoming Administration and the 111th Congress when they took office in 2009.

Attached for your information are the summary of the September Water Policy Dialogue and a copy of the letter sent to the President, all governors, and key leaders in Congress following the 2007 National Water Policy Dialogue.

If you have questions concerning the September dialogue or the previous dialogues, please feel free to contact Dr. Gerry Galloway (gegallo@umd.edu , 571-334-2103): Mr. Richard Engberg (dick@awra.or, (540) 687 8390); Mr. Brian Parsons (BParsons@ASCE.org, (703)-295-6071); or Mr. David Conrad (conrad@nwf.org ; (202) 797-6697).

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Summary

Fourth National Water Resources Policy Dialogue

September, 2008
Washington, DC

The United States faces severe water resource challenges today and in the decades ahead. The Nation must deal with significant drought, floods, growing threats to its water quality, continuing loss of wetlands and the impact of these losses on the natural and beneficial functions of floodplains and estuaries, and a water resources infrastructure that is aging, in need of revitalization and whose collapse would threaten our economic vitality. The potential impacts of climate change that could increase the intensity of floods, severity of droughts and change or weaken the health and stability of many ecosystems only adds to the challenge. These challenges were highlighted in the reports of three earlier water resource policy dialogues sponsored by the American Water Resources Association at the request of federal water agencies.

On September 22, 2008, 56 US water experts met in the Rayburn House Office Building in Washington, DC to discuss what actions should be taken by the new Administration and the Congress when they take office in 2009 and are forced to face these water challenges. The participants in this dialogue, building on the work of the earlier dialogues, concluded that:

- There is an immediate need for an assessment of the Nation's water resources to include the current status of the resource, the future needs for water and identification of gaps that exist in fulfilling these needs.
- The federal government, in cooperation with state and local agencies, needs to develop a national vision and overarching principles to guide water resources development activities supported by the federal government.
- There is increasing need for mechanisms that will better coordinate the water related activities of federal agencies and among congressional committees. The absence of effective coordination is apparent in the conflicts and overlaps that exist in legislation, programs, and agency activities.
- The relationship among the federal government, states and local communities is changing and must be addressed. The federal government's role in water resources, long seen to be a driving force, must be reevaluated in light of growing state attention and direction of water resource activities.
- Federal actions with regard to water resources must be taken in a watershed context where the underlying planning is conducted in partnership with the states and local entities.

These conclusions are discussed in greater detail in subsequent paragraphs.

The fourth dialogue was sponsored by the AWRA, the Environment and Water Resources Institute of the American Society of Civil Engineers, and the National Wildlife Federation. It built on the results of the three previous dialogues held in Washington DC in 2002, Tucson, AZ in 2005, and Arlington, VA in 2007. The participants in the fourth dialogue represented congressional staffs, federal agencies, and various government and nongovernmental organizations from across the country. The earlier dialogues identified the need for development of a national [not federal] water vision; formulation of policy principles for translating the vision into action; establishment of a mechanism to ensure appropriate coordination and cooperation among federal agencies and with other levels of government; creation of watershed organizations with the involvement and support of federal water agencies; use of incentives to encourage local watershed organization's grass-root involvement in water issue solutions; reconciliation of a myriad of laws, executive orders and Congressional guidance that have created a disjointed, ad-hoc and too often contradictory national water policy; and utilizing the Nation's superb scientific capabilities and cutting edge information technologies to support water-related decision making. In a letter to the President, Congressional leaders, and governors, the co-chairs of the third policy dialogue indicated that, "Stewardship of the Nation's water resources is being neglected and the manner in which we deal with water issues is dysfunctional."

The call for a national assessment stems from concern over the piecemeal approach being taken in examining current water vulnerabilities. Water quality and water quantity are sometimes examined together, but more often are reviewed within the context of a single focus program. We continue to witness the decline in the health and function of many important aquatic ecosystems, both biologically and physically, from a variety of stressors that many scientists say are likely to be further degraded and impacted from the effects of climate changes. Decisions on how to deal with flooding are made in the context of information that does not link actions taken in the floodplain to those in the upland areas generating the floods. The establishment of the National Drought Information System deals with the shortage of water but fails to link it with other aspects of water use and water quality. The last comprehensive assessment that looked across the varying uses of water was accomplished in 1975 by the U.S. Water Resources Council. It developed a comprehensive nationally consistent data base for the 21 water resources regions of the United States. Many would argue that the degree of planning and coordination at the Federal and state level in that and an earlier assessment along with water quantity development for future needs and a concurrent shift to a regulatory paradigm for water quality served the Nation well for many years. However, since 1975, the water picture has changed considerably and both demand and availability have changed in magnitude and in geographic location. Increasing populations, growing urbanization, changing climate and sea level rise, and demographic trends that are increasingly concentrating growth in areas that are further straining water resource health and capacities are presenting critical new challenges that must be addressed in a holistic fashion. In addition, water quality needs have often become more site or condition specific and exhibit more complex linkages to other water resources needs than can be addressed easily or cost effectively by a regulatory approach alone. Conduct of a fixed-term national water assessment would provide the information needed by leaders at all levels to carry out critical water activities.

This assessment of the Nation's water status is needed immediately. It must include the current status of the resource, the contemporary and likely future trends, needs and directions for water management and identification of gaps that exist in fulfilling these needs in a sustainable manner. Such an assessment should deal with not only water quantity and quality but also with use of water for

transportation, recreation, and energy as well as the impacts of water through floods and other weather events.

Actions taken at the federal level in water resources are inconsistent and are guided by ad hoc approaches to water resources needs and long-term challenges. A national vision and overarching principles to guide water resources development activities supported by the federal government are needed. For example, there are no national guidelines regarding the level of support for flood risk reduction that may be practicable within a 21st-century context. Each project is treated on its own without reference to any systems context or its impact on other water sectors. Actions within the agricultural sector that impact water quality are ignored in the development of agricultural support policies. Programs are supported on a sector basis rather than within a watershed context and do not recognize the geographic differences that exist across the Nation. The federal and state governments, working together, should develop principles that would guide both actions within the federal government and the state governments with respect to water resources development and regulation.

Since the shutdown of the federal Water Resources Council in 1983, there is no central water coordinating body at the federal level, and overlaps, inefficiencies and conflicts among federal agencies and their programs have grown. Continuing congressional actions taken within the context of committee jurisdictions have also limited the coordination among major federal water programs and their execution. State and local governments find this lack of coordination a roadblock to successful comprehensive planning and action on critical water resource issues. Reports to the Federal Government by independent bodies continue to point out the need for strong leadership within the executive branch and a new, coordinated approach within the congressional committee system that would provide for needed coordination of actions.

The roles of federal, state, and local governments with respect to water resources is in evolution. While there will always be a need for federally derived standards and federal funding of certain programs, the initiative to address emerging water issues is shifting to the state and regional level. For example, the Texas Water Plan represents a bottoms-up approach to dealing with the myriad water issues faced by that state. California's recent passage of a $5 billion bond issue to support levee repairs, in the absence of federal support, highlights the trend towards state impatience with a lack of consistency and action in federal programs. Federal agencies and the Congress, in close cooperation with the states, need to look at the impact of this trend on current and future water programs.

Lastly, the dialogue found that more attention must be paid to supporting water resource actions in a watershed context where cross-sector needs can be evaluated and plans developed to address issues in a comprehensive manner rather than on a stove pipe basis. The effective work of the Delaware River Basin Commission in bringing together the actions of its constituent states to concurrently deal with the contrasting needs for flood risk reduction and water storage, represent a step forward in cooperative watershed planning. In dealing with watershed activities, the federal government should serve as a facilitator or partner rather than the leader so that the unique differences such as the geographic heterogeneity of this Nation and the diverse social, economic, and cultural needs of its citizens can be properly addressed.

For further information, contact Dr Gerald Galloway, University of Maryland (gegallo@umd.edu), Co-chair, National Water Policy Dialogues, or Richard Engberg (dick@awra.org), Technical Director, American Water Resources Association.

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Testimony of the National Association of Flood
And Stormwater Management Agencies

Presented by Steve Fitzgerald, PE
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"Recommendations of the National Committee
on Levee Safety"

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

Rep. Eddie Bernice Johnson, Chairwoman

May 19, 2009

The National Association of Flood and Stormwater Management Agencies (NAFSMA) is very pleased to submit this testimony regarding the "Recommendations of the National Committee on Levee Safety" on behalf of its membership.

Background on NAFSMA

NAFSMA is a 30-year old national organization based in the nation's capital that represents close to 100 local and state flood and stormwater management agencies, most of which are in large urban areas. Its members serve a total of more than 76 million citizens by providing flood and/or stormwater management; and as a result, the association has a strong interest in the proposed recommendations of the National Committee on Levee Safety.

The mission of NAFSMA is to advocate public policy and encourage technologies in watershed management that focus on issues relating to flood protection, stormwater and floodplain management in order to enhance the ability of its members to protect lives, property, the environment and economic activity from the adverse impacts of storm and flood waters.

Formed in 1978, NAFSMA works closely with the U.S. Army Corps of Engineers (Corps), the Federal Emergency Management Agency (FEMA), and the U.S. Environmental Protection Agency to carry out its mission. NAFSMA members are on the front line protecting their communities from loss of life and property, while also improving the quality of the nation's surface waters and riparian habitats.

Responsibilities of NAFSMA members are diverse and include: local sponsorship for federal flood management (including levees) and water quality projects; operation and maintenance of federal and local flood damage reduction projects; establishing and enforcing criteria for new land development; environmental stewardship; activation before, during, and after floods; flood recovery; and actively communicating with constituents and the public. Most members have levees as one of their flood risk management "tools" in their community. At the local level, NAFSMA members are dealing directly with increased populations and helping to guide design and construction of low flood risk and affordable neighborhoods. Many of these neighborhoods will be built behind existing or future levees.

NAFSMA is pleased to present the views of our member agencies on the "Recommendations of the National Committee on Levee Safety", as well as some ideas on how to move forward.

General Comments on the Recommendations

First, I had the honor of representing NAFSMA at the National Levee Safety Committee Review Team meeting in December 2008, and meeting the Committee members who represented both the breadth and depth of levee experience in the U.S. from all levels of government and the private sector. They dedicated and sacrificed three and a half months of their lives to developing and completing this report on time because they know and understand first hand the urgency of improving levee safety in this country. Mr. Eric Halpin, as Vice Chair, I applaud you and the entire Committee. While all committee members brought many years of experience to the table and each made important contributions, one member in particular brought a recent personal experience of learning first-hand the consequences of major flooding behind a levee system that was overwhelmed by a storm well exceeding the levee design. That is Bob Turner from St. Bernard Parish, which adjoins New Orleans. Their parish was devastated more than any other leveed area during Hurricane Katrina (only 5 buildings were not flooded). Yet under Bob's leadership along with others, the community is getting back on its feet with help from hard working local people, volunteers, and federal financial assistance.

Second, this is by far the most comprehensive and complete report that clearly lays out all aspects of levees - responsibility, authority, risks, funding, historic perspective, inventory, public education, operations, maintenance, flood insurance, and many other topics. While this report focuses on levees, many of its ideas, approaches, and recommendations are applicable to the broader issue of Flood Risk Management and to other flood risk reduction "tools" such as open channels, detention basins, and buyouts. As stated in the report, improving levee safety will be most effective if it is conducted within the context of a national flood risk management program.

Third, it is important to echo the first basic principle considered by the Committee – levee safety is a shared responsibility. Responsibilities lie at all levels of government (as well as with contractors and consultants) and with persons whose lives and property are located behind levees. NAFSMA members clearly understand we have a responsibility; we just need to continue to work with the federal government to clarify each of our responsibilities, and then do a better job communicating those and individual responsibilities with the people who live behind levees.

Fourth, while everyone may not agree with all of the 20 recommendations in the report, it is paramount that implementation of the ones that we can agree on begin as soon as possible. I know if each federal government branch, office, and committee that has a role in developing, creating, and funding the National Levee Safety Program makes it a priority and agrees with the fundamental goals, together, we can make it happen. The first

version won't be perfect, but it will be a good start toward protecting people and property from floods.

Specific Comments on the Recommendations

I am not going to go over each of the 20 recommendations, today. I am going to identify the ones we feel are not controversial and the ones NAFSMA feels need further study. I'll divide them into three groups – ones that need to be implemented ASAP, those that will take longer to implement but should come next, and the ones that created the most discussion among our members and need further review.

Implement ASAP

#2. Expand and Maintain the National Levee Database to include non-federal levees

#3. Adopt a Hazard Potential Classification System

#4. Develop and Adopt National Levee Safety Standards (National standards would be applicable to all federal and non-federal levees; standards particular to a region or type of levee would be developed at the state or regional level)

#6, #7, and #8. Remove Barriers Associated with Liability

#10. Provide Comprehensive Technical Materials and Direct Technical Assistance

#12. Develop and Implement Measures to More Closely Harmonize Levee Safety Activities with Environmental Protection Requirements (See "Operations and Maintenance - Environmental Permits Dilemma" below; recognize regional variations)

#14. Design and Delegate Program Responsibilities to States (Owners and operators continue to be responsible for crucial day-to-day activities; delegation allows program development to account for regional differences)

#15. Establish Levee Safety Grant Program (Cost shared and eligibility requirements)

#16. Establish the National Levee Rehabilitation, Improvement, and Flood Mitigation Fund (Cost shared and eligibility requirements)

#19. Augment FEMA's Mapping Program (to improve risk identification and communication in leveed areas)

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

Implement Next

#5. Develop Tolerable Risk Guidelines

#9. Develop a Comprehensive National Public Involvement/Awareness Campaign to Communicate Risk and Change Behavior in Leveed Areas (In conjunction with state and local agencies)

#11. Develop a National Levee Safety Training Program (Encourage mutual–aid agreements among local agencies, as well)

#13. Conduct Research and Development Program

#17. Explore Potential Incentives and Disincentives

Further Review

#1. Establish a National Levee Safety Commission

An independent commission would have a single mission on which to focus unlike the current situation where levee issues are spread between the Corps and FEMA. It is probably the smart thing to do to develop a strong national program and to help resolve responsibility at all levels of government. However, some NAFSMA members are skeptical of another layer of government. It is suggested to begin implementation of the recommendations under "Implement ASAP" above under the current good Corps/FEMA Interagency Coordination Committee until this is resolved. In other words, do not let this one recommendation hold up progress on some very important actions that can be initiated.

#18. Mandate Purchase of Risk-Based Flood Insurance in Leveed Areas

Many NAFSMA members are very concerned about the inclusion of this requirement in the National Levee Safety Committee Recommendations. Although NAFSMA agrees that participation in the National Flood Insurance Program (NFIP) helps to reduce the impact of financial damages on individuals and businesses and raise awareness in participating communities, it does not provide flood protection to individuals, homes or businesses and it does not change their flood risk. Many of our communities already participate in the NFIP and urge residents in levee-protected areas to purchase flood insurance. This type of approach may be considered with new flood damage reduction projects in the future, but would be difficult to mandate on existing projects.

NAFSMA believes that further analysis is necessary before Congress approves such a far-reaching, one-size-fits-all approach to flood insurance. While some proposals have provided for the implementation of actuarial pricing for policies issues under a mandatory flood insurance program, NAFSMA is very interested in seeing how the risk-based approach and premium formulas would be developed for the NFIP behind levees. NAFSMA is concerned about how this proposed mandate would be implemented and its associated costs and benefits. The current flood insurance program views all flood control structures similarly and does not distinguish between differing risks of participating communities. The current program also fails to acknowledge that flood control structures, like levees, can fail for various reasons or that approximately 25% of all flood insurance damage claims are from areas outside the 100 year floodplain limits. All of these factors need to be taken into account to determine the proper actuarial rate.

NAFSMA believes that a more responsible and effective approach would involve the development of criteria for evaluating the differing types of flood risks that communities face and how to protect against those risks, and the long-term impact that the mandatory purchase requirement would have on local communities and their economies. We urge that such a study of the issues and impacts be completed before such a change is implemented on a nationwide basis. NAFSMA agrees with the House approach in the bill approved last congressional session calling for a study of these impacts to be carried out before Congress mandates such a change.

Operations and Maintenance - Environmental Permits Dilemma

Recommendation #12. "Develop and Implement Measures to More Closely Harmonize Levee Safety Activities with Environmental Protection Requirements " is particularly important to NAFSMA members who are currently trying to maintain the integrity and strength of their existing levees so they will hold up to water pressure and erosion forces. Currently, there is a lack of consistency by federal regulators and environmental agencies in the permitting/guidance of levee maintenance that is resulting in unpredictable requirements and timelines. Specifically, the management of deep-rooted vegetation on levees has become controversial. Conflicting regulatory and environmental agencies' views are resulting in long delays or inability to perform needed infrastructure maintenance. NAFSMA concurs with the Levee Safety Committee that acceptable operation and maintenance practices need to be developed in conjunction with and coordination with state and federal environmental agencies so lives and property can be protected, and significant environmental and natural resources are not impacted.

Potential Challenges

As with other national programs that include delegation to states, the primary challenges involve consistency and sufficient funding.

Consistency is important when levee and other flood risk management components overlap between states or are adjacent to one another. The laws of physics and water flow trump our human laws. With strong oversight at the national program level, these challenges can be overcome similar to the Interstate Highway System.

Another consistency concern is that some states may not be able to carry out a state levee safety program for a variety of reasons. NAFSMA recommends that regional or local districts have the option to develop a regional levee safety program delegated directly down from the National Levee Safety Program, where appropriate.

Adequate or sufficient funding is the more difficult challenge. Funding and budget priorities vary among states and change over time. Implementation of Recommendations #15 and#16 that provide cost shared funding to states is important for addressing the funding challenge.

Closing

In closing, I want to emphasize the need to pay attention to the details when implementing these recommendations so the original intent of Congress and the intent of the Levee Safety Committee are followed. We all need to read the details, thought processes, and justifications for each of the recommendations in the report, not just the executive summary. NAFSMA recommends continuing to utilize the experts and practitioners on the Levee Safety Committee to ensure effective and timely implementation of the National Levee Safety Program to reduce flood risk, loss of life, property damage, and recovery costs.

Thank you for the opportunity to present the view of the National Association of Flood and Stormwater Management Agencies.

DEPARTMENT OF THE ARMY

U.S. ARMY CORPS OF ENGINEERS

COMPLETE STATEMENT

OF

ERIC C. HALPIN
SPECIAL ASSISTANT FOR DAM AND LEVEE SAFETY

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

HOUSE OF REPRESENTATIVES

ON

RECOMMENDATIONS OF THE NATIONAL COMMITTEE ON LEVEE SAFETY

May 19, 2009

Madam Chair and other Members of the Subcommittee, I am Mr. Eric C. Halpin, Special Assistant for Dam and Levee Safety for the U.S. Army Corps of Engineers (Corps) and a registered Professional Engineer. I am pleased to be here today and to have the opportunity to speak to you about my role as the Vice Chair of the National Committee on Levee Safety (Committee) and the Committee's report to Congress on a National Levee Safety Program (NLSP).

I am here today to discuss the Committee's report but I must be clear that the Committee's recommendations do not represent an Administration position. In a letter dated May 7, 2009, the Army noted that an official policy review of the Administration would use the findings in the Committee's Report to inform its formal review. The Army also noted that the Administration expects to complete the review by this Fall.

The Committee is a diverse group of professionals mainly from state, local/regional governments, and the private sector as well as the Federal government. This group has worked diligently to represent 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.

Our nation is experiencing an increase in risk to people and infrastructure as a result of an aging levee infrastructure. The history of the United States is full of lessons - both successes and failures – of levee systems and their maintenance. 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. 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 the

1%- annual chance event, commonly referred to as the 100-year level of protection. This then became the beginning of what our Committee believes is a dangerous and inappropriate association of the 1%-annual-chance (100-year) event as a universal safety standard. As an important aside, I would like to note, though, that the use of "100-year level of protection" should not be construed to mean that this type of flood event will occur only once every hundred years; rather, in any given year there is a one percent chance of its occurrence.

The Committee prefaces its recommendations by acknowledging a need for a broader management approach to the national flood risk, 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 Committee's Report on a 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 Committee's twenty recommendations that will inform the Administration's comprehensive policy review of Federal planning for and implementation of programs while still reducing flood and storm damages to communities:

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 non-federal levees by the Corps. 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, 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 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 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 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.

The Committee recommends phased strategic implementation as follows:

- Phase I: Immediately implement critical actions, to 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.

A NLSP may be the proper 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.

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. Though a NLSP has a potentially high cost associated with it, it may also be 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. 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 fits 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 and other stakeholders while the Administration conducts its policy review. 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.

This concludes my testimony, Madam Chair. Again, thank you for allowing me to testify on the ongoing efforts of the National Committee on Levee Safety. I will be happy to answer any questions you or the other Members may have.

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Hearing on the Recommendations of the National Committee on Levee Safety

Statement of:

Andy Haney
Director of Public Works
Ottawa, Kansas

American Public Works Association

To the House Subcommittee on Water Resources and the Environment

May 19, 2009

Chairwoman Johnson, Ranking Member Boozman, members of the House Subcommittee on Water Resources and Environment, thank you for the opportunity to present testimony for this hearing on the report of the National Committee on Levee Safety (NCLS).

I am Andy Haney, and I am the Public Works Director for the City of Ottawa, Kansas which has a population of approximately 13,000 residents. The City of Ottawa is bisected by the Marais des Cygnes River, and is protected on both banks by levees totaling approximately 4.6 miles in length. This levee was constructed by the United States Army Corps of Engineers (USACE) following a significant flood in 1951. Recently, I served as a member of the Review Team for the National Committee on Levee Safety. I am also one of the founding members of the Small Cities & Rural Communities Forum of the American Public Works Association (APWA).

APWA is dedicated to providing public works infrastructure and services to millions of people in rural and urban communities. Flood control systems, which include levees, are among the infrastructure that APWA members plan, design, build, operate and maintain. I submit this statement today on behalf of the more than 29,000 public works professionals who are members of APWA. Our members are city engineers, public works directors, private consulting firms that provide infrastructure services to public agencies and professionals in all aspects of public works. Over half of our members work in the public sector in cities, counties and special districts at the local level.

NCLS REPORT

The recent recommendation to Congress by the NCLS is to establish a *"National Levee Safety Program"* and to require *"mandatory risk-based flood insurance purchase in leveed areas."*

The NCLS recommended a three-phased "strategic implementation:"

Phase I: Implement enabling legislation, inspect levees, and require affected property owners to buy flood insurance.

Phase II: Delegate the program to states and/or local governments with incentives.

Phase III: Transition into sustaining levee safety at state and local levels using disincentives, such as withholding funds.

The economic impact of these recommendations for the federal government has been under review by the Office of Management and Budget, but ***the economic impact on local governments and our citizen taxpayers may not be receiving the attention that is necessary and warranted.***

APWA PARTICIPATION WITH NCLS PROCESS

On two occasions, the NCLS Review Team was called in to review completed draft work and offer feedback. The working document was modified on each occasion in response to the feedback received.

I solicited and received input from a variety of APWA members, providing detailed feedback to the NCLS. While some of the issues brought forward by the public works community were addressed, a significant portion of our feedback seems to have been overridden by other interests, or by direction that had been given to the NCLS.

Some local experiences in small towns were cited, but the general feeling is that the impact of these recommendations is not limited to small towns. In general, we need to express significant concern about some elements of the recommendations. They include:

- **Schedule**. This issue has not been "on the radar" for public consumption. Only some professionals responsible for levees were aware of the issues. Many perceived the process may be an overreaction to recent catastrophic floods. The NCLS procedure was completed in less than four months (October 2008 through January 2009). There was a general feeling that this discussion needs to be more deliberate, and that governing bodies and public works professionals desired to be a part of the process.

- **Delegation can be a concern**. Details in the report indicate most levee systems may be excluded from funding unless states or local governments accept "delegation" of the program. Some expressed that many states are not staffed to accept such a delegation, which I believe to be true in the State of Kansas.

- **Funding issues**. Unless funding is concurrently "delegated" with the enacting legislation, implementation will be very slow and an expensive proposition for state and local governments, and affected citizens. It is not a surprise to this subcommittee that state and local government are facing extreme issues in these uncertain economic times. Limiting the federal funds to "high hazard" areas as defined in the NCLS report eliminates many municipal systems, and should be reconsidered.

- **Decentralization Equals Inefficiencies**. We believe this program may be significantly more efficient if it was not delegated to the states or local level of government, at least entirely. USACE would be a more effective entity to assume this responsibility, as they would have the ability to work across political boundaries with fewer entities (and contractual agreements) involved than if each local "sponsor" was required to initiate individual programs and be solely responsible for funding the assessment of individual levee systems. Consolidation of this effort to the maximum extent possible seems to be the most cost-effective manner of implementation.

- **Disincentives are discouraging**. Our belief is that disincentives are likely to have little merit. If a state has difficulty achieving an established standard, how is "ineligibility for National Levee Safety Program grants" going to help fix the problem?

APWA RECOMMENDATIONS

- Place a moratorium on the "schedule" relating to Provisional Accreditation Letters that may have been (or will be) submitted by levee sponsors. This would provide for a reasonable period of time for elected and appointed officials of communities nationwide to discuss this issue in depth with appropriate federal agencies, their citizens, local businesses and other stakeholders before initiating efforts toward levee compliance determination. Additionally, this would allow a more thorough understanding of the needs of the federal government to institute the policy change and for local governments to assess and address the impacts that will result.

- Publicize the anticipated costs for insuring properties against flood damage. Include information related to what cost reduction for that coverage may result if a property is "protected by a compliant levee." This listing can be reviewed, distributed and monitored by state Insurance Commissioners, if appropriate.

- We suggested to the NCLS that administration of the National Levee Safety Program should be retained by the USACE. The USACE could promulgate rules related to when and if a program could/should be delegated below the federal level based on reasonable criteria. The USACE should be augmented with an appropriate budget, staff and equipment to accomplish this routine function. To supplement the effort, the USACE could retain consultants to complete assessments and other work throughout the Districts. We believe the results would be far more standardized and significantly reduce overall costs than if the project is undertaken by individual communities.

- The report recommends establishing a "Certified Levee Professional Program." While this could prove to be beneficial, there are no significant details provided. This will be more affordable for small communities if a program for federal financial assistance to complete this process was implemented.

- Modify the "threshold" of lives at risk as a determinant of federal financial aid availability. The focus on human safety is the highest priority stated in the report, and the report indicates that emphasis should be placed where there is a risk to 10,000 lives if a levee fails. That threshold of danger to human life will likely exclude smaller communities with respect to receiving any federal funding to improve levees. Even the larger cities may have difficulty attaining the 10,000 lives threshold. However, inundation of the levee protected area of our town, as

just one example, will possibly affect that number of jobs due to the "business centers" being within the levee protected area. The economic loss could be devastating. There should be some means to incorporate "economic" impact in addition to the number of lives at risk. "Percentage of community property value at risk" or the "percentage of population at risk" may be possible starting points for that discussion.

- Bring associations which have an interest into the discussion. In addition to those organizations that were represented on the NCLS or the Review Team, we recommend that stakeholders from local elected officials organizations such as the National League of Cities, National Association of Counties, US Conference of Mayors and others be brought to the table to share their perspective.

Chairwoman Johnson, Ranking Member Boozman and members of the House Subcommittee on Water Resources and Environment, thank you for conducting this hearing and for inviting us to present our concerns and our recommendations from the Public Works community. APWA stands ready to be your resource as we move forward to achieve levee safety.

Testimony of Leslie F. Harder, Jr., P.E., G.E., PhD.
Senior Water Resources Technical Advisor
HDR, Inc.
Before the House Committee on Transportation and Infrastructure,
Subcommittee on Water Resources and Environment
May 19, 2009

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ACEC

AMERICAN COUNCIL OF ENGINEERING COMPANIES

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

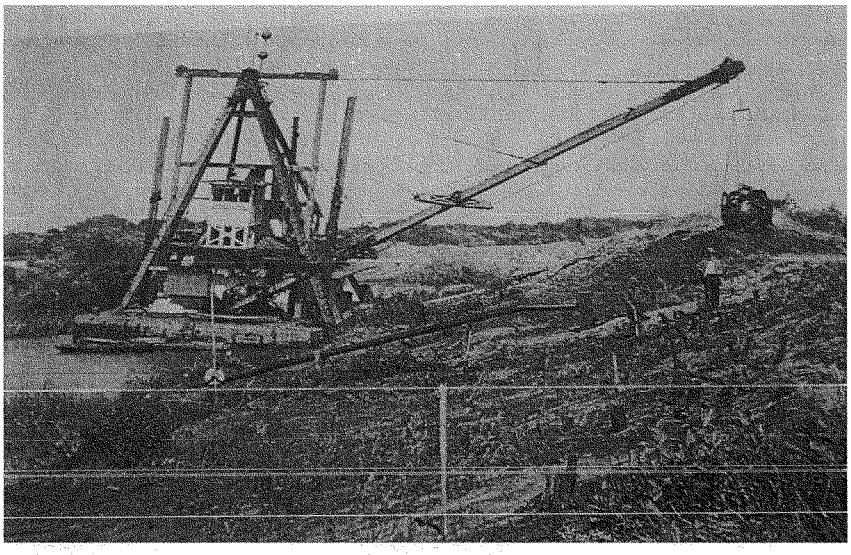
Foundation team sent to New Orleans to examine the performance of levees following Hurricanes Katrina and Rita. I have also served on the reconnaissance investigations of the performance of levees following the 2008 Midwest Flood and the 2008 Hurricane Gustav events. I previously served as the Deputy 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:

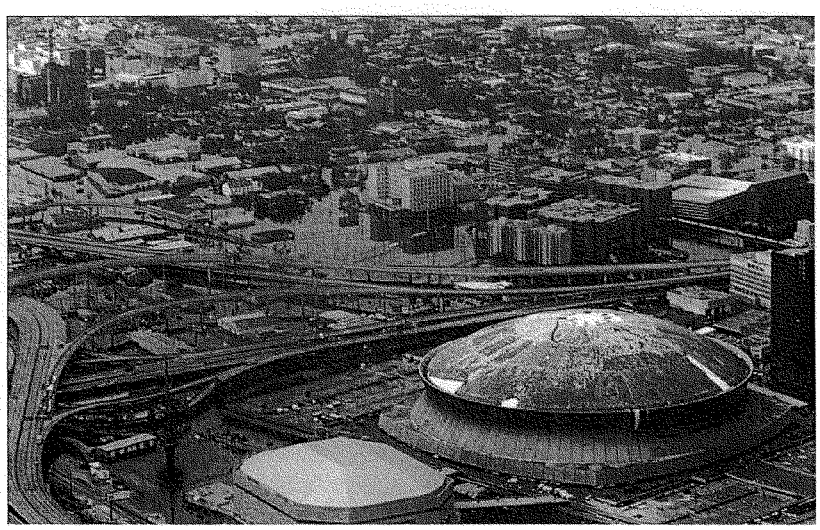
- ✓ We do not know where all the levee systems are, what they protect or what level of performance can we expect from them. It is estimated that there are over 14,000 miles of federal levees and over 100,000 miles of non-federal levees across the nation, but we cannot be certain.

- ✓ 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.

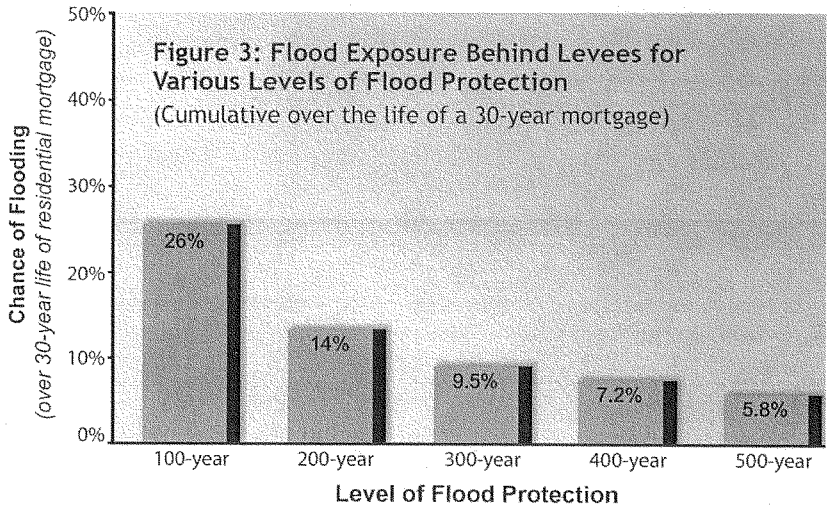
Public policies have led to unintended and detrimental consequences. The National Flood Insurance Program established the one percent annual chance (100-year) flood for actuarial insurance purposes, but this level of flood protection mistakenly is perceived as a levee safety standard, *which it is not.*

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

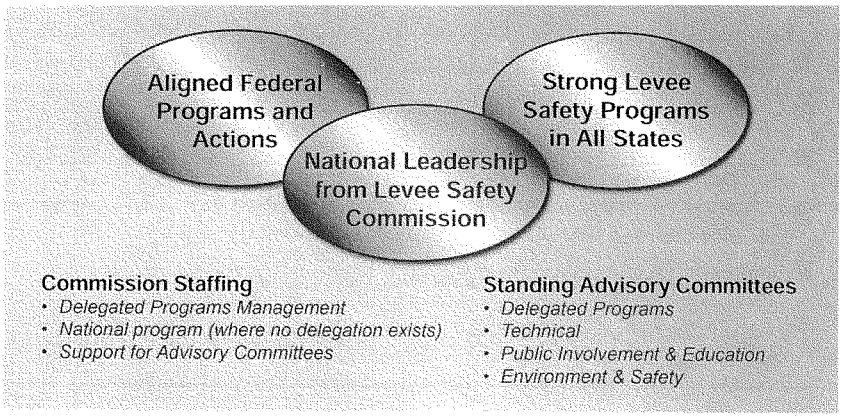
Under the category of **Building and Sustaining Strong Levee Safety Programs in All States**, the following recommendations are:

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

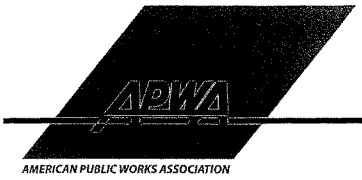
While all of these recommendations may not be within the purview of this Subcommittee, I would be remiss if I failed to address them and their criticality to an effective overall program. Much can and should be done beyond individual short-term fixes to address specific levee shortcomings. Without an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



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Hearing on the Recommendations of the National Committee on Levee Safety

Statement of:

Andy Haney
Director of Public Works
Ottawa, Kansas

American Public Works Association

To the House Subcommittee on Water Resources and the Environment

May 19, 2009

Chairwoman Johnson, Ranking Member Boozman, members of the House Subcommittee on Water Resources and Environment, thank you for the opportunity to present testimony for this hearing on the report of the National Committee on Levee Safety (NCLS).

I am Andy Haney, and I am the Public Works Director for the City of Ottawa, Kansas which has a population of approximately 13,000 residents. The City of Ottawa is bisected by the Marais des Cygnes River, and is protected on both banks by levees totaling approximately 4.6 miles in length. This levee was constructed by the United States Army Corps of Engineers (USACE) following a significant flood in 1951. Recently, I served as a member of the Review Team for the National Committee on Levee Safety. I am also one of the founding members of the Small Cities & Rural Communities Forum of the American Public Works Association (APWA).

APWA is dedicated to providing public works infrastructure and services to millions of people in rural and urban communities. Flood control systems, which include levees, are among the infrastructure that APWA members plan, design, build, operate and maintain. I submit this statement today on behalf of the more than 29,000 public works professionals who are members of APWA. Our members are city engineers, public works directors, private consulting firms that provide infrastructure services to public agencies and professionals in all aspects of public works. Over half of our members work in the public sector in cities, counties and special districts at the local level.

NCLS REPORT

The recent recommendation to Congress by the NCLS is to establish a *"National Levee Safety Program"* and to require *"mandatory risk-based flood insurance purchase in leveed areas."*

The NCLS recommended a three-phased "strategic implementation:"

Phase I: Implement enabling legislation, inspect levees, and require affected property owners to buy flood insurance.

Phase II: Delegate the program to states and/or local governments with incentives.

Phase III: Transition into sustaining levee safety at state and local levels using disincentives, such as withholding funds.

The economic impact of these recommendations for the federal government has been under review by the Office of Management and Budget, but ***the economic impact on local governments and our citizen taxpayers may not be receiving the attention that is necessary and warranted.***

APWA PARTICIPATION WITH NCLS PROCESS

On two occasions, the NCLS Review Team was called in to review completed draft work and offer feedback. The working document was modified on each occasion in response to the feedback received.

I solicited and received input from a variety of APWA members, providing detailed feedback to the NCLS. While some of the issues brought forward by the public works community were addressed, a significant portion of our feedback seems to have been overridden by other interests, or by direction that had been given to the NCLS.

Some local experiences in small towns were cited, but the general feeling is that the impact of these recommendations is not limited to small towns. In general, we need to express significant concern about some elements of the recommendations. They include:

- **Schedule**. This issue has not been "on the radar" for public consumption. Only some professionals responsible for levees were aware of the issues. Many perceived the process may be an overreaction to recent catastrophic floods. The NCLS procedure was completed in less than four months (October 2008 through January 2009). There was a general feeling that this discussion needs to be more deliberate, and that governing bodies and public works professionals desired to be a part of the process.

- **Delegation can be a concern**. Details in the report indicate most levee systems may be excluded from funding unless states or local governments accept "delegation" of the program. Some expressed that many states are not staffed to accept such a delegation, which I believe to be true in the State of Kansas.

- **Funding issues**. Unless funding is concurrently "delegated" with the enacting legislation, implementation will be very slow and an expensive proposition for state and local governments, and affected citizens. It is not a surprise to this subcommittee that state and local government are facing extreme issues in these uncertain economic times. Limiting the federal funds to "high hazard" areas as defined in the NCLS report eliminates many municipal systems, and should be reconsidered.

- **Decentralization Equals Inefficiencies**. We believe this program may be significantly more efficient if it was not delegated to the states or local level of government, at least entirely. USACE would be a more effective entity to assume this responsibility, as they would have the ability to work across political boundaries with fewer entities (and contractual agreements) involved than if each local "sponsor" was required to initiate individual programs and be solely responsible for funding the assessment of individual levee systems. Consolidation of this effort to the maximum extent possible seems to be the most cost-effective manner of implementation.

- **Disincentives are discouraging**. Our belief is that disincentives are likely to have little merit. If a state has difficulty achieving an established standard, how is "ineligibility for National Levee Safety Program grants" going to help fix the problem?

APWA RECOMMENDATIONS

- Place a moratorium on the "schedule" relating to Provisional Accreditation Letters that may have been (or will be) submitted by levee sponsors. This would provide for a reasonable period of time for elected and appointed officials of communities nationwide to discuss this issue in depth with appropriate federal agencies, their citizens, local businesses and other stakeholders before initiating efforts toward levee compliance determination. Additionally, this would allow a more thorough understanding of the needs of the federal government to institute the policy change and for local governments to assess and address the impacts that will result.

- Publicize the anticipated costs for insuring properties against flood damage. Include information related to what cost reduction for that coverage may result if a property is "protected by a compliant levee." This listing can be reviewed, distributed and monitored by state Insurance Commissioners, if appropriate.

- We suggested to the NCLS that administration of the National Levee Safety Program should be retained by the USACE. The USACE could promulgate rules related to when and if a program could/should be delegated below the federal level based on reasonable criteria. The USACE should be augmented with an appropriate budget, staff and equipment to accomplish this routine function. To supplement the effort, the USACE could retain consultants to complete assessments and other work throughout the Districts. We believe the results would be far more standardized and significantly reduce overall costs than if the project is undertaken by individual communities.

- The report recommends establishing a "Certified Levee Professional Program." While this could prove to be beneficial, there are no significant details provided. This will be more affordable for small communities if a program for federal financial assistance to complete this process was implemented.

- Modify the "threshold" of lives at risk as a determinant of federal financial aid availability. The focus on human safety is the highest priority stated in the report, and the report indicates that emphasis should be placed where there is a risk to 10,000 lives if a levee fails. That threshold of danger to human life will likely exclude smaller communities with respect to receiving any federal funding to improve levees. Even the larger cities may have difficulty attaining the 10,000 lives threshold. However, inundation of the levee protected area of our town, as

just one example, will possibly affect that number of jobs due to the "business centers" being within the levee protected area. The economic loss could be devastating. There should be some means to incorporate "economic" impact in addition to the number of lives at risk. "Percentage of community property value at risk" or the "percentage of population at risk" may be possible starting points for that discussion.

- Bring associations which have an interest into the discussion. In addition to those organizations that were represented on the NCLS or the Review Team, we recommend that stakeholders from local elected officials organizations such as the National League of Cities, National Association of Counties, US Conference of Mayors and others be brought to the table to share their perspective.

Chairwoman Johnson, Ranking Member Boozman and members of the House Subcommittee on Water Resources and Environment, thank you for conducting this hearing and for inviting us to present our concerns and our recommendations from the Public Works community. APWA stands ready to be your resource as we move forward to achieve levee safety.

Association of State Floodplain Managers, Inc.
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COMPLETE STATEMENT OF

ASSOCIATION OF STATE FLOODPLAIN MANAGERS, INC.

BEFORE THE

Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment
UNITED STATES HOUSE OF REPRESENTATIVES

National Policy Priorities and the Recommendations of the National Committee on Levee Safety

Presented by

LARRY A. LARSON, P.E., CFM
EXECUTIVE DIRECTOR
ASSOCIATION OF STATE FLOODPLAIN MANAGERS

May 19, 2009

INTRODUCTION

In the years following the 2005 hurricane season, which dramatically demonstrated the devastating consequences that can result from over reliance on levees, numerous policy summits gathered experts to craft recommendations for the future of the nation's levees and levee systems, the US Army Corps of Engineers completed its initial review of federal levees, and Congress enacted the National Levee Safety Act of 2007. The Act created a National Committee on Levee Safety which was asked to prepare a report back to Congress on what a levee safety program should entail. The Committee completed its Report with recommendations, currently under consideration by the Administration and Congress. The 2008 Midwest Floods, 2009 sandbagging of levees on the Red River, and other flood disasters involving levees reminded us all that, as we consider the problem and move toward solutions, the nation's levee infrastructure continues to deteriorate. At the same time, levees are being relied on to provide total safety, even for events larger then those they were designed for, thus these factors combine to threaten the safety, economic vitality, and long-term sustainability of our communities. The nation remains in need of robust policies, programs and institutions, of which levees can be a part, to prevent flood losses, make efficient use of tax dollars, and assure a more sustainable future. Nothing less than our nation's security, stability and prosperity are at stake. We appreciate your leadership in meeting this challenge, and welcome this opportunity to share our views with you.

The Association of State Floodplain Managers and its 27 Chapters represent more than 14,000 state and local officials and other professionals who are engaged in all aspects of managing and mitigating flood risk to address the loss of life and property from natural hazards. These aspects include land management, mapping, engineering, planning, building codes and permits, community development, hydrology, forecasting, emergency response, water resources and insurance. Most of our members work with the nation's 21,000 flood-prone communities struggling to reduce their losses from all flood related hazards. All ASFPM members are concerned with working to reduce our nation's flood-related losses. Our state and local officials are the federal government's partners in implementing federal programs and working to achieve effectiveness in meeting our shared objectives.

The 2005 overtopping and failure of levees in New Orleans have been called the "wake-up call" to the nation on the consequences of over reliance on levees and ignoring levee safety. However, many other levees are in far worse shape than those in New Orleans in 2005, and the clock is ticking largely unknown to the families and business at risk, or even to many community officials. We look forward to working with you and others to identify the nation's levees and their condition to understand and manage the flood risk associated with levees, and to address the overall flood risk management context in which those structures operate. Today, our testimony addresses the following:

A. History Leading Up to the Current State of Levee Insecurity
B. The Need for a National Flood Risk Management Policy and Framework
C. ASFPM Response to the Report of the National Committee on Levee Safety
D. Additional Recommendations to Incentivize Sustainable Flood Risk Management and Levee Safety
E. Recommended Next Steps to Address the Problem in Advance of the Next Big Flood

A. HISTORY LEADING UP TO THE CURRENT STATE OF LEVEE PROBLEMS

Levees have existed in this nation since early times. Those early levees were simply mounds of dirt thrown up by farmers or property owners to prevent frequent flooding of their property or crops: others were earthen mounds from mining operations. Most of the population lived near rivers or the coast, since waterways were our highways and the rivers were our source of water for industrial, human and livestock consumption, and crop irrigation. The federal government got into the levee business in an organized way when Congress asked the Corps to become involved in the levees in Sacramento in 1917. By 1926, the Corps had hemmed in the Lower Mississippi River along its thousand mile course through six states, relying solely on levees to control floods, and reporting that the system of levees "is now in condition to prevent the destructive effects of floods."[1] The very next year, this levees-only approach led to widespread destruction when the extent and consequences of levee overtopping, failure, and flooding exceeded even that of New Orleans as a result of Hurricane Katrina.

There are five main components to the problematic use of levees in the United States today.

1. Communities and states erroneously think flooding is a federal responsibility. The Flood Control Act of 1936 provided authority for the Corps of Engineers to be the lead agency on flood control projects in the nation, and fostered the evolution of responsibility for management of floods. That authority has been used extensively for structural projects such as levees, dams, and channelization, which modify our natural waterway systems to accommodate development needs. While the Corps has authority to perform non-structural projects such as elevation or relocation of at-risk buildings, the vast majority of projects have been structural. The evolution of responsibility for flooding and its consequences that has focused on federal structural projects has led states and communities to view flooding incorrectly as a federal problem, not a local and state problem.

2. We don't know how many miles of levees there are or their condition. As a nation, we are largely uncertain about the condition or likely performance of our levees. The Corps has constructed nearly 9,000 miles of levees, most with a non-federal sponsor that cost-shares in the construction and agrees to be responsible for operation and maintenance of the levee. Many private levees have been built to protect farmland from frequent flooding. Over time, however, communities and infrastructure have been built or greatly expanded in areas that will be inundated when those levees are overtopped or fail. Little is known about the current condition of Federal or non-federal levees, including whether these levees were designed to meet today's conditions, or whether they have been properly maintained by the non-federal interests. Property owners behind those levees may not even be aware the levee "protecting" them is deteriorating and subject to failure or is inadequate to handle today's flood events. Too often, we learn about the existence and condition of these levees when one fails or is overwhelmed by a flood event.

For these reasons, **ASFPM strongly supports efforts by the Corps to complete the nationwide inventory of federal levees and to include in this inventory the thousands of miles of other levees built by other Federal agencies, states, towns, farmers, landowners, and other private interests.** While some of these levees were well-built and maintained, many

[1] United States Army Corps of Engineers, *Annual Report of the Chief of Engineers for 1926: Mississippi River Commission* (Washington: GPO, 1926), p. 1793.

others were not, or were not built to handle larger floods. To fully understand and manage the scope of the nation's exposure, Federal and nonfederal levees need to be inventoried, including their current actual level of protection, condition, and scope of development they are relied upon to protect. A comprehensive inventory of the locations and protective qualities of the nation's levees will enable Congress, states, and local governments to grasp the full scope of the nation's exposure. Only then can comprehensive, effective levee safety programs be designed and actions prioritized to invest resources where they will address the areas of greatest risk or of greatest benefit to the community, state or the nation's taxpayers.

3. Levees and the NFIP. Levees have been built to various heights to contain storms of various frequencies. Before the 1970s, the Corps of Engineers focused on building levees to protect properties from the Standard Project Flood (SPF), the 500, or 200-year flood. However, it was not until widespread implementation of the NFIP that communities began feeling pressure from developers and property owners, so communities often sought to "remove" land from the mapped 100-year flood zone. The presence of a 100-year levee, when accredited under the NFIP, removes the flood zone designation from the "protected" property, and thus eliminates the NFIP requirement to comply with construction standards, such as elevation of any new or substantially improved buildings in that area, and also removes requirement for purchasing flood insurance. Increased development in these flood risk areas may provide a short-term economic benefit to the local community with potentially long-term adverse consequences to the community and to the nation's taxpayers.

FEMA leaders emphasize that the 100-year standard for flood insurance purposes was never designed or adopted to be a standard for public safety. However, many factors conspire to make this minimal, 100-year level of protection the most popular standard for new levees. These factors include the attractiveness of short-term relief from NFIP requirements, the ease with which the levee project can be "sold" to the public, and the externalization of catastrophic damage costs due to levee failure away from those who gained the benefits and onto the federal taxpayers. In other words, these 100 year levees became the "buy cheap" option the community chose. The false perception of a federally endorsed 100-year standard of protection combines with local and state budget constraints to prevent communities from fully exploring and selecting greater than 100-year levels of protection or from selecting other mitigation options that may have smaller long term costs, but less federal cost sharing up front. Moreover, even if communities recognize the need for greater protection – for areas of urbanization or where failure will have huge consequences—the economics may become a barrier.

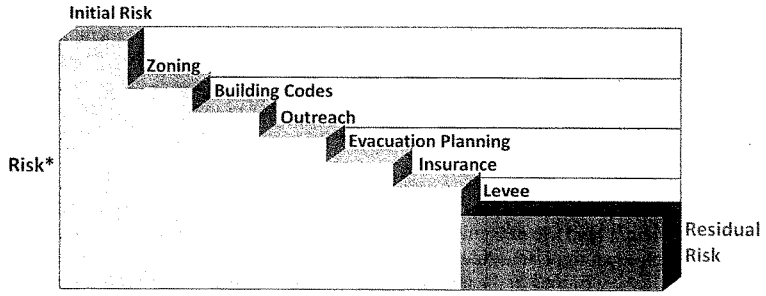
By default, the design standard for levees is currently based on either (1) the 100-year standard of the NFIP, or (2) the level of protection justified using federal, development-oriented policy that attempts to maximize the levee project's net national economic development (NED) return to the nation. While a larger levee may have a positive benefit/cost (B/C) ration, the B/C may be higher for the 100 year then the 500 year, and the current Principle and Guidelines promote selecting the alternative that "maximizes" the B/C. The NFIP and NED factors, along with cost-sharing requirements and the federal budget process, have resulted in "lowering the bar" for most levees in the nation to the 100-year standard, even in cases in which the consequences of the failure of a particular levee would be catastrophic. They also can result in ignoring the options of non-structural measures that could be used instead of a levee to avoid the catastrophic consequences in larger flood events. Ironically, based on current practice, the nation and citizens would fare better if a community built a "99-year levee," because this would lead to the

continuation of both mandatory flood insurance as well as continued floodplain management construction practices—which collectively would lower vulnerability and risk much more than would a 100-year levee by itself.

4. Residual risk. A significant problem with the management of our levees is that people by and large do not fully understand the nature of flood risk and the fact that it can never be fully eliminated. It is too easy to believe that a levee or other measure provides complete protection from flooding when, in reality, a large "residual" risk remains behind the levee.

Residual risk areas are those lands subject to flooding that continue to have risk, even after a number of mitigation measures have been implemented. The chart below shows how communities can address areas that are considered "protected" by levees by taking a number of mitigation actions. With each additional action, the community "buys" down more of its flood risk. But in the end, there will never be 100% protection---there is still residual risk. More importantly, the chart shows that communities and citizens who rely "only" on a levee are addressing just a small portion of their flood risk. Mapping these residual risk areas and requiring flood insurance in them is essential. Levee standards for protection of urbanized areas and critical infrastructure like hospitals, emergency operation centers, water supply and shelters must be protected to and operational during at least the 0.2% (500-year) flood event or in a Category 5 hurricane in storm surge coastal areas. The larger the levee, the more that risk that will be reduced---but again, only a portion of the flood risk.

Flood Risk Management:
Buying Down Risk, One Step at a Time



* Risk = Probability x Consequences

5. Risks are increasing behind levees. Finally, a levee safety problem increases when new homes and businesses are being allowed behind to be built or redeveloped with more costly structures behind levees. This is especially the case if it is an agricultural levee that was designed just to

lessen periodic flooding of crops. These levees were never meant to accommodate even the 100-year flood, and they certainly don't meet the higher level of protection that is appropriate for urbanizing areas. Moreover, legacy levee structures that may have been designed to withstand a 100-year flood have been rendered ineffective due to development in the watershed that increased runoff, or due to the more severe rainfall events associated with our changing climate.

The conditions that led to the "Era of Unintended Consequences" just described have long been recognized by policy experts. In fact, leaders of both the Corps and FEMA acknowledged as early as the 1970s that the 100-year standard was inappropriate for levees in urbanized areas. In recent decades, numerous reports have called for a sharing of responsibilities and accountability among all levels of government, business, and private citizens; balance among the many competing uses and functions of rivers, coasts, and floodplains; and for the national coordinated strategy for management of the nation's waterways and floodplains.[2]

B. The Need for a National Flood Risk Management Policy and Framework

Although the National Levee Safety Act of 2007 provided for the development of a policy framework for levee safety, the National Committee on Levee Safety struggled to identify and operate within its mission parameters in a policy vacuum; with no national flood risk management policy to guide decision-making beyond the levee footprint. While the Committee recommendations on governance, engineering, and outreach help guide decision-making once the decision is made to build a levee, the report provides no insight to guide the important decision of whether or not to levee an area to protect against floods, or how a levee may be combined with nonstructural measures or is a levee should be built at all.

The Committee's recommendations are prefaced by recognition of a need for a broader national flood risk management approach, and for leveraging levee safety as a critical step in a national infrastructure investment. However, the report deals with levees as an entity unto themselves lacking any nexus to land use decisions, regional or watershed based flood risk management, and existing or proposed levees. Additionally, the report is nearly silent and makes no specific recommendations for requiring appropriate land use decisions to accompany federal investment in building new levees, or when rehabilitating existing levees.

States and local governments will make more economically sound and sustainable decisions when the responsibilities for flood risk management activities are shared more and also are clearly defined. Although land use planning and management is a local and state function, the federal government plays an important role in helping communities guide development safely from harm, by attaching conditions to the availability and cost-sharing of federal dollars and also through its policies and regulatory guidance.

When they are built, levees should be the mitigation measure of last resort, after steps such as accurate floodplain designations, adoption of building and land use standards to guide development to avoid high risk areas and build safer in low flood risk areas, management of runoff from developed areas, relocation of existing development from flood-prone areas, approval of intergovernmental agreements in larger watersheds, and wetlands revitalization, have been implemented. Additionally, the impacts of building a levee on areas downstream, upstream

[2] A list of these reports is provided as an addendum to this testimony.

and across the river must be fully identified, evaluated and mitigated, since hemming in the river and pinching in the floodplain will increase flood heights in other areas. Levees have a huge effect on the ability of a river or estuary to provide the natural and beneficial functions upon which we rely ---the functions of flood storage or conveyance, water quality, habitat, and others that are the natural functions of floodplains. Rivers and estuaries are the life blood of our ecosystems. When we build levees on the bank of the river, we lose all those functions and put added strain on the levee for erosion and flood levels, which increases the chance of failure of the levee and of increasing flood levels on other property. Levees should only be considered in the context of a systems-based approach that evaluates levee setbacks to allow room for river flows and other natural functions, and combines a levee with complementary measures to slow and absorb flows.

However, a range of government regulations and financial and insurance incentives instead often make levees a leading option for many local governments. In order to remove the perverse incentives currently driving many flood risk management decisions toward the structural alternative alone, state and local governments must be required to demonstrate that all other nonstructural approaches have been fully considered, including a combination of structural and nonstructural solutions. For those cases where a levee is truly the most effective risk management strategy, nonfederal partners must provide clear assurance and demonstrate their commitment and ability to perform long term operation and maintenance of the levee not only to protect this significant federal investment, but also to prevent inappropriate reliance on potentially hazardous structures.

Along with the challenges of the unknown levels of protection of levees and of their condition, many local governments are facing the de-accreditation of their levees, for purposes of recognition under the NFIP. More than 300 (of over 900) communities are facing the impending expiration of agreements regarding their Provisionally Accredited Levees, or PALs, during FY09. The result of having a levee that is not accredited as providing flood protection is that the area behind that levee will be mapped in the "without–levee" condition and will be designated a Special Flood Hazard Area subject to appropriate flood insurance requirements and land use measures to prevent and mitigate flood damage.

Unfortunately, an issue has emerged in recent years that hinders the potential effectiveness of this existing system of incentives to prevent harm: the misperception that flood insurance is an unnecessary burden on those living behind levees. Levees are designed to provide only a specific level of protection. They can fail in any flood, or be overtopped in larger flood events, which is why relying solely on levees leaves those living behind them subject to significant and poorly understood risks. Everyone should understand the risk to life and property that remains behind levees—risks that engineers acknowledge that even the best flood-control system cannot completely eliminate.[3] In its recently adopted Resolution on levee safety, the American Society of Civil Engineers amplified the need for public understanding and better management of the nation's flood risks, emphasizing that:

> ..risk communication is especially important in situations such as levee construction where the community is often emboldened by an erroneous

[3] See American Society of Civil Engineers Resolution 529, adopted Jan. 25, 2009, available at http://www.asce.org/pressroom/news/policy_details.cfm?hdlid=527.

> sense of security to greatly increase development in areas protected for a time by levees; and at the same time the consequences of such failure have dramatically increased due to flood depth and velocities which accompany such failures.
>
> [T]he solution to levee safety and flood-risk reduction must be developed within the complex context of community development, land use, building codes, emergency preparedness (especially warning, evacuation, and risk communication), as well as an efficient and orderly system of indemnification for the inevitable losses when levees fail or are overtopped

The purpose of FEMA's mapping program is to provide people living and working behind levees with appropriate risk information so that they can make informed decisions to minimize economic loss, damage, and loss of life. As noted above, the 1%-chance standard for flood insurance rating purposes is not a safety standard. Congress wisely intended that those levees that do not meet certain criteria not be depicted on flood maps as providing protection. Although a newly imposed requirement to purchase flood insurance is an additional cost for those living at risk, it is only appropriate that those at risk be informed and insured and bear part of the cost of living at risk.

Another issue being discussed is that of perceived legal liability associated with performing levee certification work. We understand that some engineering firms have decided to stop providing levee-related services due to these concerns. Some engineers are calling for legislation to cap their liability and otherwise limit their exposure for levee-related work. It is the view of ASFPM that there are firms performing this levee certification, and the issue is not ripe for a legislative solution, and the ASFPM would not support liability caps for levee-related work. However, Congress could lead the development and adoption of uniform national standards of care for all levee projects and for levee maintenance activities, by tasking the National Levee Safety Commission, or another entity to do this. Additionally, a national standard of care for levee systems would facilitate development of market-based incentives between liability insurers and policyholders to support industry best practices.

Ultimately, any national levee safety policy will function best within the context of an overarching national flood risk management strategy, and risks failure without it. The best engineering and evacuation planning will not be sufficient to ensure that existing levees and activities they are intended to protect are well managed, and that any new levees are appropriately selected as just one part of an overall strategy to manage flood risk in a given community. The Report of the National Committee on Levee Safety provides Congress with important insights to help drive at least some of the next steps for the nation. ASFPM and its members stand ready help Congress meet the challenges identified in the report that related to levees, and the overall physical, political, environmental, economic and social landscape in which they operate.

C. ASFPM Response to the Report of the National Committee on Levee Safety[4]

[4] ASFPM Comments to the Report of the National Committee on Levee Safety are available at http://www.floods.org/PDF/Levees/NCLS_Report_Review_Committee_Comments_from_ASFPM_1208.pdf.

The recommendations put forth in the report of the National Committee on Levee Safety provide important insights to the possible scope of the nation's exposure, and into certain key governance, engineering, and public affairs measures designed to ensure that levees are well understood, constructed, and maintained. ASFPM commends the work of the Congress and the NCLS, especially to recognize where levees differ from dams and call for a differentiated management framework. Although ASFPM supports much of the report and many recommendations, during the review process we identified important gaps that will need to be addressed in order for the National Levee Safety Program to be sustainable and effective.

As noted above, we support the expansion of the National Levee Database to include nonfederal levees, and encourage Congress to act swiftly on this important first step to identify and begin to manage the full scope of the nation's levee-related risks.[5] The development and adoption of National Levee Safety Standards will help ensure that the best engineering practices are brought to bear, and help address liability concerns. Although ASFPM supports the concept of a national discussion on flood risk and tolerable risk guidelines, that effort would be better served by consideration of the full breadth of flood risk management strategies.[6]

ASFPM strongly supports the requirement that properties protected by a levee be insured against flood damage. This requirement will reduce economic exposures, increase understanding of residual risk behind levees, and place the responsibility for levee-related flood risk on those who live with or contribute to that risk. However, Congress needs to take the following factors into consideration in crafting this requirement:

(1) Current mandatory purchase guidelines exempt from the flood insurance requirement those properties that do not have a federally backed mortgage. As a result, homes and businesses that are owned outright have no mechanism for ensuring that flood insurance is purchased and maintained. One option would be to require insurance as a condition of receiving a local certificate of occupancy, accessing local utilities, or other means currently employed to enforce building codes for other safety issues. Congress might also require a study of a long-term (20 years or more) flood insurance policy that attaches to the property.

(2) Risk-based premiums could have a significant effect on some low income families. One option would be making vouchers available through HUD to support the transition to risk-based flood insurance premiums.

We also agree that a Levee Hazard Classification System will help prioritize where resources can prevent the most harm. However, the classification system put forth in the NCLS Report, which would classify a levee endangering 999 families as one of "Low Hazard," falls far short of what is needed. We recommend that the classification system rate any levee that presents a risk of loss of life as "High;" any that threatens real property as "Significant," and reserve the "Low"

[5] The costs of inspection of nonfederal levees should be the responsibility of the levee owner. Failure to provide adequate inspection should disqualify the levee owner from eligibility for any federal funds for that levee.
[6] Furthermore, the concept is currently abstract at best, and experience shows that communities and citizens will tolerate considerable risk as long as someone else pays the consequences. Until a levee safety program is in place that places greater responsibility on those who live at risk or contribute to risk associated with levees, any discussion of tolerable risk is premature.

classification for those levees that threaten neither real property, nor lives.

We could support the NCLS recommendation calling for an independent and multidisciplinary National Levee Safety Commission to provide for consistent national leadership and standards if it were done properly. Moreover, as discussed above, we encourage Congress to craft a national flood risk management policy and task a national governing body to oversee the many public interests in reducing flood losses beyond the realm of levees. Such a body would be best positioned to oversee the development of programs for risk communication, training, and technical assistance to states and local governments. In addition, research and development efforts to advance techniques and practices for all flood risk management activities – not just for levees – will be best served by oversight from a governing body tasked to consider the broad range of approaches to stabilize and manage flood risks in the nation.

Although the NCLS Report identifies minimal criteria for participation in a National Levee Safety Program and potential access to federal funds, the measures identified do not appear sufficient to achieve shared responsibility, accountability, and reduced risk. As emphasized above, existing federal programs encourage inappropriate reliance on levees, undervalue nonstructural risk management solutions, and provide few consequences for unsound local land use practices. For these reasons, the new system of incentives and disincentives needs to address each of these existing policy flaws, target the right audience, and ultimately change how states and local governments, as well as citizens, view and rise to their responsibility to prevent flood damage.

Strong state levee safety programs should be the objective of the new nationwide program, because states are endowed with constitutional authority to authorize, oversee and enforce levee improvements and adequacy, other alternatives, and the land use associated with them to reduce flood risk. However, the delegation of programmatic responsibilities of key public safety programs should not extend beyond the states until more measures and governance are in place. Further, tangible consequences should exist for those states that choose not to participate.

States will need strong incentives to modify the existing federal disaster relief environment. The minimum qualifications for federal levee funding must include participation in the NFIP and regulation of all development that is or will be impacted by levee failure or overtopping. States should face sanctions and not be eligible to receive any type of federal assistance within levee protected zones if that state is not participating in the NFIP program. Federal funds such as PL 84-99 and disaster relief funds for any levee-related damage should not be available to any entity that is not in compliance with a national or state levee safety program, or to any community that does not participate in the NFIP. We further suggest consideration of a COBRA-like sanction of no federal assistance within levee protected zones if a state is not participating in the program. At some point, the non-availability of federal flood insurance within the state could be phased in as a sanction for states that are not participating in these programs.

D. Additional Recommendations to Incentivize Sustainable Flood Risk Management and Levee Safety

As noted above, the NCLS Report provided important insights regarding engineering, evacuation, and education related to levees. However, key opportunities to support sound

management principles at all levels of government were not fully explored in the report and remain untapped. In fact, after each major flood in our nation's modern history, experts have gathered to consider the flooding problem and craft recommendations for the future.[7] Unfortunately, we have "hit the snooze button" for public policy change in response to these wake-up calls, and have paid a high price in subsequent flood disasters.

The 1994 report, *Sharing the Challenge: Floodplain Management into the 21st Century,* known as the Galloway Report, authors made specific recommendations to the Clinton Administration for changes to federal policies, programs, and activities to reduce flood risk associated with levees. The report emphasized that the existing "loose aggregation of federal, local, and individual levees ... does not ensure the desired reduction in the vulnerability of floodplain activities to damages." The report's recommendations from more than fifteen years ago reverberate over the years to remind us all that, for decades, leaders on these issues have made the same recommendations grounded in common sense measures. These include the following:

- To reduce the vulnerability to flood damages of those in the floodplain, the Administration should:
  - Give full consideration to all possible alternatives for vulnerability reduction, including permanent evacuation of floodprone areas, flood warning, floodproofing of structures remaining in the floodplain, creation of additional natural and artificial storage, and adequately sized and maintained levees and other structures;
  - Adopt flood damage reduction guidelines based on a revised *Principles and Guidelines* which would give full weight to social, economic, and environmental values and assure that all vulnerability reduction alternatives are given equal consideration; and
  - Where appropriate, reduce the vulnerability of population centers and critical infrastructure to the standard project flood discharge through use of floodplain management activities and programs.

- Increase the state role in all floodplain management activities including, but not limited to, flood fighting, recovery, hazard mitigation, buyout, floodplain regulation, levee permitting, zoning, enforcement, and planning.

- To ensure the integrity of levee and the environmental and hydraulic efficiencies of the floodplain, states and tribes should ensure proper siting, construction, and maintenance of non-federal levees.

- Require actuarial-based flood insurance behind all levees that provide protection less than the standard project. A mandatory flood insurance purchase requirement behind such levees would provide a number of benefits to the public and to property owners:
  - Property owners would be insured against the real possibility that a levee will be overtopped or will fail,
  - Federal expenditures for disaster assistance would decline,
  - Property owners would be more fully aware of the residual risk in building or locating behind a levee, and

[7] A bibliography of many of the existing reports and recommendations is on the ASFPM web site

- Communities would have an incentive to seek higher levels of protection.

Additionally, the Galloway Report makes the following specific recommendations regarding Corps programs and practices:

- The Administration should reaffirm its support for the USACE criteria under the PL 84-99 levee repair program and send a clear message that future exceptions will not be made.
- The USACE should investigate procedures to minimize impacts associated with levee overtopping. Differing methods to lessen levee overtopping impacts should be investigated. A report should be prepared by USACE that details preferred engineering techniques to improve current levee structures, where appropriate.
- Federal and state officials should restrict support of flood fighting to those levees that have been approved for flood fighting by the USACE.

Sustainable flood risk management and levee safety can best be achieved through sound, shared management at all levels and the private sector. To foster those sound approaches and discourage ineffective, costly approaches, the ASFPM recommends the following additional steps.

- ASFPM recommends that the national flood risk or levee safety commission be tasked with the full exploration of federal programs, such as HUD's Community Development Block Grants, transportation, and EPA state revolving funds and watershed funds, to leverage eligibility in those programs for projects in leveed areas. The commission should report on how the cost of these incentives to the federal taxpayers will be offset by savings in disaster and other federal program costs that will be reduced by effective flood risk and levee safety programs.

- The PL 84-99 and FEMA Disaster Relief Programs often serve to shift the consequences of inadequate levees or non-federal responsibilities associated with them from levee owners and communities to the federal taxpayers We recommend that the PL 84-99 and the disaster relief programs be reviewed and aligned with the flood risk management, levee safety, and the NFIP. As noted above, PL 84-99 for any levee-related damage should not be available for levees that provide less than 100-year protection, to any entity that is not in compliance with a national or state levee safety program, or to any community that does not participate in the NFIP.

- Federal investments in new levees should not be made for a structure that provides less than 500-year protection, and the Corps process maximizing the NED should explicitly incorporate this standard as a lower boundary for federal investment. In addition, Congress and the Administration should adopt a standard of 500+ year protection for levee design as the minimum standard for purposes of flood insurance and other federal investment.[8] These requirements should be phased in for existing levees, which will need a significant phase in period

- Before a levee is federally recognized as providing a certain level of protection (and this

[8] Existing levees that provide less than 500-year protection but meet all requirements for design, maintenance, and operation, and are recognized by federal programs as meeting the standards for 100-year protection, could be granted grandfather status. Criteria should be developed to determine when and if protection provided by a specific levee would need to be upgraded and how that would be achieved.

must include protection from future levels of flooding) and before a levee project is approved for construction, reconstruction, or repair, the local sponsor must clearly demonstrate the financial and administrative capability to provide for operation and maintenance for the life of the structure.

- Federal funding should be allocated in ways that promote a more collaborative working relationship among states and communities that share waterways and watersheds. To prevent flood damage, for example, a larger federal cost share could be provided for those risk management projects that were developed collaboratively and that considered opportunities to avoid increasing flood levels in other communities/areas and also limit adverse environmental effects. To hold down increases in flood levels and better protect water quality, some funding could be targeted to (1) encourage greater state and local investment in water quality planning that aims to reduce or better manage urban runoff; (2) encourage the implementation of protective land use strategies, such as acquisition and relocation of existing structures at high risk and preservation of floodplains as open space; and (3) promote collaborative flood risk, water quality, and land use plans that take a regional focus on environmental impacts and involve all the relevant local jurisdictions within a watershed.

- Federal funding should be consistent with state and local hazard mitigation plans, growth management initiatives, and environmental needs. For example, consideration should be given to whether federal funds for transportation, water treatment, and other infrastructure are providing incentives to build in flood-prone areas. Beyond funding incentives, the federal government can also play an important role in encouraging sound practices. For example, the federal government could encourage states and localities to reform outdated planning laws that hinder efforts to conduct comprehensive flood risk management and land use planning.

E. Recommended Next Steps to Address the Problem in Advance of the Next Big Flood

As can be seen from the Levee Safety Committee report and this testimony, the issues surrounding a levee safety program are many and they are complex. ASFPM suggest that Congress not attempt to lay out the entire future of a national levee safety program at this time. First of all, the report you just received does not give you adequate information to do that, and until you see an inventory of all levees in the nation— the number of miles, their ownership, and their general condition—with some general estimate of the cost and time it will take to address the existing inventory of levees, it is not reasonable to craft a final solution. These just-mentioned factors will need to be cross matched with new standards for level of protection and design, construction, operation and maintenance of levees, and a vision of how the responsibility for flood risk associated with levees is to be shared among all levels of government, the private sector and especially those people, businesses, and communities "protected" by levees.

These latter elements need to be developed, and this could be one of the first tasks of a commission or whatever oversight group Congress might set up. The oversight group could explore and develop those components, determine the progress in each state toward a levee safety program, and expand and refine the incentives and disincentives the federal government could adopt that will foster this shared responsibility Those efforts can proceed concurrent with

the inventory, so within a couple of years Congress would have the information and full picture, enabling you to then establish a more complete national levee safety program.

In the meantime, some first steps Congress could take at this time might include:

- Draft and enact a Levee Safety Act of 2009 to stand up the National Levee Safety Commission or similar independent oversight body to develop data and craft next step recommendations to Congress.
- Task the new Commission with overseeing completion of the National Levee Inventory, including nonfederal levees, and reporting to Congress within a certain time on:
    - State capabilities and possible barriers to the creation of robust state levee safety programs throughout the nation.
    - Further exploration and recommendations for incentives for state and local flood risk and levee safety programs
    - Initiate development of national engineering standards for levee and their operation and maintenance

CONCLUSION

As each hurricane and riverine flood disaster raises awareness of the instability and insecurity of the current flooding predicament, the nation is waking up to find that we cannot afford to continue to live in a disaster relief environment. The NCLS Report provided important guidance on engineering, evacuation, and education related to levees. However, key opportunities remain untapped.

Since the intent of the National Levee Safety Program is to improve public safety, and levees have proven to fail with catastrophic consequences, one of the cornerstones of an effective program for the nation must include a requirement for investigations into alternatives before levees are built or identified for rehabilitation or improvement. The lack of mitigation alternatives or incentives is a major deficiency of the NCLS Report. Flood insurance and public education alone are not sufficient to mitigate fully the devastating effects of levee failure. Effective mitigation can take many forms, but the most sustainable and successful mitigation actions entail local and state initiatives to achieve the following:

- Levees should not be built or enlarged to protect undeveloped land, or for deep floodplains or high-risk storm surge areas due to the dire consequences when these levees fail or are overtopped;
- The Federal government should not invest in any new levees that provide less than PMF or 500+ year protection, and take climate change into account;
- The new national flood risk management and levee safety policy should call for the gradual retreat of levees away from rivers and coasts, provide for setback levees, and give rivers room to flood and so that floodplains can perform their natural flood reduction function and provide other benefits;[9]
- No new federal levees or investments for levee repair or rehabilitation should be considered without prior consideration of nonstructural and of hybrid nonstructural/structural approaches;

[9] The State of California is leading the way with this approach. The nation should follow its lead.

- The Federal *Principles and Guidelines* should give full weight to social, economic, and environmental values and assure that all vulnerability reduction alternatives are given full and equal consideration;
- States and local governments that participate in a national levee safety program and access federal resources must be required to fully consider the broad range of nonstructural and hybrid nonstructural/structural solutions;
- Water resources should be managed and planned for on a watershed basis, and Federal funding should be allocated in ways that promote a more collaborative working relationship among states and communities that share waterways and watersheds
- State and local plans and activities for development and hazard mitigation should reflect all hazards and identify actions with multiple benefit;
- No levee should be cost shared with federal resources unless the non-federal partner has assured funding for long term operation and maintenance.
- Flood-prone areas should be restored and permanently preserved as open space, through land acquisition, buyout and relocation, and adoption of open space plans; and
- Critical facilities sited out of harm's way and also be protected to and operational during the 500-year flood, using future development for calculating the 500 year flood.

States and local governments that have committed to these measures fare best in floods, and should be showcased as examples to follow. Moreover, these practices should be incentivized since they demonstrate the commitment needed to be worthy of trust to care for a significant federal investment. Those policies and practices that contribute to the ever-increasing risk of loss of life and property in floods should be eliminated; not incentivized with continued outpourings of federal resources.

As Congress considers the report and its recommendations, ASFPM stands ready to provide assistance to assure the protection and sound management of the federal investment in, and the long-term sustainability of, the National Levee Safety Program. The ASFPM represents the federal government's state and local partners in the continuing quest to reduce flood damage and disasters. Today, we once again stand at a crossroads--- with an opportunity to work with you to craft a national flood risk management policy framework that will serve the nation for decades to come. Thank you for the opportunity to provide the wisdom and expertise of our members on these important issues.

For more information, please contact Larry Larson, ASFPM Executive Director, at (608) 274-0123, or via email at larry@floods.org.

May 27, 2009

The Honorable Eddie Bernice Johnson
Chairwoman, Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, DC 20515

The Honorable John Boozman
Ranking Member, Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, DC 20515

Dear Chairwoman Johnson and Ranking Member Boozman:

On behalf of American Rivers 65,000 members and supporters across the nation, thank you for holding a hearing on the National Committee on Levee Safety's *Recommendations for a National Levee Safety Program.* As your subcommittee considers the recommendations included in the report, we recommend that you consider the following points.

American Rivers strongly agrees with the National Committee on Levee Safety (Committee) that "A *National Levee Safety Program* will be most effective only when coupled with an overall national flood risk management strategy." However, the Committee then recommends the formation of a National Levee Safety Commission (Commission) as a new independent federal agency. We're concerned that this would be a continuation of the current stovepipe approach that treats levees, dams, flood insurance and floodplain management as distinct topics. Our nation can - literally - no longer afford to piecemeal our approach to flood risk reduction. American Rivers continues to encourage Congress to consider the recommendations of the 1994 Galloway Report to modernize the nation's water resource policies and reinstitute the Water Resources Council.

If Congress decides to move forward with a Commission, it must include representation from the public, including conservation and business interests. It must not be solely focused on levee owners (public and private) and private sector firms that build, maintain and/or operate levees. The National Dam Safety Review Board is an example of what not to do.

The Committee's report recognizes the importance of nonstructural approaches to flood risk reduction. American Rivers believes that nonstructural approaches must be better defined and communicated with all levels of government and communities. This includes completing the project life cycle through decommissioning and removing obsolete and unsafe levees, as well as restoring wetlands and moving people out of harms way to restore a river's natural capacity to reduce the size and power of floods.

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The Committee report notes that the effects of climate change are likely to result in increased flood risk, but failed to include a recommendation to stem the tide. When developing future legislation on this subject, we encourage Congress to include requirements for the best available science with respect to climate change to be integrated in levee decision-making (i.e., assessment of need, design, and maintenance). Additionally, scientific studies have shown that instream navigation structures and levees increased flood heights in some parts of the Mississippi and Missouri rivers by five to ten feet. Therefore, Congress should require greater consideration to the role that existing and new structures will play in increasing flood risk downstream.

Finally, American Rivers strongly supports a requirement that every state have a levee safety program and that federal code is developed that all states must adopt. Rivers and their levees do not respect political and state boundaries. Our nation already suffers from a dangerous lack of consistency in state regulation of dams due to federal guidance that is purely advisory-in-nature. We must not make the same mistake with levees.

Thank you for considering these recommendations as you consider the recommendations of the National Committee on Levee Safety. We look forward to working with you to improve our nation's floodplain management policies for the benefit of our communities and natural resources.

Sincerely,

Rebecca R. Wodder

Rebecca R. Wodder
President

Cc: Chairman James Oberstar
Ranking Member John Mica

Letter

May 18, 2009

Re: U.S. House of Representatives, Subcommittee on Water Resources and Environment
May 19, 2009 Hearing on "Recommendations of the National Committee on Levee Safety"

Dear Chairwoman Eddie Bernice Johnson
U.S. House of Representatives
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
B-376 Rayburn House Office Building
Washington, DC 20515
Attention: Ms. Jenna Tatum, staff assistant

The enclosed document is submitted for your consideration as testimony for the record on the subject hearing on May 19, 2009 at the Rayburn House Office Building.

Any comment on the document or information about submitting testimony in the future would be appreciated.

I am looking forward to attending the hearing and learning more about the establishment of a "National Levee Safety Program".

Sincerely,

Charles E. Karpowicz, P.E., water resources engineer
7915 Bressingham Drive
Fairfax Station, VA 22039
703-493-8050, cell 571-265-2477

Enclosure (Word file NPS-Levee-CongrHear-5-17-2009)

Written Testimony Submitted for the May 19, 2009, 2:00 p.m.
U.S. Congressional Subcommittee on Water Resources and Environment
hearing on "Recommendations of the National Committee on Levee Safety"
Located at 2167 Rayburn House Office Building, Capital Hill,
Independence Avenue, SW, Washington, D.C.
Chaired by Congresswoman Eddie Bernice Johnson

Submitted by Charles E. Karpowicz, P.E., water resources engineer
7915 Bressingham Drive, Fairfax Station, VA 22039
703-493-8050

The purpose of this testimony is to provide a brief photographic essay of the difficulty and the future challenge for a "National Levee Safety Program" in the establishment of adequately funded "Continuous Maintenance and Operations Programs" by levee sponsors as required by the U.S. Army corps of Engineers.

As a photographic illustration of this future challenge the local "Washington, D.C. and Vicinity Flood Protection Project", National Park Service portions are shown. This flood control project protects the Constitution Avenue N.W. and Canal Street S.W. corridors, Anacostia Park, the Anacostia Naval Station, and the Bolling Air Force Base. The project is authorized by the U.S. Congress and administered by the Baltimore Engineer District of the U.S. Army Corps of Engineers. The local federal sponsors of this project are the National Park Service, the Anacostia Naval Station, and Bolling Air Force Base. Levee Program sponsors have ownership and maintenance and operations responsibilities for their sections of the project.

Special note: This aspect of total project management is not directly related to the current efforts by the National Park Service to make a modification to what is referred to as the 17th Street NW emergency closure at West Potomac Park Levee which is on the National Mall.

The project is within minutes of Capital Hill and its failure would cause catastrophic losses with a curtailment of business and government operations for several weeks. Based upon the photographs provided herein it does not appear to have an established and funded "Continuous Maintenance and Operations Program" as required by the U.S. Army Corps of Engineers for federally authorized levees.

For the National Park Service portion of the project, it is my estimate that it would take $20 million to complete necessary documentation, detailed inspections and investigations, deferred maintenance and operations, emergency plans for the project, and evacuation plans for affected areas. Also the existing "Washington D.C. and Vicinity Flood Emergency Manual" dated March 2006 is not reviewed, exercised fully, revised, and re-distributed on an annual basis.

Photographs by Charles Karpowicz on the National Mall (West Potomac Park) and Anacostia Park sections of the "Washington, D.C. and Vicinity Flood Protection Project", owned and maintained by the National Park Service

Photo 1. On the National Mall. October 21, 2007, Public and Occupational type safety deficiency: unsigned confined space in visitor area.

Photo 2. On the National Mall. October 21, 2007. Public and Occupational type safety deficiency: tripping hazard to visitors.

Photo 3. On the National Mall. October 21, 2007. Public and Occupational type safety deficiency: exposed wires.

Photo 4. Anacostia Park near National Park Service offices. July 17, 2008. Maintenance type deficiencies: presence of weeds, lack of grass cover, mowing, and visibility for holes which inhibits inspection. **Special note: For the location of photographs 4 – 6, it appeared that some degree of maintenance had been performed since July 17, 2008**

as observed by Mr. Karpowicz on December 17, 2008. However at the other location for photographs 7 – 13 no changes in maintenance condition were observed.

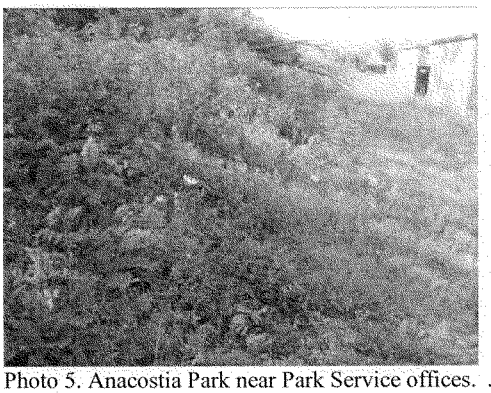

Photo 5. Anacostia Park near Park Service offices. July 17, 2008. Maintenance type deficiencies: presence of weeds and up-rooted tree, lack of grass cover, mowing, and visibility for holes which inhibits inspection. Note that National Park Service building is on the unprotected side of levee.

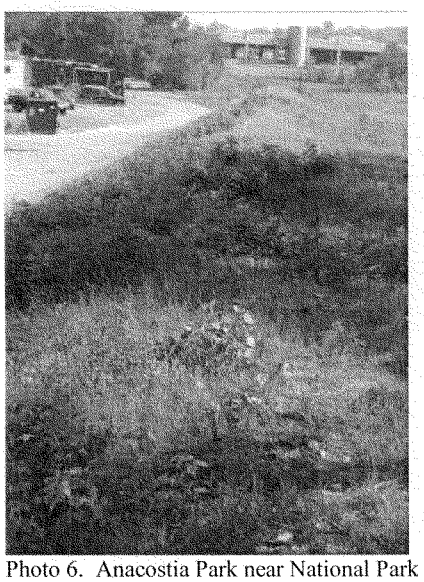

Photo 6. Anacostia Park near National Park Service offices. July 17, 2008. Maintenance type deficiencies: presence of weeds, lack of or inconsistent grass cover, mowing, and visibility for holes which inhibits inspection. Note National Park Service vehicles and buildings on the unprotected side of levee. In the distance is the Anacostia Metro Station.

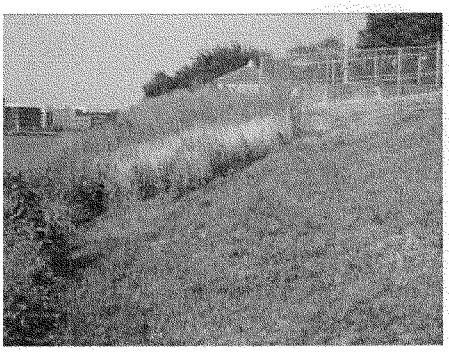

Photo 8. Anacostia Park at South Capital St. Bridge. July 17, 2008. Maintenance type deficiencies: poor grass cover and lack of mowing and access and visibility which inhibits inspection.

Photo 9. Anacostia Park at South Capital St. Bridge which is in the background. July 17, 2008. Maintenance type deficiency: Vegetation damaging seawall. Underwater Inspection should be performed.

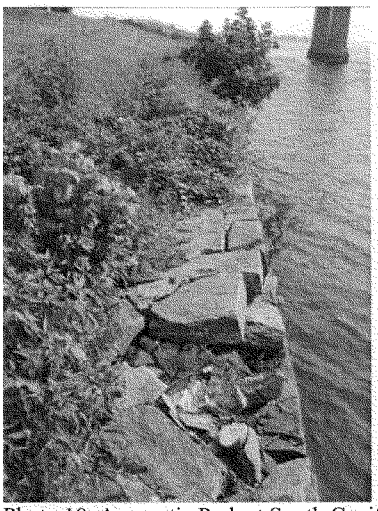

Photo 10. Anacostia Park at South Capital St. Bridge. July 17, 2008. Maintenance type deficiency: Damaged seawall.

Photo 11. Anacostia Park at South Capital St. Bridge. July 17, 2008. Maintenance type deficiency: burrow hole undermines structural integrity of levee.

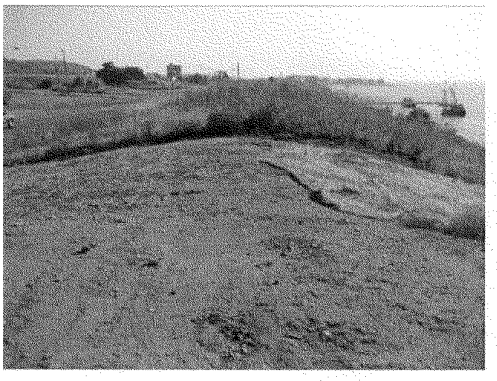

Photo 12. Anacostia Park at South Capital St. Bridge. View is toward the Anacostia Naval Station. July 17, 2008. Maintenance type deficiencies: inconsistent cover, lack of mowing, access, and visibility which inhibits inspection.

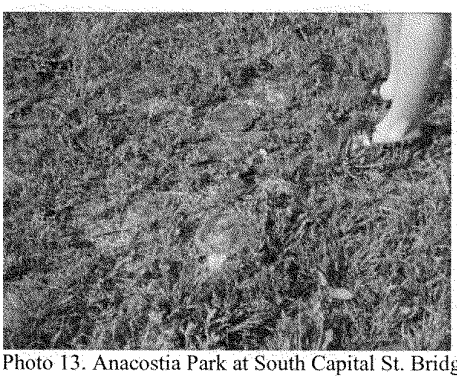

Photo 13. Anacostia Park at South Capital St. Bridge. July 17, 2008. Maintenance type deficiency: tree roots left in levee and which will rot and undermine integrity of structure.