WRITE TESTIMONY

OF

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BEFORE THE
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ON
WATER RESOURCES DEVELOPMENT ACT OF 2010: LEGISLATIVE ISSUES

NOVEMBER 17, 2010
10:00 A.M. – DIRKSEN SENATE OFFICE BUILDING, ROOM 406
Chairman Boxer, Ranking Member Inhofe, and members of the Committee,

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

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

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

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

What We Have Learned About the Nation’s Levees

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

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

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

- Many urban areas protected by levees, particularly those in deep floodplains, place people who live behind them at an unacceptably high risk. Failure of such levees has recently resulted in high loss of life, property damage, economic losses, environmental damages, and the disruption of social and cultural community fabric.
In addition to human life and private property, levees protect critical public infrastructure such as schools, hospitals, wastewater treatment plants, oil refineries, power plants and transportation systems.

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

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

- Many individuals and communities in leveed areas do not understand their flood risk. Many believe that levees – by themselves – make the public safe from flooding. Levees only reduce the risk of flooding – they do not eliminate the risk.

- In many areas, levees have inadvertently increased flood risks by attracting residential and commercial development into the floodplain, increasing the speed at which flooding occurs, and increasing the depth and duration of flooding when water gets trapped within the leveed area after a levee break;

- There are currently no national policies, standards or best practices relating to the safety of levees.
Unintended Consequences of the Existing Federal Policies Regarding Levee Safety

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

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

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

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

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

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

Risks from Levees Are Misunderstood and Increasing

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

Our levees are aging. The average age of levees within the U.S. Army Corps of Engineers programs is approximately 50 years, and the age of many nonfederal levees can be much older – 100 years or more. Many levees were originally constructed without the benefit of modern
engineering techniques and now provide only limited protection. Advancements in the state of art for engineering and science have been considerable, leaving many levees with features that have serious design, construction and operational inadequacies.

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

The Committee’s Recommendations

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

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

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

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

14. Design and Delegate Program Responsibilities to States
15. Establish a Levee Safety Grant Program
16. Establish the National Levee Rehabilitation, Improvement, and Flood Mitigation Fund
Under the category of **Aligning Existing Federal Programs (Incentives and Disincentives)**, the Committee’s recommendations are:

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

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

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

**Phased Strategic Implementation**

The Committee recommends phased strategic implementation as follows:

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

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

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

**What We Are Hearing**

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

Several major themes have emerged in stakeholder comments:

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

**Conclusion**

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

One of the dichotomies of levees is that, while these structures have afforded the country economic prosperity, they have also tended to cost the U.S. taxpayer when it comes to paying for disaster response, damages, and repairs when these same levees fail. The average yearly national
cost can run in the billions. The potential risk exposure in the future is even greater. Although there are costs for a NLSP, they will be long-term investments in public safety and continued economic prosperity. These investments will provide major returns in the form of avoided loss of life, reduced economic losses, and the prevention of regional and national impacts over the long term. With growing development and consequences in many leveed areas, the benefits of a strong levee safety program will only increase. Based on current trends, disaster assistance and recovery cost will likely continue to increase unless the country significantly changes its floodplain management practices at all levels of government.

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

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

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

- Assist the U.S. Army Corps of Engineers in expanding the National Levee Database through the submission of voluntary information from all levees in the nation not under U.S. Army Corps of Engineer’s authorities;

- Serve as technical advisors to foundational documents necessary for the development of eventually national standards such as the International Levee Manual and Tolerable Risk Guidelines;

- Assist the Federal Emergency Management Agency in improving communication regarding flood risk, especially as related to levees;

- Research federal programs to provide detailed recommendations on improvements of alignment of federal programs to increase safety of people and property behind levees; and

- Refine costs and benefits of a National Levee Safety Program.

Please consider the Committee as a resource as you develop the next WRDA bill or related legislation. Additional information can be found at [www.leveesafety.org](http://www.leveesafety.org).

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

Recommendations of the National Committee on Levee Safety Explained

Comprehensive and Consistent National Leadership

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

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

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

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

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

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

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

8. Swiftly address growing concerns regarding liability for damages resulting from levee failures through exploration of a range of measures aimed at reducing the potential liability of engineering firms and/or government agencies that perform engineering services for levee systems (e.g. inspections, evaluations, design, construction administration, certification or flood fighting). Congress should address this liability concern as a first priority in order to help ensure state and local interest in developing levee safety programs, and to prevent much needed levee repairs, rehabilitation and certification from coming to a halt.
9. Develop a comprehensive National Public Involvement and Education/Awareness Campaign to communicate risk and change behavior in leveed areas as an essential element of levee safety to improve public understanding of the role of levees, associated risks and individual responsibilities to empower people to make risk-informed choices.

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

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

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

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

**Building and Sustaining Levee Safety Programs in All States**

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

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

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

**Aligning Existing Federal Programs (Incentives and Disincentives)**

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

18. Mandate purchase of risk-based flood insurance in leveed areas to reduce economic flood damages and increase communities’ and individuals’ understanding that levees do not eliminate risk from flooding.
19. Augment FEMA’s mapping program to improve risk identification and communication in leveed areas, and consolidate critical information about flood risk.

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

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

http://www.leveesafety.org