

December 12, 2008

Memorandum

To: National Committee on Levee Safety (NCLS) Review Team

From: National Committee on Levee Safety
National Levee Safety Act
Title IX of the Water Resources Development Act of 2007 (WRDA)

Re: Review of Compiled DRAFT Recommendations and Strategic Timeline

On October 30, 2008, the NCLS solicited feedback from the Review Team on the scope of the intended strategic plan to develop a National Levee Safety Program. Feedback included specific recommendations on key scoping questions organized by Congressional goals, draft definitions and a hazard classification. The NCLS considered Review Team feedback in the formulation of a set of recommendations outlined in this memorandum which consists of two parts: 1) draft outline for the entire strategic plan for a National Levee Safety Program; and 2) highlights of draft recommendations.

Instructions for Review Team Members

The NCLS would like to solicit feedback on the content, clarity and completeness of this report outline and recommendations. Please consider this document to be a *work in progress*. As such, some of the recommendations are presented in more detail than others, the final order or presentation is not yet determined and there exist inconsistencies between sections in terminology, and likely conflicts of schedule, etc. Because early feedback is important to the Committee and we are on a tight timeframe, please do not allow these to distract you from the important content and context feedback we seek. There are three main sections to this document:

- **Part One:** Draft Outline for a Strategic Plan for a National Levee Safety Program, and
- **Part Two:** Draft Recommendations
- **Part Three:** Appendices List

The Committee is most interested in your feedback and suggestions on the questions that are highlighted on the agenda and the response template, but will read and consider all comments. For ease in our compilation and analysis of comments, please utilize the template provided and send back your comments (one set per organization) electronically to Terry Zien (terry.r.zien@usace.army.mil) by December 19, 2008. Earlier submission will allow for more Committee consideration and incorporation. Identical to the procedure for the first Review Team Meeting, please compile comments from an organization into a single set.

PART ONE: DRAFT OUTLINE FOR A PLAN FOR A NATIONAL LEVEE SAFETY PROGRAM

- I.** Executive Summary
- II.** 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.”
- III.** Vision and Approach
 - a. Vision of the National Levee Safety Program – *“An informed public and reliable levee systems working as part of an integrated approach to protect people and property from floods.”*
 - b. Focus of this report and its relationship with the broader issue of Flood Risk Management
 - i. In developing our strategic plan and recommendations for a National Levee Safety Program, the Committee focused on those foundational elements defined in the Levee Safety Act, supporting the vision statement, but that distinguish the broader issues of Flood Risk Management from those issues specific to Levee Safety, namely:
 - Use of sound technical practices in levee design, construction, operation, assessment, security, and maintenance;
 - Ensure effective public education and awareness of risks involving levees;
 - Establish and maintain competent levee safety programs and procedures that emphasize the protection of human life;
 - Implement feasible governance solutions and incentives that encourage and sustain effective levee safety programs at all levels of government.
 - c. In order to achieve our stated purposes, the above four aspects of Levee Safety were the Committees’ primary focus. The Committee explored other goals and connectivity with related flood risk management 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.
- IV.** Background, Context, and Urgency
 - a. The Evolution of Levee Policy in the United States
 - i. A Long History
 - ii. An Early Renaissance Period
 - iii. Unintended Consequences
 - iv. Complacency Regarding Levees
 - v. A Wakeup Call
 - b. The Current State of Levees and Public Safety
 - c. Where We Go From Here – The Call to Action
 - i. Understanding the Future Through Risk Concepts

- ii. What We Can Do to Secure a Better Future
- iii. What if We Don't Take This Opportunity to Act?

PART TWO: RECOMMENDATIONS

- I. Introduction and Consideration for the Development of Recommendations
 - a. Levee safety is a shared responsibility
 - b. A long term problem cannot be solved overnight – phased approach
 - c. Focus on human safety as paramount
 - d. Levees should be managed as systems
 - e. Flexibility at local and state levels to address levee safety
 - f. Relationship between Levee Safety and Flood Risk Management

- II. Establish National Levee Safety Commission
 - a. Creation of Levee Safety Programs in Each State is Cornerstone of the National Levee Safety Program
 - b. Governance of a National Levee Safety Commission

- II. Major Components of a National Levee Safety Program
 - a. Understanding the Nation's Levee Situation
 - i. Developing a Hazard Classification Systems and Definitions (p. 13)
 - ii. Develop a Comprehensive Inventory and Inspection Program for the Nation's Levees (p. 16)
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 - b. Communicate Risk to Governments and Affected Communities (p. 21)
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 - iii. Guidance for Levee Safety Programs (p. 34)
 - iv. Support Local Levee Safety Programs (p. 34)
 - v. Develop Training Programs (p. 35)
 - vi. Develop Technical Assistance Materials/Best Practices (p. 36)
 - e. Align Federal Programs to Support Levee Safety
 - i. Mandatory Flood Insurance (p. 37)
 - ii. Aligning FEMA CRS Program to Reward Levee Safety Activities (p. 37)
 - iii. Rehabilitate Levees in High Hazard Areas (p. 38)
 - iv. Address liability concerns (p. 40)

- III. Strategic Implementation Will Be Conducted in Phases
 - a. Immediate Actions

- b. Standing Up the National Levee Safety Program
- c. Long-term Actions

PART THREE: APPENDICES

- a. Committee on Levee Safety Membership and Charter
- b. Levee Safety Act of 2007
- c. Review Process and Team
- d. Current Related Authorities and Activities (within all Federal agencies, including: emergency response, recovery, mitigation, planning, etc.) The purpose of this section is to describe other national (and significant state) programs that might be impacted by, or should be considered in, the development of a National Levee Safety Program. Show Congress that we are aware of how our recommendations leverage impact or potentially replace existing programs.
- e. List of Acronyms
- f. List of Definitions (need consistent definitions across agencies)
- g. Description of federal programs related to levees (Corps, FEMA, NRCS, Bureau of Reclamation)
- h. References
- i. Experts Who Provided Advice Before the Committee

PART TWO: DRAFT RECOMMENDATIONS

I. Introduction and Considerations for the Development of Recommendations

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, tribal, 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 NCLS 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 previous statement placing levee safety in an appropriate and useful flood risk management context, the NCLS considered the following principles while developing its recommendations:

- Levee safety is a shared responsibility. Responsibilities lie at all levels of government and with individuals whose lives and property are protected by levees;
- Our nation's levee problem 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 primary focus of the Committee has been on protection of human health and safety;
- Levees are most effective when managed as physical and human systems, not as individual reaches. We are only as strong as our weakest point; and
- While human safety should not be compromised, levee management should be as flexible as possible at the state and local levels. This reflects the heterogeneous nature of levees across many factors (e.g., geography, ownership, etc.).

II. Establish a National Levee Safety Program

Currently, responsibility for levee safety is assigned in an often uncoordinated and incomplete manner: (1) distributed across all levels of government – federal, state, regional, and local; (2) housed in different agencies and functions within each level of government – operating and maintaining districts, technical standards, emergency management, flood plain management, risk management and mitigation, and land use development; and (3) shared – often unknowingly - by the individuals and industries living and working behind levees. In order to create and sustain a strong national levee safety program, a new independent Federal agency is required that draws on and integrates the diverse and existing skills across organizations and levels of government. Such an organization would ensure a strong voice of participation of all key players and provide the appropriate singular focus and commitment to sustain a comprehensive and robust levee safety program over time.

Careful consideration was given to placing a national levee safety program within an existing organization of the Federal government as this would likely be the easiest and fastest way to launch the program. While both FEMA and the Corps have strong programmatic involvement with levees, neither is a suitable home for the program. FEMA lacks much of the detailed engineering knowledge required to lead such a program, and the Corps lacks the cultural and programmatic advocacy to sustain such a program. Further, 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 programs run by these organizations.

Recommendation: Establish a National Levee Safety Commission (NLSC) as an independent Federal agency, that is composed of 7 Commissioners for policy and management decisions, a Commission staff of technical and program support, and several Standing Committees to provide advise to the Commission.

In addition, a national levee safety program will succeed best when it provides a strong and balanced voice across all levels of government and the private sector – each of which plays an important role in the creation, maintenance, and sustainment of levees and in addressing the risks posed by them. The National Levee Program has three main levels of responsibility that will be described in greater detail below.

- **National Leadership** – develop standards, technical assistance, national risk communication materials and messages, conduct research and development activities, develop tolerable risk standards, etc.
- **State Programs** – require inventory and inspection, require emergency action planning and evacuation, coordinate program activities among parties within the state, and conduct risk communication activities, owner/operator requirements, etc.
- **Aligned Federal Agencies** – federal agency programs with a levee nexus align to support overall goals of National Levee Safety Program, adoption of standards, etc.

Specific recommendations are found in more detail in Part II of this outline.

a. Creation of Levee Safety Programs in Each State is Cornerstone of the National Levee Safety Program

The National Levee Safety Act clearly outlines Congress' intent that state levee safety programs be enacted to better manage the critical life safety infrastructure associated with non-federal levees. This recommendation provides for the possible delegation from the state level to a qualified entity within the jurisdiction of one or more states.

The authority for creating and implementing State Levee Safety Programs rests with individual states. Coordinating State Levee Safety Programs, providing guidance to state programs, and determining whether individual states met the minimum requirements of a state program would be the responsibility of the National Levee Safety Commission. The National Levee Safety Commission will work and provide assistance to states in creating State Levee Safety Programs and other levee safety efforts.

Delegation should be highly encouraged, and therefore obtainable with minimum qualifications necessary to perform the basic functions of the NLSP. Funding should be provided to allow states and others to achieve designation and perform basic inventory, inspection, reporting, and notification/public outreach activities. There are additional NLSP activities and responsibilities that would serve the public interest and entities with capability to perform them should receive additional incentives.

Recommendation: Delegate qualified entities to implement a subset of National Levee Safety Programs. These entities may include international organizations, states (as defined in the NLS Act), interstate regions, intrastate regions or local governments. States should be the first choice to be the designated entity for implementation of a Levee Safety Program within their borders.

- States may designate other qualified entities within their borders or may, in combination with other states (or countries) designate a qualified interstate or international entity to implement a Levee Safety Program on a levee system that does not lie entirely within any one political jurisdiction. In the event that a State is not designated, intrastate regions or local governments within the state may be designated to implement a Levee Safety Program within their own borders.
- Incentives should be provided to designated entities. Entities with levee safety programs that exceed the minimum qualifications should receive additional incentives.

The National Levee Safety Act clearly outlines Congress' intent that state levee safety programs be enacted to better manage the critical life safety infrastructure associated with non-federal levees. This recommendation addresses that intention and provides for the possible delegation from the state level to a qualified entity within the jurisdiction of one or more states.

Delegation has many merits, including:

- Allowing for a degree of variation and tailoring to meet local needs and circumstances rather than a national, one-size-fits-all approach

- Encouraging innovation to provide more effective and cost-efficient ways to promote levee safety
- Allowing for multi-jurisdictional or sub-state delegation around levee systems or watersheds which are potentially a more effective basis for overall management of levees and floodplains
- Leveraging existing and complementary programs already underway in some states.

Thus, delegation should be highly encouraged, and therefore obtainable with minimum qualifications necessary to perform the basic functions of the NLSP. Funding should be provided to allow states and others to achieve designation and perform basic inventory, inspection, reporting, and notification/public outreach activities. Additional incentives should be provided to state and other entities to encourage them to adopt NLSP activities and responsibilities beyond the basic requirements.

Qualified entities with delegated levee safety programs would operate such programs per the national standards and requirements and provide timely and regular notification of their performance to the National Levee Safety Program. The National Levee Safety Commission would, in turn, provide grants, technical assistance, and oversight to ensure the success of the delegated programs.

The following sub-sections relate to some of the specific ideas, parameters and side boards the Committee is recommending related to aspects of a delegated program.

Qualifications

To be a qualified entity, the entity **must have authorities and capabilities** throughout its jurisdictional area, to perform the following:

1. Adopt the National Levee Code, for the activities performed under the Levee Safety Program.
2. Perform or require performance of safety inspections of levees.
3. Identify the hazard potential classification of levees.
4. Provide updated information to the national levee database following the database standards.
5. Require or perform development and implementation of emergency action planning procedures for imminent or actual levee failure.
6. Enter public or private property for safety inspections or to perform emergency action.
7. Provide risk notification and public outreach/educational information.
8. Provide reports on the status and performance of the delegated program.
9. Promulgate rules, regulations, guidelines, policies, and procedures as needed to implement the program.
10. Have FEMA approved Hazard Mitigation Plan. Updates of plans should specifically reflect levee hazards.
11. Establish liaison approach to coordinate state agencies to address environment and safety issues as they relate to operations and maintenance activities.

To be a qualified entity, the entity **shall have and implement an approved Levee Safety Plan** covering the following elements, at a minimum:

1. Adoption and implementation of statutes, rules, regulations, guidelines, policies, and procedures, as applicable and as necessary to implement the entity's levee safety plan and program.
2. Adopt the *Interim National Levee Engineering Procedures*, and when available, the *National Levee Safety Standards*, for all levee projects and activities performed under the Levee Safety Program.
3. Adopt emergency action and evacuation plans in accordance with national program guidance.
4. Adopt measures as needed to require consideration of nonstructural measures associated with any levee related activities.
5. Provide initial information to the national levee database for the levees within the state/region's jurisdiction and provide updates at least annually, following the standards for the database.
6. Act as a coordinator between the National Levee Safety Program and levee safety programs within the state.
7. Approve application packages from entities within the state for grants from the NLSP and submit them to the NLSP.
8. Receive and disburse grant funding from the NLSP.
9. Request a one-time inspection by the Corps of the levees within the state/region's jurisdiction.
10. Inspect the levees within the state/region'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 national levee safety program.
11. Provide a report on the program status and performance at least annually.
12. Provide public notification of the maintenance ratings and risk behind levees at least annually.

A qualified entity must demonstrate sufficient resources to operate the delegated levee safety program in the areas of:

1. Funding
2. Qualified personnel
3. Equipment and vehicles
4. Contracting authority

Require that local owner/operators operate and maintain (O&M) their Levee Systems to acceptable standards to ensure they function as designed.

The local owners/operator shall conduct the following O&M practices as it relates to appropriate minimum standards:

- a. Perform routine O&M including
 - routine inspection
 - routine maintenance
 - appurtenant works maintenance
- b. Perform on-site specific training
- c. Fulfill specific role in Floodplain Management Plans

- d. Local communication and education of risks
- e. Provide flood fighting and notification of distress
- f. Coordinate with local/regional flood fighting
- g. Participate in shared/new construction
- h. Perform repair, rehabilitation, replacement with sufficient property rights
- i. Develop and communicate emergency action plans

In the absence of a qualified state program, the National Levee Safety 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 NL 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.**
- **Other and further action as the Commission deems appropriate to encourage, publicize the benefits of and foster support for a qualified state program.**

Primary NLSP implementation for non-federal levees is through qualified state programs. A state may not apply for or achieve qualified status, or may lose qualified status. In a state with no qualified program, the NLSP should implement certain functions to:

- monitor condition of levees;
- communicate risk, and
- encourage development of a qualified state program.

Penalties for non-participation, including reduced or eliminated eligibility for federal funds, should substantially exceed the benefit to the state of the performance of these functions by the NLSP in that state. The National Levee Safety Commission should notify each year the state's legislature and governor of the lack of state participation and the consequences/benefits associated with establishing/not establishing a qualified program, and develop and implement measures to encourage state achievement of qualified status.

All Federal agencies should adopt the National Levee Safety Code and comply with all other requirements of the National Levee Safety Program for levees under their jurisdictional control. Require that all Federal agencies provide technical or programmatic guidance, assistance, support, and applicable training in the development and implementation of the National Levee Safety Program.

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

- a. U.S Army Corps of Engineers (Corps)
- b. Federal Emergency Management Agency (FEMA)
- c. United States Bureau of Reclamation (USBR)
- d. U.S Fish and Wildlife Service (USFWS)
- e. Department of Homeland Security (DHS)

- f. U.S Geological Survey (USGS)
- g. National Oceanic and Atmospheric Administration (NOAA)
- h. Federal Energy Regulatory Commission (FERC)

Implementation of the requirements set forth by the National Levee Safety Commission by all federal agencies will promote nationwide consistency and promote the program. Utilizing federal agency programs with applicable expertise in the areas will provide a direct benefit to National Levee Safety Commission in the development and administration of a National Levee Safety Program and will help to ensure coordination across Federal programs and harmonization of Federal requirements. To ensure fulfillment of this recommendation, Federal agencies would use their existing authorities or seek appropriate modification.

b. Governance of a National Levee Safety Commission

Recommendation: Establish a National Levee Safety Commission (NLSC) as an independent Federal agency, that is composed of 7 Commissioners for policy and management decisions, a Commission staff of technical and program support, and several Standing Committees to provide advise to the Commission (repeated recommendation)

The National Levee Safety Commissioners

The National Levee Safety Commission would consist of 7 voting members (Commissioners), 5 non-Federal Commissioners appointed by the President as representatives from States/Tribes (3) and local/regional government and the private sector (2). Of these representatives, one will be designated as Chair and another as Vice Chair. Representatives will serve staggered 5-year appointments and be selected based on demonstrated qualifications related to the design and operation of a national levee safety program. Two Commissioners would be drawn from Federal agencies including at least 1 member from both FEMA and the Corps. All Federal agency appointments would be subject to confirmation by the Chair. The Commissioner positions will be part-time and Commissioners will be special government employees appropriately compensated for their work. (Note: please see attached flow chart for visual of Commission organization)

Commissioners will have the following key duties and responsibilities:

- Establish and oversee the National Levee Safety Program
- Review and approve all key regulatory and programmatic changes to the Program once established
- Review and approve delegation of the National Levee Safety Program to an qualified State or other entity
- Review and approve rescission of a delegated program for non-performance
- Provide periodic recommendations to the President on the effectiveness of the National Levee Safety Program including needed authorities, budgets, and coordination with other Federal programs
- Develop and transmit reports to key oversight bodies
- Conduct periodic evaluations of the Program to ensure effectiveness

The National Levee Safety Commission Staff

The National Levee Safety Commission would be staffed with its own full-time employees and supplemental staff detailed from Federal agencies under the direction of an Executive Director, selected by the Chair of the National Levee Safety Commission. Permanent staff would fulfill the standing

statutory and regulatory responsibilities of the Commission and use supplemental staff to address specific programmatic and operational requirements. It is expected that the number of supplemental staff will fluctuate over time and that the Commission will compensate those Federal agencies for the time that staff dedicated to the Commission's work.

The principal duties and responsibilities of the staff would be to:

- Support the deliberation and decisions of the National Levee Safety Commission
- Develop and draft regulations to implement a National Levee Safety Program
- Serve on various interagency workgroups and other bodies for purposes of furthering levee safety through related programs
- Implement such regulations through delegated programs to qualified States or through direct Federal action for non-delegated States
- Provide oversight and compliance monitoring for delegated State programs
- Operate grants programs to provide positive financial incentives to States and other entities related to levee safety
- Provide technical assistance and training related to levee safety
- Develop, maintain, and disseminate broad and comprehensive set of materials related to levee safety, maintenance, and risks
- Provide staff support to the Advisory Committees
- Provide critical administrative and managerial support to the Commission in the areas of human resources, legal affairs, public and legislative affairs, procurement, budget and finances, facilities, information management and technology, contracts and grants, and records management

Standing Advisory Committees

In addition, the National Levee Safety Commission will be supported by 4 standing Advisory Committees with specific responsibilities to advise the Commission in all matters related to the National Levee Safety Program. Advisory Committee members will come from diverse and appropriate backgrounds and disciplines to provide advice and counsel to the Commission on specific programmatic issues. The size, members, and specific charter of each Advisory Committee will be established by the Commission. Members may be drawn from all levels of government and the private and non-profit sector, shall serve terms appointments, and will not be compensated for their work except for travel and other expenses associated with meetings and formal discussions of the Committees. The Advisory Committees will be supported by NLSC staff as necessary and tasked by the Commission Chair. As the discretion of the Commission, additional ad hoc Advisory Committees may be established to address specific topics.

- **Technical Committee:** advises the Commission on matters related to the management of the National Levee Database, development and maintenance of the National Levee Safety Standards, development of processes for technical assistance to States, development of training programs, and oversight of research and development related to levees.
- **Outreach and Education Committee:** advises the Commission in the development and fielding of programs for public outreach, public education, risk awareness, communication regarding delegated programs, and notifications of Commission decisions.
- **Delegated Programs Committee:** advises the Commission concerning the development and implementation of delegated levee safety programs to qualified states, the sustainment of qualified programs at states, revocations of delegated programs, management of incentives (including grant programs) and disincentives for state, local, and regional programs.
- **Environment and Safety Committee:** advises the Commission on O&M permitting processes for existing projects and the coordination of environmental and safety concerns on new and rehabilitation levee projects.

II. Major Components of a National Levee Safety Program

Major components of a National Levee Safety Program can be grouped into the categories denoted below. For the purposes of this review, the categories are roughly chronological and explain the story of understanding the condition of our nation's levees and developing a set of specific steps for addressing risks associated with that condition.

- a. Understand the Nation's Levee Situation
- b. Communicate Risk to Governments and Affected Communities
- c. Develop an Uniform Set of Levee Safety Standards & Practices
- d. Develop Levee Safety Capacity at the State and Local Levels
- e. Develop Technical Assistance Materials/Best Practices
- f. Align Federal Programs to Support Levee Safety
- g. Rehabilitate Levees in High Hazard Areas
- h. Address liability concerns

a. Understanding the Nation's Levee Situation

i. Develop Hazard Classification System and Definitions

It is expected that both the National Levee Safety Program and delegated programs will need to classify levees by potential hazard, and later by risk, in order to set priorities, criteria, and requirements. The definitions proposed herein 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.

Definitions and classifications should initially be based on consequences of levee failure. Levees with different consequences of failure can be assigned different target levels of flood protection to manage risk. Levees with both high consequences of failure and high probability of levee failure can be assigned the highest priorities for levee classification (highest risk). Levees with lower consequences of failure and lower probabilities of levee failure can be assigned lower classification. [Note: probabilities of levee failure are likely not currently known].

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

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

- The State of California recently passed flood management legislation (Senate Bill 5) and a separate flood bond initiative (Proposition 1E) that define an urban area as

having 10,000 people and subject to higher flood protection requirements, and also eligible for greater financial assistance from the State.

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

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

Recommendation: The Committee recommends that the following levee definitions and Hazard Potential Classifications be adopted on an interim basis for use with both the National and State Levee Safety Programs and that they be subject to revision after 5 years.

Hazard Potential Classification	Number of People Potentially Inundated	Number of People Potentially Inundated to Depths \geq 3 feet*
High	\geq 10,000*	\geq 10,000*
Significant	$>$ 1,000**	$<$ 10,000**
Low	$<$ 1,000	0

* Also includes 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 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 are managed or regulated as dams, 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.

- **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 functioning 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 or is managed or regulated as a dam.

National Levee Safety Program Levees (jurisdictional)

Levees and canal structures should be exempt from the requirements of State or National Levee Safety Programs under any one of the following four conditions:

1. The levee or canal structure is already regulated by the federal government and is required to meet certain safety criteria (e.g. power canals regulated by the Federal Energy Regulatory Commission and subject to dam standards). *To be exempt, the federal regulation must be by an agency that does not own or operate the levee or canal structure, and the safety criteria meets or exceeds the National Levee Safety Standards.*
2. A canal constructed completely within natural ground without any manmade structure such as an embankment or retaining wall to retain water and where water is retained only by natural ground.

3. Highway and railroad embankments which are not functioning as part of a flood control system.
4. 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**

** Tentative values proposed – used as placeholders*

Federal canal structures owned by the United States Bureau of Reclamation (USBR) would not initially be subject to the jurisdiction of State Levee Safety Programs, but may be brought into jurisdiction five years following passage of legislation creating the National Levee Safety Program. Such federal canal structures, however, are subject to the National Levee Safety Program.

ii. Develop a Comprehensive Inventory and Inspection of Nation's Levees

As a nation, we have scant information about the location or condition of the nation's levees. It is critical that all levees nationwide are identified, inventoried, and inspected as soon as possible, as such tasks are needed prior to implementation of many expected NLSP elements, specifically those that require the quantification of the Nations' overall flood risk associated with levee systems. Among other things, this information will help in prioritizing investments and targeting properties for public outreach, funding, evacuation planning, and mitigation. This will set the boundaries for application of the levee safety program.

The Corps is best positioned because they are already authorized and currently establishing an inventory and conducting inspections for all Federal levees. It would be cost effective, more efficient, and consistent for one entity to inventory and inspect all levees – especially one that has existing experience.

Recommendation: Authorize and fund the Corps to establish an inventory and conduct an inspection of all levees nationwide, including structures along canals.

Recommendation: Require (and fund) the Corps to expand the National Levee Database to include inventory and inspection of federal levees, federally constructed, non-federally operated and maintained levees, and all jurisdictional levees on a periodic cycle, not to exceed 10 years.

One of the most reliable 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. Further, the condition and viability of levees is in constant flux. Any and all decisions that rely on information contained within the NLD are only as good as the data upon which they are based.

- Gather Levee Performance Data. Past performance data will help inform the engineering community in regard to:
 - Identifying the most critical levee safety issues
 - Quantifying (true) costs of levee safety
 - Focusing priorities for future funding
 - Providing data for risk-based assessments
- Provision for periodic inventory and inspection updates (may be done by State Levee Safety Programs on an ongoing basis).
- Development of guidelines related to both the open and limited dissemination of information related to levees.
- Require that all State and local governments provide the minimum basic information set out in the Act.

Even before a National Levee Safety Commission is created, the Corps should expand their current NLD by including performance data for levees and canal structures. Performance data that should be added would include the following information available after a flood event:

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

Performance data associated with routine operation and maintenance would include:

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

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. 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.

The Corps, in consultation with the Department of Homeland Security, should establish guidelines to distinguish those portions of the NLD (if any) that, for National security concerns, should not be released to the public. While it is recognized and understood that levee security is a vital part of the Nation's obligation to safeguard its citizens against acts of terror, the safety of those protected by levees is also highly dependent on the performance of those same levees in during times of flooding. A balance must be struck that recognizes both needs and balances the public's need/right to know against the necessity of securing sensitive information.

iii. Understanding Environmental Barriers to Operations and Maintenance (O&M)

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

- NLSP 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.
- NLSP 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 rehab and new construction.
- NLSP 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.

iv. Develop Tolerable Risk Guidelines

People choose to live in risky areas for a variety of reasons. They may derive benefits from those places despite the risk. The acceptability of risk due to natural hazard, and the levels of protection that infrastructure should provide, may be approached from several directions:

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

The societal risks deemed tolerable from the last consideration are now widely used for dam safety guidelines. Recent recommendations have been made that coastal defenses should be designed to provide the exceptionally low levels of societal risk associated with modern, well-engineered dams. For fatalities fewer than the low thousands, the *tolerable* level of risk for coastal and riverine protection – based on other risks society accepts – is arguably on the order of 10^{-3} per year. To be consistent with current practice in other sectors of civil infrastructure, the *acceptable* level of risk could be as much as two orders of magnitude smaller (perhaps to 10^{-5} per year). Between these bounds, *as-low-as-reasonably-practicable* (ALARP) practices seem a reasonable precaution.

The United Kingdom has been a leader in developing risk-informed regulation of industrial hazards. Beginning in the 1990's, the UK developed an approach to risk and safety regulation based on societal risk that is now widely practiced in Europe, the Commonwealth countries, and Asia. The UK approach is structured around the concept of tolerable societal risks, and is often implemented through *F:N* curve concepts. 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.” UK also identifies “broadly acceptable risks.” These *broadly acceptable risks* are those that essentially everyone finds reasonable.

Establishing National Tolerable Risk Guidelines would preclude having to establish a specific level of protection, i.e 1% annual chance (i.e. 100-year protection), therefore allowing communities to build to a level of protection that is consistent with established risk analysis parameters (i.e. probability of failure, annual exceedance probability, loss of life and property, etc).

Recommendation: Develop National Tolerable Risk Guidelines for levees and structures along canals.

It is anticipated that future legislation and enactment of regulations would be needed in order to set new flood damage reduction standards associated with tolerable risk. Main steps include:

- Authorization and appropriation of sufficient funds to perform the work.

- The National Levee Safety Commission assembles a panel of international renowned expert's 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 by an equally renowned group of experts.
- Publish the draft National Tolerable Risk Guidelines for public comment in the Federal Register.
- Finalize and publish in the Code of Federal Regulations.
- Enact new federal (and perhaps state) legislation with requirements for incorporating National Tolerable Risk Guidelines for land use and flood insurance purposes.

It is anticipated that because of the complexity and far-reaching implications of establishing such guidelines that it will take a minimum of 4 years to complete the steps identified above. This should be one of the first actions initiated by the Commission.

v. Research & Development

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.

The establishment of a Levee R&D Sub-Committee (as part of the technical efforts) comprised of some of 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: Develop a Research and Development (R&D) program funded at the federal level, with contributions from States and private sector that includes as a minimum:

- a. Innovative technology for repairs and improved engineering methods that would lead to more reliable levees and more cost-effective approaches**
- b. Technical and archival research**
- c. Dissemination of research products (technical manuals and guidelines, workshop and conference proceedings, training manuals, executive summary documents, brochures, etc..) to the levee safety community**
- d. Build upon existing resources and research**
- e. Technology and tools to enhance the security of levees at the operation level**

b. Communicate Risk to Governments and Affected Communities

i. Develop Public Education and Awareness Program

The NLSP will benefit from having a communication and education component integral to the entire program. An informed public can drive the safety program by demanding accountability, and also be better prepared to take risk reduction measures such as buying insurance, making structural changes to homes and property, providing adequate revenue (taxes) for proper levee operation maintenance and upgrades, developing an emergency plan, and evacuating when needed. In turn, personal activities by the public increase public safety and reduce their personal loss and the economic loss to the nation. Because we are striving for an informed public and the ability to make decisions based on community and individual risk, the public must be engaged in the debate.

As standards are set and levees evaluated, the public's knowledge and ability to participate in the overall program will be greatly enhanced by the education and information provided to them. While standards are most appropriately developed by engineers and technical experts, a different set of skills is required to effectively engage local governments and the protected public.

- By involving experts in fields as social marketing and behavioral economics, we can better design programs and products to achieve the behavior change we are seeking: an informed public that understands the risks and takes action to mitigate those risks.
- No less than the engineering expertise needed to ensure reliable levees, we must use professional communicators to design and oversee the accompanying public education and awareness programs. Adequate dedicated funding for this purpose must be provided to ensure success.
- Regarding risk communication, currently there is no consistent effective way of communicating risk to the public. Numerous experts have identified and articulated this need. A key piece of getting the public to act on risk is their understanding of the consequences of not acting. The public must learn that every individual is responsible for mitigating risk, particularly when it comes to preserving personal safety and the safety of family members.

Recommendation: Develop a public education and awareness program designed to increase public support of State and National levee safety programs and communicate residual risks associated with living in levee protected areas. The program will be guided by the following parameters:

1. The program will be developed nationally (by Federal, state and local representatives). Portions of the program will be implemented at the national level, but major emphasis will be given to state/locally implemented programs.
2. The program will identify and promote behavior change to improve the public's safety and well-being and reduce economic loss due to flooding in levee-protected areas.
3. The program will promote consistency of the messages and terms used by Federal, state, local and tribal governments and agencies.

4. The program will include a public involvement element in order to better gather information and feedback from the public at risk and others affected by the NLSP.
5. The program will leverage existing Federal, state and local programs and use best practices to develop a meaningful, cost-effective plan.
6. The program will include training and employ “train the trainer” techniques to facilitate the delegation of the program to state/local entities.
7. The program will be designed around specific target audiences with the first priority for implementation being to engage the public at risk, and state and local legislators and government officials.
8. Establish a Communication and Education Committee as a standing committee of the National Levee Safety Commission. The Committee will advise the Commission on matters related to the development and implementation of a public education and awareness program. It shall include Federal, State and local experts in communication who will be responsible for the development and implementation of the public education and awareness program.
 - The Committee should include professional communication experts and have the capability to bring in experts in social marketing, behavior change, risk communication, and other related expertise from the private sector, as needed.
 - Support, in the form of policy and personnel from all agencies, especially FEMA and the Corps will be provided
 - The Committee shall work to ensure better cooperation and consistency between agencies in matters related to levee safety.
9. The public awareness and education program developed by the Commission will include:
 - An assessment of public understanding and needs that have been developed through professional research and surveys. This assessment will tie directly to the goals and measurements established for the program. Such “listening sessions” across the United States will increase the profile of the program 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.
 - Messages, materials and behavior change goals that are aligned with technical recommendations, levee safety policies, and (local/state) entity incentives and disincentives.
 - Training elements to teach communication skills and effective use of materials and a program to “train the trainer.”
 - An educational program for school-age children.
 - A website linked to state and local agencies that can be used for numerous purposes, including 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.
 - Public discussion guides to explore levee safety policy on such topics as have been previously identified, e.g. flood risk management; liability, etc.

- Information papers and materials as required, including:
 - Importance of the National Levee Safety Program
 - Anticipated changes from establishment and implementation of the NLSP
 - Mechanics of the NLSP
 - Templates and programs for public workshops and meetings to foster public debate and awareness of levee safety issues.
 - Lists of education opportunities such as civic clubs, Councils of Mayor, Chambers of Commerce and Councils of Government meetings.
 - A citizen’s levee watch feature that will educate local citizens about the status of their own local levees. Modeled after the weather spotters and neighborhood watch programs, the program will educate citizens on what a good levee looks like, potential problem areas and other basic information. Linking to a blog feature of the website will create chatter and promote a sense of ownership.
 - An annual report to Congress and the public on the state of levee infrastructure and the overall efforts and status of the NLSP.
 - Technical assistance to state, local and tribal agencies and private owners.
 - To increase public awareness of the “good” levees and levee-protected areas, consider various physical markers:
 - Road signage to be displayed when entering an area that identifies the risk and clearly marks the evacuation route.
 - Signs on schools, hospitals, nursing homes and other municipal buildings stating that the building is in a flood zone and marking the high water mark on the building.
 - Signs and/or color codes on levees that have passed evaluation as good levees.
 - Mechanisms that can measure the success of the program, including the changes in behavior that are identified as goals.
3. The program will also include a risk communication element that consistently and clearly explains to the public the risk of living in levee protected areas. The Commission will take the following steps to implement this portion of the program:
- a. Identify and engage leading experts in risk communication, behavior change, social marketing and graphic design to develop terminology and graphics that can explain the risk to the public.
 - b. After the terminology and graphics are developed and tested, wide dissemination will be made through various venues. All Federal agencies will adopt the terminology and it is recommended that State, local and tribal agencies also adopt the terminology.
 - c. The risk communication element will be developed at the national level. The program will be designed to be implemented primarily at the local level.
 - d. The programs will be tailored to assist in communicating risk to the affected public. This risk will be determined by the technical elements of the National Levee Safety Program.

- e. Materials, including training and “train the trainer” sessions, will be in concert and leverage other Federal, state, local and tribal agencies that are already providing similar training and using best practices.
- f. A risk communication element of the program will be designed which will include setting measurable goals, identifying the target audience, designing and delivering materials and activities, and providing forums for the information to be discussed and disseminated.

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

Target Audience	Behavior	Information/Tools to Get There
Affected public at risk	Buy flood insurance	Risk of living behind levee
Affected public at risk	Develop emergency plan	Height of potential flooding; evacuation routes; checklists for what to take and timeline
Affected public at risk	Elevate home	Height of potential flooding when levee is compromised; how to elevate home
Affected public at risk	Provide resources (taxes) sufficient for proper levee operation, maintenance and upgrades	Inspection reports, levee system assessments, stating consequences associated with deficiencies
Levee owner	Bring levee up to standard	Risk to the public; how to bring up to standard
Levee owner	Provide adequate O&M, RRR	Inspection reports accessible by public
Affected public behind levee	Watching levee for problems	Levee watch program; information on what to look for
Administration	Support NLSP	Number of public at risk; loss to the nation when levee is compromised
State, local and tribal governments	Support NLSP	Number of public at risk; loss when levee is compromised
Technical societies	Assist with technical standards and training	Current standards and where problems with those standards are occurring; review of proposed new standards
Technical societies	Advocate for funding required for levee infrastructure upgrades	Existing “lobbying” programs within Societies; existing education and public awareness programs sponsored by societies
Non-governmental organizations		
Financial industry		
Insurance industry		
Developers, realtors, homebuilders		
Media	Reporting on NLSP; levee issues;	Program standards, which levees

	remaining risk	are in compliance; general statistical and semi-technical information
School Children	Cultural changes aimed at getting individuals to take ownership in flood risk reduction	Education programs in the classroom

ii. Enhance FEMA Mapping Program to Communicate 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 levee safety program.

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 proximity to FIRM/DFIRM maps. It puts all the information in the place where decision makers already go to find related data. FEMA’s website and resources are also frequently accessed by real estate professionals and mortgage lenders in reviewing property purchases.

Recommendation: 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.

- **Option One:** Identify levee systems, including structures along canals, and associated levee system failure consequence zones. This should be carried out in accordance with the standards established through the effort lead by the Corps, and depicting the consequence areas identified by the Corps in the NLD. The completion of this step is dependent on the Committee recommendation that recommends authorization and funding the Corps to inventory and inspect non-Federal levees.
- **Option Two:** 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.
- **Option Three:** Depict on FEMA’s website additional flood hazard information (i.e. 200-year and 500-year floodplain maps) that may be provided by local/regional/state entities.

c. Develop a Uniform Set of Levee Safety Standards and Practices

There are several issues associated with a lack of uniform and up-to-date engineering policies, procedures, standards, and criteria across the United States. Various agencies use different criteria or are not specific, and many applicable guidance documents are in different states of revision. 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.

For example, there is a perception that some levee maintaining organizations are unwilling or financially unable to perform appropriate levee maintenance of completed projects. The Corps' Levee Vegetation Management memoranda have created major concerns across the nation, and especially in California. 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.

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 USBR. Using these as a basis upon which to develop both interim procedures, and eventually the 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: 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 while final standards are developed.

Interim Procedures: Under the authority of the National Levee Safety Program, the Corps should be charged with the lead responsibility and provided the necessary funding to develop Interim National Levee Engineering Procedures (including policies, procedures, standards, and criteria) for levees, canal structures, and related facilities for the following engineering activities:

- Levee Inspections
- Geotechnical explorations and site characterization
- 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
- Operations and Maintenance (including vegetation management)
- Encroachments
- Security
- Risk Analysis, including levee fragility evaluations
- Performance Instrumentation
- Residual Risk
- Emergency Preparedness and Response, including Emergency Action Plans, Floodwarning Systems, and Floodfighting
- Performance documentation following flood events
- Interim risk reduction measures
- Evacuation
- Mapping and risk notification
- Surveys

Levee designs and levee certifications for FEMA’s National Flood Insurance Program would be required to undergo independent peer review. Initial or interim guidance would also be developed regarding independent peer review.

It is expected that the Interim National Levee Engineering Procedures would update established policies, procedures, standards, and criteria to address the different requirements for the following 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, are managed as dams, or constrain water along canals.
- Embankments and floodwalls that constrain water along canals, including water supply and power canals

The modified and updated criteria developed by the Technical Subcommittees would be subject to external peer reviews. Unresolved differences of opinion would be settled by the National Levee Safety Commission.

The Interim National Levee Engineering Procedures would be completed, published, and disseminated by the National Levee Safety Commission within 1 year.

All appropriate federal agencies should adopt the Interim National Levee Engineering Procedures for agency practice within 1 year after they become available:

- Corps shall adopt Interim National Levee Engineering Procedures
- USBR shall adopt Interim National Levee Engineering Procedures

- FERC shall adopt Interim National Levee Engineering Procedures
- FEMA shall require that Interim National Levee Engineering Procedures be used for levee certification/accreditation

Development and Adoption of National Levee Safety Standards. The National Levee Safety Commission should contract with the Corps and provide the Corps with funding to take the lead responsibility to take the Interim National Levee Engineering Procedures and develop them into the National Levee Safety Standards:

- Technical Subcommittees, using the same process and participation of federal, state, and local/private ratios as outlined above, shall be tasked with developing the engineering standards.
- 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 Classifications for potential hazard and should incorporate concepts of tolerable risk.

The development of the National Levee Safety Standards should involve independent peer review and participation of the National Academy of Sciences. Unresolved differences of opinion should be settled by the National Levee Safety Commission. The National Levee Safety Standards should be completed, published, and disseminated by the Corps within 5 years.

All federal agencies and all State Levee Safety Programs should adopt the National Levee Safety Standards after they become available. Local flood control agencies participating in either State or the National Levee Safety Program should also be required to adopt the National Levee Safety Standards. The National Levee Safety Standards should be reviewed and updated on a frequency no less than once every 10 years.

Timing: This recommendation should be initiated at the beginning of a National Levee Safety Program due to the urgent need to upgrade levees across the nation and the need for clear, uniform National standards and criteria to accomplish this necessary work. Having uniform, National standards and criteria is essential for the current ongoing work to inventory and evaluate flood protection, and to communicate risk to the public.

d. Creating State Levee Safety Programs

i. Creating Effective Mix of Incentives and Disincentives

In addition to the developing the regulatory framework, guidance, authorities and program guidelines for an effective State Levee Program, incentives should be provided to encourage entities to set up delegated levee safety programs and perform basic inventory, inspection, reporting, notification/public outreach, and coordination activities. In order to obtain sufficient support for establishment of an NLSP, it would be advisable to provide significant resources to assist states in setting up delegated levee safety programs, and few disincentives, initially. After an adequate time, such as five years, the disincentives should take effect where states have not set up delegated levee safety programs. The disincentives should be substantial, making it difficult for states to continue without having a minimum delegated levee safety program.

There are many additional levee-related activities and responsibilities that could and 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 such as 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.

Recommendation: Incentives and disincentives can be used to encourage states, regions, communities, and owner/operators to meet and to exceed minimum qualifications for delegated levee safety programs and to manage flood risk in levee-protected areas.

Incentives: Various existing and envisioned programs and fund sources can be considered for use as incentives and disincentives. Most may be adjusted or constrained in order to serve as an incentive or disincentive, such as by adjusting:

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

The following incentives should be considered for qualified states with delegated levee safety programs:

1. Community Rating System credits
2. Eligibility for NLSP grants
3. Priority for FEMA grants
4. Eligibility for loans and/or grants from federal funds for infrastructure and/or levees
5. Identification as having an NLSP-approved levee safety program
6. Eligibility to participate on NLSP committees or the Commission

7. Federal immunity for some activities performed under a levee safety program

For delegated levee safety programs that exceed the minimum requirements, the following additional incentives should be considered:

1. Additional Community Rating System credits
2. Priority and improved cost sharing for NLSP and FEMA grants
3. Improved cost sharing on Corps projects
4. Priority for PL 84-99 rehabilitation funds
5. Priority for participation on NLSP committees

Benefits from any given incentive may accrue at numerous levels, but it is possible to identify the primary beneficiaries of the identified potential incentives, as shown below.

Incentives and Primary Beneficiaries

Incentive	Property Owners in NFIP Community	Owner Operator	Regional Entity	State
1. CRS credits	x			
2. Eligibility for NLSP grants		X	x	x
3. Priority for FEMA grants		X	x	x
4. Eligibility for capital grants		X	x	x
5. Identified in NLSP		X	x	x
6. Eligibility for committees		X	x	x
7. Eligibility for federal immunity		X	x	x

Disincentives: The following are potential disincentives (and are the counterparts of proposed incentives) for states that do not establish or maintain delegated levee safety programs:

1. Ineligibility for NLSP grants
2. Lower priority for FEMA grants
3. Ineligibility for certain Corps projects
4. Ineligibility for PL 84-99 rehabilitation
5. Ineligibility for certain federal funds with a nexus to levee safety
6. Ineligibility for loans and/or grants from the federal capital funds

Timing: The mix of incentives and disincentives associated with setting up a state levee safety program that meets the minimum requirements should be established through NLSP-enacting legislation. If the legislation needs policy guidance and/or additions to the Code of Federal Regulations for it to be implemented, this would likely take two years. Establishing a sliding scale system of incentives for levee safety programs that exceed the minimum requirements is a complex undertaking that requires a good deal of judgment, public vetting, and periodic adjustments. Therefore, it would likely take two years to set up such a system, once the effort is funded.

Rewarding 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, due 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 taking more control of levee related activities in the state, such as by permitting levee work and controlling levee construction, will help manage flood risk in the state and benefit the state and the nation.

Recommendation: Congress 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 NLSP, 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.
- Using eminent domain to acquire property rights for levee safety, where necessary to prevent harm.

States and communities should be rewarded when they exceed minimum requirements for managing 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 levee protected 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

ii. National Levee Safety Commission Start-Up Grants

To make the NLSP achievable, the States will need funding to get the program up and running and to keep it sustainable. Otherwise, it will be up to the States to pay for this, which will likely not happen in most States, and it may be perceived as an “unfunded mandate.” The consideration for grant prioritization will provide a great deal of incentive for most States, as well as locals, regional entities. This opportunity may push them to implement an NLSP sooner and want to continue to maintain the program so that they can reap the other indirect (not related to levees) mitigation benefits. FEMA is best positioned to administer these grant programs due to their many current responsibilities as a granting agency.

Recommendation: Establish a new grant program which would be used to support the establishment of a sustainable National Levee Safety Program for all States, at least at a minimum level.

iii. Guidance for Levee Safety Programs

In order to aid in quick adoption of State programs, states would benefit from direct assistance aimed at problem-solving in addition to technical materials, standards and funding.

Recommendation: States should be offered the services of federally funded staff and Peer Review teams that would advise the states on establishing and maintaining an effective Levee Safety Program.

iv. Supporting Local Levee Safety Programs

Many states and communities have difficulty in raising funds for levee safety activities. The NFIP could be aligned to support the NLSP by empowering communities to raise funds from policy holders living within levee-protected areas. The people with property within levee-protected areas are the direct beneficiaries of levee safety program activities and should be the primary source of local funds. By raising these funds, there will be more levee safety programs at the community level and/or state level and there will be more local funding to match federal grant funds for levee safety programs. This will have the benefit of stretching federal funds through cost sharing levee safety activities with communities. Three different approaches to raising these funds have been identified for the consideration of Congress.

Option One: Aligning the insurance companies writing NFIP flood insurance policies, states, and communities to raise funds for state and community-level levee safety programs by placing a fee on flood insurance premiums in AL and XL zones, as requested by the state or community, much like the state of Texas has done for all flood insurance premiums sold through the NFIP.

This would provide states and communities the opportunity to utilize the policies existing in levee-protected areas as a source of revenue to assist the local levee safety program, by attaching a fee to the policies. In order to do this, the community or state would need to be authorized to collect the fee. In some states or communities, this may require voter approval. Considering that nearly 80 percent of properties in levee-protected areas with mandatory insurance would have NFIP insurance policies, this would be an efficient collection mechanism.

Option Two: Collecting a surcharge nationwide through the NFIP on flood insurance premiums in AL and XL zones, with the surcharge proceeds used to fund the nonfederal cost share on NFIP and FEMA levee safety grants for communities and/or states with levee safety programs.

This would be imposed at the national level, much like the gasoline tax, involving a fee or surcharge at the national level and not necessarily returning the amount collected from each state back to that same state. Even if collected fees were set aside for use by the state from which the fees were collected, fees from states without a delegated levee safety program would be available to other states. Because collecting such funding from states and communities reduces their capacity to directly raise local funds for levee safety programs and for cost shared federal grants, it would be appropriate to recognize the funds as locally-derived funds that are available to reduce the typical nonfederal cost share required for federal grants. Linking the reduction in

nonfederal cost share to the performance of the state or local levee safety program will encourage robust state and local levee safety programs.

Option Three: Allowing communities, instead of policy holders, to receive the savings that result from a levee safety program under Section 620 of the CRS.

In many communities with levees, only a portion of the community is protected by levees. Yet under the CRS, all policy holders in the community receive discounts. Rather than passing on the savings to policy holders outside of levee-protected areas, it would be more appropriate to reward the community itself and provide the savings directly back to the community to support its levee safety program. Even if all policy holders in the community are in levee protected areas, the community should be able to decide whether the Section 620 savings should go to the policy holders or to the community – to support levee safety program activities funded and implemented by the community.

Timing: This recommendation is highly dependent on the schedule for mapping of AL and XL zones. FEMA would need to identify AL and XL zones on its floodplain maps within any community or state that would avail itself of these funding mechanisms. Such mapping may be completed with a few years in many areas of the country, and implementation could begin in those areas. To collect a surcharge nationwide, essentially all of the AL and XL zones in the nation would need to be identified on FEMA’s maps. It would likely take about 5 years to complete the nationwide AL and XL zone mapping effort. It would also take about two years to revise the CRS to fund communities for Section 620, rather than reduce insurance premiums for policy holders. This would be a substantial change to the CRS that alter its focus on insurance premium reductions, and significantly increase the complexity of program administration.

v. Training Programs

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 National Levee Safety Program is dependent on increasing the expertise and number of levee professionals across the Country.

The design, operation, and maintenance of levees is 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 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 will be the most effective and efficient.

Recommendation: Develop a National levee safety training program that includes the following minimum elements:

1. A specific curriculum, the successful completion of which would result in the certification of the graduate as a “Certified Levee Professional”. *(Note: 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.)

2. 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.
3. Local training through direct assistance to the states
4. Self-paced training
5. 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).

Recommendation: In order to ensure the high level of professional training and experience, delegation of the National Levee Safety Program (or parts thereof) to States 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.

vi. Technical Assistance Materials/Best Practices

The Corps has a well-established Dam Safety Program that has recently begun to develop a Levee Safety Program, including technical assistance tools, so they are the best suited to lead this effort. Since the majority of the levees in the country are outside the preview of the federal government, it is essential that states and local agencies be provided the knowledge and the tools necessary to have a creditable levee safety program.

Recommendation: The National Levee Safety Commission 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.

Timing: This recommendation is dependent to some degree on developing the National Levee Safety Standards. To begin to energize the states and others to take an active interest in levee safety, state and local entities have to be provided some tools with which to work. So the sooner technical assistance materials are made available the sooner states and others can start. The effort should start within two years of legislation being passed and be completed within the first 5 years and kept up to date thereafter.

e. Align Federal Programs to Support Levee Safety

i. Mandatory Flood Insurance

Flood insurance is one of the most effective ways to limit financial damages in the case of flooding. Currently, many people who live behind levees 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 the best-built levee brings risk. Implementing this recommendation will result in a greater number of structures located behind jurisdictional levees to be covered under the National Flood Insurance Program. Implementing this recommendation will increase risk awareness and preparedness of the public residing behind jurisdictional levees. Implementing this recommendation will incentivize through reduced insurance premiums communities to exceed 1 percent protection.

Recommendation: Require the phasing in of mandatory purchase of flood insurance for structures in areas protected by levees with risk informed premiums.

ii. Align FEMA's CRS Program to Reward Levee Safety Activities

The intent of CRS is to reward communities that do more than meet the minimum NFIP requirements to help their citizens prevent or reduce flood losses. The CRS also provides an incentive for communities to initiate new flood protection activities. Currently there are only two communities that have taken advantage of the existing CRS Activity 620 credits. There could be a variety of reasons for the limited list of CRS credited communities, but it is most likely due to the difficulty in meeting the requirements of 620, particularly the "Level of Protection." This recommendation would focus on levee safety, not the requirements of 44 CFR 65.10 and given level of protection.

By increasing the ease of application for CRS credit along with the increase in possible credit, which in turn would reduce flood insurance premiums community-wide, this recommendation would provide additional incentives to operate and compliant levee safety program. Removing the construction date requirement will also allow for additional communities to seek the CRS credit and flood insurance premium reduction. Community management of areas subject to flooding in the event of levee failure and community preparedness for levee failure, both elements of the National levee safety program, would further the goals of the NFIP/CRS programs, which is to reduce overall hazard/damage potential.

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

iii. Rehabilitation of Levees in High Hazard Areas

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

- Creating a National Inventory of Levees

- Establishing Nation Levee Safety Standards
- Requiring State Levee Safety Programs
- 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 National Levee Safety Program 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 National Levee Safety Program does not provide funding to address the many levee deficiencies that are expected to be discovered and documented.

Failures and devastation will continue to occur and threaten this nation as levees continue to age and deteriorate and as urban populations grow and development behind levees increases. Because of increasing population and development behind levees, the risks are expected to actually increase over time even if modest levee improvements are made. Failures affect large populations, flood into neighboring states and cost millions of dollars in federal disaster relief spending. There are thousands of unsafe non-federal 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. Levees identical to those overtopped and breached in scores of places along swollen Midwest rivers in 2008 make up the vast majority of flood protection efforts across the United States. 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 Inventory of Levees will further enhance the recognition and realization of the deteriorating condition of many of the Nations levee structures and of the lack of a focused public policy to address the problem. Federal, state, 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 and state level continues to be securing adequate funding countrywide for levee rehabilitation. There is currently only one major federal levee rehabilitation funding program and that is the New Orleans Flood Damage Reduction System.

Key questions before the American people are:

- Does the country want the nation's levees to remain unsafe, causing increasingly intolerable risk over time?
- 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 later)

It is a reasonable expectation of every American to be protected from preventable disasters such as levee failures. There is a critical need to create 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 states 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 since privately owned levees are at risk of failure just as are publicly owned levee systems.

Recommendation: Authorize the National Levee Rehabilitation, Improvement, and Flood Mitigation Act

A federally authorized program would be cost-shared 65 percent federal and 35 percent 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-based priority system that would be based in part on information taken from the National Levee Database. Such federal assistance would initially be limited to only levee systems that protect existing urban areas which have a high damage potential. In order to be eligible to receive federal assistance an owner 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 Standards;
- 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; and
- Provide a flood risk management plan as part of a public safety element of a general/master land use plan that demonstrates the local community plan to manage land use over time to move substantially towards the established national tolerable risk guidelines.

The federally sponsored program would be established through legislation that would be enacted at the same time as the National Levee Safety Program. Early funding could be used to assist states and local interests in conducting levee evaluations that will help inform the condition of levee systems and further facilitate funding priorities. It is anticipated that it will take two years for states to populate the National Levee Database 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 the state to be eligible for assistance; and further specify that Congress rely on the recommendations of the National Levee Safety Commission on the priority of allocation of funds based on the National Levee Database and risk-based assessment performed and the level of appropriations over the next five years. The legislation would specify that the following funding amounts be authorized and appropriated to initiate the National Levee Rehabilitation, Improvement and Flood Mitigation Act:

iv. Address liability concerns

Under current law including case-law, liability will or could be incurred by engineering firms or government agencies that provide flood management engineering services for levees and other flood control structures and systems. Parties harmed due to levee failures are allowed to bring suit against levee designers and engineers who inspect for certification purposes, and provides for the application of the strict liability standard in assigning responsibility for that harm. For example, in California, the 2003 *Paterno* Case 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 Corps (and other federal agencies), through liability protection offered under the 1928 Mississippi Control Act, has express immunity from liability of any kind for damage from or by floods or floodwaters. 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 if not unwilling to provide these services due to a liability potential that 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 A/E consultants are also no longer willing to provide design and construction services as well.

In the past, the nation has found it necessary to provide limitations on liability to engineering firms in order to build certain types of structures or complete various projects (e.g. Price Anderson Act of 1957, CERCLA/Superfund Immunity, Support Anti-Terrorism by Fostering Effective Technologies Act of 2002, state construction site safety laws).

Recommendation: Congress should explore 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) for damages resulting from levee failures.

Examples of measures considered by this Committee include:

- a. Establish Standards of Care for engineering services for levee systems
- b. Change the term “certification” as used by FEMA in its National Flood Insurance Program to “compliance determination” to better communicate to policy makers and the public that this does not imply a guarantee or warrantee.
- c. Legislation that would limit third-party liability of 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).
 - iii) An engineering firm would be liable only to the extent caused by negligence, recklessness or willful misconduct of the firm.
- d. Legislation that would establish that State and local agencies which sponsor, and then accept, federal flood control projects should not be liable for the deficiencies in the design and construction of the facilities. State and local agencies should be provided the same immunity against suits alleging damages to persons or property resulting from the construction of the flood control facilities as is currently enjoyed by the federal government.

If this issue is not addressed expediently, it is likely that some of the most qualified and experienced flood control engineering firms and agencies will not offer service where it is most needed due to disproportionate risk. 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 areas protected by levees 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 has drafted policy that states they will not certify non-Corps levees. In reaction to this policy other engineering firms and agencies which do not have federal or state immunity are being asked to provide this service. These firms do not have adequate liability protection.

IV. Strategic Implementation Will Be Conducted in Phases

It has taken over a century of neglect and indifference for our current levee safety challenges to develop and the solutions that are needed cannot simply be emplaced 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 National Levee Safety Program in well planned phases. Each phase is intended to build from the data and experience collected in previous phases. Phases are not entirely distinct from each other. 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 National Levee Safety Program primarily through incentives, while building the foundational strategies for a sustainable program into the future through both incentives and disincentives.

Phase I: **Immediate Actions** = *actions that are time critical and can begin without prior to the development of the National Levee Safety Commission. Current authorities exist, but funding is needed. Major components include:*

- i. Develop legislation to create National Levee Safety Commission
- ii. Obtain legislative authority and appropriations to the Corps to expand the National Levee Database (NLD) and conduct a one-time National Levee Inventory and Inspection Program for all non-federal levees in the United States.
- iii. Begin national dialogue on liability issues
- iv. The Corps and FEMA to develop a Coordinating Council on Communications to develop strategy and materials for communicating risk
- v. Develop an Initial Levee Safety Website to communicate need for the program, initial risk communication messages and interim technical documents and standards
- vi. Begin to develop interim National Levee Safety Standards
- vii. Begin the R&D program

Timing: This phase should begin immediately and run until the Commission is created through legislation and fully operational (approx. 2 years).

Phase II: **Standing up the National Levee Safety Program** = *activities designed to create the National Levee Safety Commission, a delegated state program and initial incentives and start up grant funding. Major components include:*

- i. Stand up National Levee Safety Commission (e.g. organization, personnel recruitments, guidance, program governance, etc...)
- ii. Develop policies, procedures and guidance for delegated State programs and begin to grant state delegation for “early implementers” through incentives
- iii. Begin National Levee Safety Grant Program to assist with State program development costs
- iv. Develop final National Levee Safety Standards
- v. Create Initial Set of Incentives (e.g. FEMA CRS and existing grant programs, mandatory flood insurance, etc.)

- vi. Conduct public education/communications research and develop risk communication strategy and materials
- vii. Develop training program and technical assistance materials
- viii. Require Flood Insurance in levee protected areas

Timing: This phase should begin as soon as legislation for the National Levee Safety Commission is passed and continue on a periodic and continuing basis via reauthorizations and concepts of continuous improvement.

Phase III: **Long-term Actions** = *activities that result in a mature program, with all needed tools and materials developed. Once this phase is reached, the mix of incentives/disincentives should weigh more heavily towards*

- i. Finalize national Tolerable Risk Guidelines
- ii. Finalize certification for “Levee Professionals”
- viii. Authorize and fund the National Levee Rehabilitation, Improvement, and Flood Mitigation Act
- ix. Develop disincentives the penalize states that have not developed a minimum State Levee Safety Program (e.g. withhold federal funding from programs with a nexus to levee safety)

Timing: This phase should begin in about 5-10 years