

REVIEW TEAM COMPILATION

NATIONAL COMMITTEE ON LEVEE SAFETY (NCLS): National Levee Safety Act, Title IX of the Water Resources Development Act of 2007 (WRDA)

31 October 2008

SRA International, Inc.
Arlington, VA

CONTENTS	PAGE
A. Instructions to Review Team	1
B. Interim Definitions and Classification of Levees	2
C. Working Group Presentations	5
a. Working Group 1	7
i. Assumptions	
ii. Questions	
iii. Data Needs	
b. Working Group 2	10
i. Assumptions	
ii. Questions	
iii. Data Needs	
c. Working Group 3	12
i. Assumptions	
ii. Questions	
iii. Data Needs	
d. Working Group 4	15
i. Assumptions	
ii. Questions	
iii. Data Needs	

A. INSTRUCTIONS TO REVIEW TEAM

The purpose of this document, and the complementary presentation on October 30, 2008, is to solicit feedback from the Review Committee on the *initial scope and direction* under consideration by the National Committee on Levee Safety. This document is organized by three main components: 1) interim definition of levee and classification system; 2) reminder of the wording of the goals in the National Levee Safety Act (charge to the Committee); and 3) a series of questions organized by working group. The Committee would like confirmation and suggestion on whether these are the key questions that would need to be answered to make recommendations.

This is a working product and should be considered draft. The Committee is pleased to receive all your comments and suggestions in writing through the provided template by November 13th. The October 30 meeting will be 3.5 hours in length and will focus on a narrow set of questions:

- Do you have any substantial improvements or considerations for the Committee regarding the definition of levee?
- Do you have any substantial improvements or considerations for the Committee regarding the suggested classification system for levees? Is a classification system helpful?
- Are the key questions presented by workgroup the important questions that should be asked in order to make recommendations to Congress? Is anything missing?

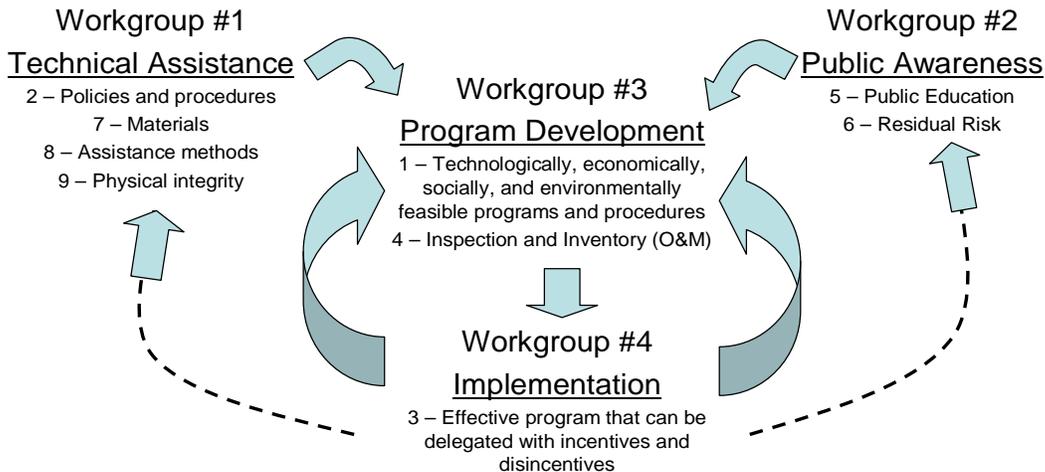
Much of the deliberations conducted to date on the National Levee Safety Committee have been done in the following Working Groups. The Committee wishes to share this graphic designed to elucidate how the Working Groups (and goals) interrelate.

National Levee Safety Committee

TITLE IX – NATIONAL LEEVE SAFETY PROGRAM
(National Levee Safety Act of 2007)

The purpose of the National Levee Safety Committee (NLSC) is to develop recommendations for a national levee safety program, including the strategic plan for implementation.

Recommendations are to ensure that the nine goals named in the Act are met. These goals are listed below under the work group assigned to address that particular goal.



B. INTERIM DEFINITIONS AND CLASSIFICATION OF LEVEES

I. Guiding Principles

1. There is a need to further refine the definition of a levee in order to develop policies and criteria as part of a levee safety program.
2. The definitions proposed herein are intended for interim use over the next 10 years. During this time, knowledge and lessons learned should be used to develop improved definitions and classifications.
3. Definitions and classifications should initially be based on the magnitude of 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 upgrades (highest risk). Levees with lower consequences of failure and lower probabilities of levee failure can be assigned lower priorities [Note: probabilities of levee failure are likely not currently known].
4. Consequences of levee failure can include the following parameters related to people at risk, ability to evacuate (depth of flooding), property values at risk:
 - Population within levee flood protection zone
 - Depth of flooding
 - Area within levee flood protection zone
 - Height of levee
 - Purpose of levee
5. Classifications should endeavor to use parameters and definitions consistent with those in use by other agencies (e.g. State of California, FEMA).

II. Title IX Levee Definition

Title IX, Section 9002, defines a levee as follows:

“(A) In GENERAL. – The term “levee” means an embankment, including floodwalls –

(i) the primary purpose of which is to provide hurricane, storm, and flood protection relating to seasonal high water, storm surges, precipitation, and other weather events; and

(ii) that normally is subject to water loading for only a few days or weeks during a year.

(B) INCLUSION. – The term includes structures along canals that constrain water flows and are subject to more frequent water loadings but that do not constitute a barrier across a water course.”

III. The Committee recommends the definition of levee be expanded to include:

- Embankments and floodwalls that provide flood protection to lands below sea level and other lowlands and that may be subject to water loading for much, if not all, portions of the year, but that do not constitute barriers across water courses or managed as dams.
- **Levee** - A levee is a manmade barrier (embankment, floodwall, or structure) along a water course for the purpose of flood damage reduction or water conveyance.
- **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 or operated and maintained by a single entity. A levee segment may have one or more levee features.
- **Levee System** – A levee system comprises one or more levee segments which collectively provide flood damage reduction to a defined area. A levee system is an example of a type of flood damage reduction system. Failure of one feature within a levee system constitutes 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. This definition does not apply to shore line protection or river bank protection systems such as revetments, barrier islands, etc.

IV. Additional Types of Structures Covered by the Act

- Canal structures
- Other man-made structures that may function as part of levee systems
 - Highway embankments
 - Railroad embankments
 - Coastal barriers

V. Proposed Hazard Potential Classifications

A. **Very High Hazard Potential:** A levee/structure which, should it fail with a water surface elevation at the top of the embankment/floodwall, would inundate **10,000* people or more** to a depth of **3 feet* or more**.

B. **High Hazard Potential:** A levee/structure which, should it fail with a water surface elevation at the top of the levee, would inundate **10,000* people or more**, but with fewer **than 10,000*** people inundated to a depth of **3 feet* or more**.

or

A levee/structure which, should it fail with a water surface elevation at the top of the levee/structure, would inundate fewer **than 10,000*** people, but with some to a depth of **3 feet* or more**.

C. **Significant Hazard Potential:** A levee/structure which, should it fail with a water surface elevation at the top of the levee/structure, would inundate fewer **than 10,000*** people and no one to a depth of **3 feet* or more**.

D. **Low Hazard Potential:** A levee/structure which, should it fail with a water surface elevation at the top of the levee/structure, would inundate fewer **than 1,000*** people and no one to a depth of **3 feet* or more**.

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

** Tentative values proposed – used as placeholders. Number of People Potentially Inundated also serves as a placeholder for property values at risk and potential economic losses*

V. Jurisdictional Levees and Canal Structures

In order to be exempt from the requirements of State or National Levee Safety Programs, levees must meet **all** of the following criteria:

- Must not be part of a federal flood control project,*
and
- Must not be an accredited levee by FEMA,*
and
- Must not be greater than 3 feet high,*
and
- Must not protect a population greater than 50 people,*
and
- Must not protect an area greater than 1,000 acres*

* *Tentative values proposed – used as placeholders.*

VI. Potential Alternatives

- Consider including number of acres/potential economic loss parameters directly in hazard categories.
- Consider using 500-year flood instead of top of levee inundation area (levee flood protection zone).

C. WORKING GROUP PRESENTATIONS

Each of the nine (9) goals in the National Levee Safety Act has been assigned to one of the four Working Groups listed below. Each Working Group was asked to:

- 1) list important assumptions and interpretations of the goal(s) assigned to them;
- 2) list important questions they would ask in order to develop effective recommendations;
and
- 3) list key information sources (e.g., briefings, other programs, reports, data).

At this point the Committee is seeking feedback from the Review Team regarding assumptions/interpretations and scope (are these the right questions to be asking?).

Working Group 1 – Technical Assistance (Goals 2, 7, 8, 9)

Working Group Lead: Les Harder, private sector representative

Questions are related to the following goals:

- 2 – Encouraging use of the best available engineering policies and procedures for levee site investigation, design, construction, operation and maintenance, and emergency preparedness.
- 7 – Developing technical assistance materials for State and national levee safety programs.
- 8 – Developing methods to provide technical assistance relating to levee safety to non-Federal entities.
- 9 – Developing technical assistance materials, seminars, and guidelines relating to the physical integrity of levees in the United States.

Assumptions & Interpretation

- The Committee has decided that the definition of a levee needs to be expanded and that it should establish classifications to help define/describe policies.
- Many engineering firms in the private sector are now refusing to be involved with levee certification, evaluations, inspections, designs, or even peer review of such work because of potential liability. As a result, the pool of potential engineering expertise is becoming limited and there are implications with regard to accomplishing needed levee work.

Questions the Committee is seeking to answer in order to develop recommendations

Question 2-1: What is the best approach for encouraging the use of best engineering practices – developing general guidelines? Or developing and adopting a single set of “national” engineering policies, procedures, and criteria?

Question 2-2: Who would be required to use “national” engineering policies/criteria and what would be the consequences of not using it, and/or incentives for using them (i.e., how to get Corps, Bureau of Reclamation, FEMA, States, local agencies, and private sector to accept them)?

Question 2-3: Until “national” engineering policies/criteria are developed (perhaps requiring 5-10 years), what should be used in the interim?

Question 2-4: How should the National Levee Database currently being developed by the Corps be expanded beyond a voluntary basis for non-federal levees?

Question 2-5: How should the concepts of “tolerable risk” and risk-informed analyses be used in establishing engineering policies and criteria?

Question 2-6: How should core engineering competencies be encouraged, developed, and maintained?

Question 2-7: Should the National Levee Safety Program provide some type of liability relief to the private sector? If so, should this also be given in one form or another to state and local agencies as well?

Question 7-1: What elements go into and what technical assistance is needed to establish and maintain levee safety programs? The following is an initial list of possible technical elements:

- Levee inventories
- 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)
- Construction administration and inspection
- Operations and Maintenance (including vegetation management)
- Encroachments
- Security
- Risk Analysis, including levee fragility evaluations
- Performance Instrumentation
- Residual Risk and risk communication
- Levee Professional Certification Programs
- 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
- Training (inspectors, flood-fighters, general public, etc...)
- Environmental permitting

Question 7-2: Who is best suited to develop, maintain, and periodically update requirements for and/or technical assistance materials for State and National Levee Safety Programs?

Question 8-1: How can technical assistance be best provided to non-federal entities?

Question 9-1: What are the best delivery methods for providing technical assistance materials and guidance?

Question 9-2: What does physical integrity mean?

Question 9-3: What expertise is associated with and what technical assistance is needed relating to the physical integrity of levees?

Data Needs

- Legislative history of National Levee Safety Act
- Legislative history for National Dam Safety Act
- Federal (Corps, FEMA, USBR) current authorities with regard to levees across the nation
- Lessons learned regarding the National Dam Safety Act
- Information on delegated programs: NPDES, Surface Mining, Clean Water Act, etc...
- Potential use of “Grant” or “Pass-through” programs by the Corps
- Engineering/Maintenance/EAP policies/criteria for levees in the Netherlands, UK, Australia, Hong Kong together with that used by the Corps, USBR, and California
- Current Corps plans and schedule for revisions to engineering procedures, implementation of tool boxes
- Current FEMA plans to revise CFR 65.10 and/or to implement Corps procedures
- Application of “tolerable risk” concept in addressing societal risks
- Lessons learned from the National Inventory of Dams program in extracting information from state and local agencies
- Information regarding previous efforts to limit engineering liability in other industries
- What technical assistance materials, information, seminars, guidelines, etc... already exist that might be adopted or used for either interim or long-term?

Working Group 2 – Public Awareness (Goals 5, 6)

Working Group Lead: Robert Turner, state representative

Questions are related to the following goals:

- 5 – Developing and supporting public education and awareness projects to increase public acceptance and support of State and national levee safety programs.
- 6 – Building public awareness of the residual risks associated with living in levee protected areas.

Assumptions & Interpretation

- Building Awareness = communicating risk + recommending actions to deal with risk.

Questions

Question 5-1: What messages/information do we want to get out using public education and awareness projects?

Question 5-2: Who is best suited to develop public education and awareness projects and why (level of government/agency)?

Question 5-3: Who is best suited to deliver public education and awareness projects to the following targeted audiences?

- Congress
- Federal State Local and Tribal agencies
- General Public
- Public at Risk
- State and Local Governments
- Technical Societies
- Non-Governmental Organizations
- Others

Question 5-4: How should we propose to sequence execution of the public awareness program?

Question 5-5: What is the most effective way to disseminate the information to target audiences?

Question 5-6: What existing successful public awareness programs might be leveraged to assist or complement this effort (FEMA, USACE, states, NGOs?)

Question 6-1: What is the definition of residual risk (based on the entire system - levees, drainage, pumps – entire basin)?

Question 6-2: What constitutes a “levee protected area?”

Question 6-3: What do people (e.g., public, local government, legislators) already know about risk associated with living in levee protected areas?

Question 6-4: Who will determine the level of risk in a particular levee protected area?

Question 6-5: How can risk be communicated when we don’t know the level of risk?

Question 6-6: What actions are we trying to drive?

Question 6-7: Who can best implement a public awareness program to deliver the reality of risk associated with living in a levee protected area? (depends on governance?) (incentives/disincentives?)

Question 6-8: What criteria should be used to establish outreach and communication priorities?

Question 6-9: Should the public awareness programs apply equally to all categories of levee systems? (urban, agricultural, etc.)

Question 6-10: What existing public awareness programs have proven successful in communicating risk and how are they structured?

Data Needs

- Examples of other successful National/State PE&A Programs (not just governmental programs)
- Published surveys involving members of the public who live in levee protected areas
- *Expert Peter Mitchell, Marketing for Change*

Working Group 3 – Program Development (Goals 1, 4)

Working Group Lead: Karin Jacoby, local government representative

Questions are related to the following goals:

- 1 – Ensuring the protection of human life and property by levees through the development of technologically, economically, socially, and environmentally feasible programs and procedures for hazard reduction and mitigation relating to levees.
- 4 – Ensuring that levees are operated and maintained in accordance with appropriate and protective standards by conducting an inventory and inspection of levees.

Assumptions & Interpretation

- The responsibility of Working Group 3 is to identify the national levee safety program (NLSP), which will include all levels of government.
- Working Group 4 is to determine how the program and various program components may be delegated to states and possibly to local governments.
- The Committee believes that inventory and inspection of levees will need to be an ongoing effort, not a one-time event.
- The term “inspection” generally means simply a visible inspection and reporting any visual problems such as vegetation, rodent burrows, cracking, slumping, over-steepened slopes, unauthorized encroachments, etc.
- Inspections typically do not include performance history investigation, surveys, geological / geomorphological studies, geotechnical investigations (such as drilling, sampling and testing), or engineering analyses. Such activities, typically called evaluations or assessments, can be several orders of magnitude more difficult and expensive than inspections.
- An environmental enhancement that does not provide for increased public safety related to a levee is not included in the definition of mitigation. Mitigation is intended to mean mitigation from flood damage.
- In ensuring whether a program component is feasible the Committee is tasked with looking at environmental feasibility, which may lead to recommendations such as permit streamlining procedures as a means to address operation and maintenance issues.

Questions

Question 1-1: What activities/programs would be important to include in a National Levee Safety Program (NLSP)? Program elements under consideration are:

- Security Standards
- Technical guidance, assistance, and training
- Engineering Design Standards/Criteria/Procedures
- Research & Development
- Levee Professional Certification
- Operations & Maintenance Requirements
- Operations & Maintenance work
- Risk Assessment/Analysis guidance
- Risk Assessment/Analysis execution
- Independent Peer Review program
- Independent Peer Review non-federally partnered projects
- Inspection Policy
- Routine Inspection
- Periodic Inspection
- Permitting for encroachments
- Environmental compliance assistance/streamlining
- Inventory
- Program Performance Reviews/Reporting/Evaluation
- Legislation
- Levee Performance rating
- Delegation to Qualified State/Other
- Default for non-qualified delegation
- Flood fighting
- Emergency Preparedness & response
- Security
- Risk reduction interim and long range
- Rehabilitation
- Improvement
- Evacuation Plans
- Post flood recovery
- Public Awareness/Education
- Floodplain Mapping

Question 1-2: What activities/programs should be excluded from national levee safety program (NLSP)?

Question 1-3: How much money would it take to fund a robust National Levee Safety Program, and what options exist or could become available?

Question 1-4: How could the National Flood Insurance Program and its Community Rating System be modified to assist the NLSP?

Question 1-5: To what extent should the National Levee Safety Program include hazard reduction and mitigation beyond the levees structures? Identified options include 1) not at all; 2) only to the extent that there is a strong relation to the levee and the floodplain protected by the levee and 3) to the extent that there is any connection to the levee and the floodplain protected by the levee.

Question 4-1: Beyond inspection and inventory, what would be needed to ensure adequate operation and maintenance?

Question 4-2: How can levee inspection and inventory be accomplished in states that do not cooperate?

Data Needs

- *Expert* Jack Byers, Former Colorado Deputy State Engineer
- *Expert* Tom Browning, Colorado Water Conservation Board, Chief of Flood Protection
- *Expert* Kevin Houck, CWCB
- *Expert* Chris Pauley, Anderson Consulting
- *Expert* Bill DeGroot, Floodplain Manager, Urban Drainage and Flood Control
- *Expert* Paul Hindman, Executive Director, Urban Drainage and Flood Control District
- *Expert* L. Scott Tucker, Former Executive Director, UDFCD
- *Expert* Roslyn Trojan, Consultant
- *Expert* Rich Hansen, CO Department of Emergency Management
- *Expert* Brian Becker, USBR

Working Group 4 – Implementation (Goal 3)

Working Group Lead: Mike Stankiewicz, state representative

Questions are related to the following goal:

3 – Encouraging the establishment and implementation of an effective national levee safety program that may be delegated to qualified States for implementation, including identification of incentives and disincentives for State levee safety programs.

Assumptions & Interpretation

- Systems approach for implementation or delegation may not align with existing political boundaries, but may follow physical or watershed boundaries.
- The Committee believes that the delegation component of a National Levee Safety Program is not limited to states and may include other qualified entities.
- Qualified states administering a delegated program may further delegate to a qualified entity in that state’s jurisdiction.
- Federal levees may be regulated by delegated programs (e.g. a qualified state administering a delegated program may regulate a federal levee asset).
- Delegation is optional, not required.

Questions

Question 3-1: What functions can be delegated, and what functions should be delegated? The following is a list of potentially delegated functions:

- Review and approve plans and specifications for levee construction, modification or removal;
- Perform periodic inspections to assure compliance with approved plans and specifications;
- Require State approval prior to operation (not as applicable to levees);
- Perform or require performance of periodic and irregular inspection of levees;
- Require qualified professional supervision of inspections;
- Order procedural or operating changes, maintenance, repair, or removal of levees;
- Promulgate regulations to implement the statutory authority;
- Provide funds to compel action, or to take action, to protect public safety;
- Develop and implement emergency procedures for imminent or actual levee failure;

- Identify levees, the failure of which may endanger human life, and determine the magnitude of the consequences of failure;
- Adopt or establish technical standards for construction, operation and maintenance;
- Require operating permit for any jurisdictional levee;
- (Need a verb here – provide? Seek?) Explicit authority to enter public or private property for inspection or to take necessary action to protect public safety.

Question 3-2: Are there any functions that should not be delegated?

Question 3-3: What qualifications should be met to receive a delegated levee safety program?

Question 3-4: Should levee safety program be mandatory or optional?

Question 3-5: What are possible incentives and disincentives (for effective implementation) and how could they be used? Possible incentives and disincentives currently under consideration by the Committee include:

- State/local regulation (not federal)
- Favored treatment in CRS, NFIP, Public Assistance and Mitigation grants
- Priority eligibility / discounted rates for NLSP training
- Eligibility for loans from infrastructure trust fund
- Reduced (not eliminated) flood insurance premiums
- Eligibility in PL84-99 at full federal expense
- “Good” levee safety ratings and characterizations
- Eligibility for federally cost-shared levee rehabilitation and/or construction projects
- Favored treatment for federal funding, e.g. CWA, Transportation, HUD, CBDG. Expand CRS concept to all federal funding programs.
- Less/no federal oversight (primacy)
- Eligibility for (yet to be authorized) Federal grant/assistance programs
- Access to reduced costs training and technical document programs
- Access to federally funded technical assistance
- Local agencies that unreasonably approve new development share liability.
- Penalties/consequences for noncompliance with evacuation order
- Eligibility for funding from State bonds
- Eligibility for low/no interest loans.
- Indemnification of delegated program entity by delegating entity, provided delegated program is properly implemented.
- Streamlined environmental permitting
- National, regional, basin-wide mitigation banking
- No development in protected area without in-compliance LSP
- Use funds to maintain undeveloped flood plain land. Land purchases should be targeted to flood plain land acquisition.

Question 3-6: Where should the National Levee Safety Program reside?

Question 3-7: What is the significance of real property ownership related to program implementation?

- Who owns projects built by USACE and turned over to non-federal sponsor for O&M?
- What are implications to program if owners cannot be identified?

Data Needs

- Legislative history of the National Levee Safety Act
- Examples of incentives/disincentives in other delegated and/or voluntary programs (e.g., NPDES, Surface Mining)
- *Expert* Nicole Carter from Congressional Research Service (academic work on incentives and disincentives, motivations, etc). Other experts or resources?
- *Expert* Tracy Mehan, former Assistant Administrator for Water at EPA (will discuss delegated programs, funding for aging infrastructure, trust funds, voluntary programs, incentives/disincentives, and governance)
- Best estimate of profile of levee O&M responsibility and ownership by USACE
- Lessons from the National Dam Safety Program