USACE Levee Safety Program

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Portland District
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Topics

- ARRA
- Quiz
- Path to a Safety Program
- Mission
- Organization
- Current Tools
- Inventory and Inspections
- Portfolio Condition
(ARRA)  
American Recovery and Reinvestment Act

USACE Levee Periodic Inspection Initiative

- Obligate 90 Million dollars for Levee Periodic Inspections by 30 Sept 2010.
- Contract for Inspections to create jobs.
- Provide consistent products by:
  - Use national and regional contracts
  - Use standard Task Order Template
  - Train contractor and USACE staff
  - Use Levee Inspection Tool Laptops (GFE to contractors)
- Provides basis to conduct risk screenings of levees within portfolio using data obtained.
Quiz
The best definition of a levee is:

A. A way to raise money for schools.

B. A brand of jeans.

C. A man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.
Floods and Levees Were Part of Early North American History
Levees Were a Key Method of Defense

“...designed and constructed in accordance with sound engineering practices...”
and levees grew
and sometimes failed
Historic Perspective

Majority 500+ year Levees

100 year Levees More Prevalent

- 1917 Flood Control Act
- 1936 Flood Control Act
- National Flood Insurance Program
- National Dam Safety Act
- WRDA 1986
- Hurricane Betsy
- Teton and Toccoa Dam Failures
- Hurricane Hugo
- Hurricane Andrew
- Midwest Flooding
- California Flooding
- Hurricane Katrina

Path to a Levee Safety Program

“Business as Usual”

Pre-2005

- Annual Inspections
- Different criteria for non-Fed. vs Fed.
- Inconsistent application
- More “100 yr” levees
- No risk communication

Post-Katrina

- Hurricane Katrina/Rita
- MG Riley commits to improve Levee Safety
- FY06 Supplemental
- National Levee Safety Act

Levee Safety Program

Inventory
Assessments
Inspections

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Assess the integrity and viability of levees and recommend actions to assure that levee systems do not present unacceptable risks to the public, property, and the environment.

Program Objectives:

- Hold Public Safety Paramount
- Reduced Economic Impacts
- Maximize Cost Effectiveness
- Develop Reliable and Accurate Information
- Build Public Trust and Acceptance

West Columbus, Ohio
Levee Safety Initiatives

- Program Management Plan
- PIR Review SOP
- Monthly LSPM Conference Calls
- ILTF Member for BG Rapp
- FY 09 Priorities
- LSPM Workshop
- Budget
- Levee Inventory
- Inspection Tool
- Routine Inspections
- Maintenance Deficient Levees
- Periodic Inspections
- Periodic Assessments - TBD
- Levee Certifications
- I – Wall Design Guidance
- Levee Vegetation
- Vertical Datum
- Silver Jackets

2009 Flooding in Castle Rock, Wa.
Levee Safety Organization

Levee Safety Community of Practice

HQUSACE Levee Safety Management Team
Levee Safety Officer – James Dalton
Special Assistant – Eric Halpin
Program Manager – Tammy Conforti

National Teams
- Inventory & Database
  Team Lead
  Tim Pangburn
- Assessments
  Team Lead
  Andy Harkness
- Inspections
  Team Lead
  Dale Munger
- Inspection Tool
  Team Lead
  Kevin Carlock
- Certification
  Team Lead
  Mike Deering
- Vegetation
  Team Lead
  Kevin Holden

Regional Teams
- Policy & Procedures Team
  Team Lead
  Michael Bart
- Division Levee Safety Teams
- District Levee Safety Teams
**FEMA NFIP**
Objective: Communicate the most current information for flood insurance purposes.

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**UNIVERSE OF LEVEES**

- **Level of Protection**
  - 100-year

- **Levee Categories**
  - **NFIP & CORPS**
    - Federal O&M
    - USACE built / Local O&M
    - Local built / Enrolled in RIP

  - **NFIP only**

  - **Local & Other**

  - **CORPS only**
    - 2100 mi
    - 9650 mi
    - 2250 mi

  - **No Prior Nexus with USACE or FEMA**

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**USACE Inventory and Assessment**
Objective: **Assess** all levees in USACE programs, regardless of level of protection.

**WRDA Authorities**
Objective: **Inventory** all levees in nation, lead strategic plan for a National Levee Safety Program

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**USACE Dec 07**
Not to scale
Levee System

All components and features which collectively provides protection (reduces the probability of flooding) to a defined area up to a specific event.

This diagram shows one levee “project” and three levee systems.
USACE Levee Safety Program

- Four Major Functional Areas
  - Inspection
  - Inventory & Database
  - Assessment Methodology
  - Policy and Procedure
Routine Inspections: Verifies proper O&M

Periodic Inspections: Verifies O&M, compares criteria used in the design to current criteria, et al

National Levee Database; Data and document management

HAZUS Data Used to determine consequences

Levee Screening Tool: Uses RI and/or PI output, a limited engineering assessment, and HAZUS data to determine a relative risk index.

Levee Safety Action Classification

Portfolio Management
Levee Inspection System

- Developed by Rock Island District

- Provide greater efficiency and standardization to the process of data collection and reporting

- Standardized Inspection template
  - Individual descriptions either Acceptable (A), Minimally Acceptable (M) or Unacceptable (U) for each rated item.

- Designed for implementation throughout the US Army Corps of Engineers
Levee Inspection System Specifics

- ArcGIS Software
- Crystal Reports (Included with ArcGIS)
- Tablet PC
- GPS Receiver
**Inspection Program**

**Routine Inspections:**
Verifies O&M, More Rigorous Standards, Improved Communication, System-based, Every Year

**Periodic Inspections:**
Verifies O&M, Evaluates Structure Stability, Compares Constructed Criteria to Current Criteria, Every 5 Years

**Periodic Assessments:**
Periodic Inspection + Potential Failure Mode and Consequences Analysis, Every 5 Years

**Risk Assessments:**
Data Intensive, Determine Likelihood and Consequences of Failure, Every 10 Years

**Continuous Feedback**

**Increasing Rigor**
Levee Inventory
National Levee Database (NLD)

- SDSFIE-compliant geospatial National Levee Database
- Include all necessary attributes of levees/floodwalls relevant to design, construction, operations, maintenance, repair, inspections, and potential for failure.
- Common database structure at every District to assure use of levee data with other agencies
- Maintained at District level and be accessible as a regional/national database by Division and HQUSACE users.
Inspection Map eGIS Output - NWP
USACE Program Levees

14,000 miles identified (USACE program levees)
9,800 mi detail inventory FY08 (USACE Fed levees)
No information on private/other
SDSFIE Levee Data Model Features

- piezometer_point
- borehole_point
- sand_boil_point
- flood_fight_point
- levee_failure_point
- cross_section_line
- encroachment_point
- levee_station_point
- levee_relief_well_point
- closure_structure_line
- rehabilitation_line
- levee_crossing_point
- levee_centerline
- toe_drain_line
- protected_area
- pump_station_point
- gravity_drain_line
Levee Screening Tool

- Developed to assess the condition and consequences of levees in the Corps of Engineers portfolio.
- Combines information from -
  - National Levee Database
  - Revised routine levee inspections
  - Limited engineering assessment of project features.
- Begin in late FY2009 and complete FY2012
Levee Screening Tool Outcomes

- Identification of relative risk
- Assist in the assignment of the Levee Safety Action Classification
- Guide priority setting
- Identify performance concerns and potential consequences of levee failures
- Identify issues to assist to develop & prioritize interim risk reduction measures
Risk Informed Decision Process

Levee PreScreening Qualitative Life Risk

Population at Risk (PAR)

Decreasing Condition Assessment

Increasing Consequences

Note: Above information based on results of initial questionnaire survey for District Levee Projects
Flood Risk = f(chance of flood, consequences)
Levee Safety Program

Current Activities & Path Forward

- FY06 FCCE Supplemental Direction
- FY07 Activities
- FY08 Field Levee Inspection Tool
- FY09 ARRA Periodic Inspections
- Report to Congress NCLS Levee Screening

Inventory Ph I – III National Levee Database

- Inventory, Non-Federal

Develop Assessment Methodology (Levee Screening)

- Interagency Coordination, Develop Guidance and Policy, and field Risk Communications Strategies

Initiate Levee Screening (Risk Assessments)

- Risk Assessments, Continued
  Integrate with more Robust ICW Program

National Vision (End State)

2006 2007 2008 2009 20?? BUILDING STRONG®
Levee Certifications

- USACE policy - funding for certification is a non-Federal responsibility.
- There is still no easy way for USACE to do certifications on a cost reimbursable basis.
- USACE can fund activities to provide existing, available information to assist sponsors certification efforts.
- RIP and ICW funds may be used for “data” support.
- It should be noted that an “Acceptable” rating by the Corps does not equate to levee certification.
Levee Vegetation

- Hot issue in the Northwest.
- Recent BiOp on FEMAs NFIP for Puget Sound may have far reaching consequences.
- New ETL 1110-2-571 that clarifies EM1110-2-301. Result: **no change** in inspection policy.
- RVs and RVAs – message is use it or lose it.
Example Non-Compliant Vegetation Growth
Potential Consequences

- Tree/Woody Growth

  - Riverside
  - Landside

  Blocks Emergency Access
  Uncontrolled Piping Through And Along Root Cavities
Root Penetrations

Danube Dike 1988
Root Penetrations

Dike at River Mulde 2002
Wind Falls
Vertical Datum

- NWD District’s completed datum assessments inFY08.
- Submitted cost and schedule data for corrective actions was entered into CEPD.
- Metrics were established from that CEPD data.
- Model letter was provided to inform non-Federal sponsors to bring their projects into compliance.
- Corrective actions are typically O&M funded.
Silver Jackets Program

- Jennifer Dunn is the new HQ Program Manager
- COE, FEMA and other federal partners create an interagency team at the state level.
- Interagency approach to planning and implementing risk reducing measures.
- Improve public risk communications
- Collaboratively solve issues and implement initiatives.
- On radar: NWK, NWW (Idaho) and NWS.
Questions?
## Levees in the Inspection Program in NWD

The following table shows the number of levee systems in various programs as of the specified date. The table includes columns for Federal O&M (O&M Gen), Fed/Local (RIP/FCCE), and Local (RIP/ICW). The table also specifies whether levees are active or inactive in the Ripple Inspection Program (RIP).

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