What We’ll Talk About Today

1. Origins of the Project
2. What’s Involved
3. Automated Tools & Processes
4. Review of Products
5. Project Findings
6. Next Steps
1 Origins of Project

- FEMA Map Modernization 2003
- Risk Map followed
- Dams generally not addressed
Origins of Project

Kentucky Division of Water (KDO) has existing program – State Owned Dam Repair Program
• Improvements in planning and allocation of funds needed
• Dam safety modernization

KDO able to utilize available HMGP funding through DR1818
Origins of Project

Purpose: To determine best practices to help quantify, communicate, and mitigate current risks associated with dams and eventually to help avoid future risks.
Origins of Project

Starting Point – Subset of Inventory (195 dams):

• SODR (State Owned Dam Repair) Program Dams
• Selected NRCS Dams
• Other Publicly Owned Dams

Partnership between KDOW Dam Safety, KDOW Floodplain Management, Kentucky EM, NRCS-Kentucky, and FEMA Dam Safety
Initial Set of Dams in Program
What’s Involved

• Data Collection
• Rapid Inundation Mapping
• Detailed Inundation Studies
• Preliminary Risk Screening & Prioritization
• Field Reconnaissance
• Development of Mitigation Strategies
• Simplified Emergency Action Plan Development
• Seismic Assessment Reviews
• Prototype Catastrophic Long Term Recovery Plans
• Expanded Dam Owner Outreach
Rapid Inundation Mapping

- GeoDam-BREACH – Arc-GIS based tool, using simplified dam break routines
- Produces a quick preliminary dam breach inundation map
Selected group of dams identified during screening process
Better identify potential risks

Detailed inundation Studies
Preliminary Risk Screening and Ranking

**Purpose:** Establish a consistent and justifiable ranking of dams considering various risk factors

- Used NRCS spreadsheet tool based on USBR procedures
- Results based on field data, as-built data, H&H data and dam breach modeling
- Combined with FEMA HAZUS-MH for consequence review
Dam Risk Mitigation Strategies

Risk Screening results used to support a review of potential mitigation options for dams, including:

- Structural upgrades to dam/spillways
- Acquisition of easements in downstream inundation areas
- Establishment of downstream development regulations
- Buy-outs of affected property owners
- Flood proofing/elevation/relocation of structures
- Enhanced flood warning/evacuation systems & plans
Simplified Emergency Action Plans

Goal: To produce a “starting point” semi-automated EAP document

Step 1: Event Detection
- Detect Event

Step 2: Event Level Classification
- Level 1 (Advisory)
  - Unusual Event;
  - Slowly Developing
- Level 2 (Watch)
  - Potential Dam Failure Situation;
  - Rapidly Developing
- Level 3 (Warning)
  - Urgent;
  - Dam Failure is Imminent or in Progress

Step 3: Notification and Communication
- Notify
  - Level 1 Lists
  - Level 2 Lists
  - Level 3 Lists

Step 4: Expected Actions
- Monitor
- Save Dam Protective Actions
- Save People Evacuate

Step 5: Termination and Follow-Up
- Termination and Follow-Up
5 Project Findings
15% Of the dams studied may have an outdated hazard classification
36% Of the dams studied may not meet current design criteria
50% Of the dams studied could benefit from easements downstream to prevent future increases in hazard classification.
Buy-outs may be feasible in lieu of more costly structural repairs.
Next Steps
Next Steps

• Pilot project to study risk identification methods
• Build inspection database
• Incorporate database and processes into dam safety modernization process
Next Steps

• Distribute products to dam owners & communicate mitigation options
• Use project findings to support decision making & fund allocation (mitigation vs. dam upgrades)
• Revisit state hazard risk regulations
• Expand analysis to more dams (public & private)
• Integrate into future Risk MAP watershed studies
Summary

• Dam’s carry an inherent risk
• More cost-effective to mitigate pro-actively