Developing Levee Emergency Action Plans in Maricopa County, AZ – For use by Emergency Managers and for CRS Credit

Frank Brown, Flood Control District of Maricopa County
Stephanie Routh, Dewberry
This Presentation Will Speak to ...

- Levee Operator
- Those Impacted by Levee Inundation Areas
- Emergency and Floodplain Management Professionals
“There will always be a frontier where there is an open mind and a willing hand.”

-Charles Kettering (1876-1958)
American inventor, one example: the electric starter for autos)
Why Emergency Action Plans (EAP)?

- Protect life & property, and manage the risk
- Maricopa County’s robust safety program for Dams – Could it work for levees?
- Levee EAP: limited examples (Emergency Operation Plan vs. EAP)
  - vs. COE requirements
  - vs. CRS requirements
District Levees Locations

What’s the future with Standard Levee Names?
County’s Name = CBRLS vs. FEMA PAL ID #11
Again, Why Levee EAP? For Community Rating System (CRS) Credits

• We have 3 Levee EAPs on-file (plus more in future)
• 2013 IGA with Emergency Management = Actionable
Our CRS Class 4 Community and Levee Activity Credits

Maricopa County

successfully participates in the

National Flood Insurance Program
Community Rating System

The community has undertaken a series of meaningful activities to protect its citizens from losses caused by flooding and has significantly exceeded the requirements for NFIP participation and effective floodplain management.

May 1, 2012

David L. Millard
Associate Administrator for Federal Insurance and Mitigation
Federal Insurance and Mitigation Administration
Federal Emergency Management Agency
A Levee EAP contributes to: 610 & 620

Our County - 237 points in 2010 (155 + 82) but not in Levee Safety
CRS Activity 620: Levee Safety

Levee EAP contributes to CRS Rating!

Threat Recognition
• Advise Emergency Manager for failure or overtop threat
  • 30 pts

Warning
• Issue warnings to threatened population
  • 30 pts

Operations
• Take steps to protect life and reduce losses during a flood
  • 30 pts

Critical Facilities Planning
• Coordinate warning & response with Critical Facilities
  • 30 pts

O&M Maintain Levee
• Written Plan with annual inspections
  • 95 pts

Activity 623
• Building count
  • Adjust impact
  • 20 pts max

Levee EAP fits into existing Activity 610!
What would be in a Levee EAP?

• Borrow from our Safety Program for dams (EAP with template)
• Our Levee EAP’s include:
  – Location and Background
  – Triggers for the event
  – The inundation area maps (& evacuation area maps)
  – Backup modeling
• Supply data to Emergency Managers and their EOC QUICKLY!
What Levee Events to Model?

Failure
- Traditional 100-year
- Discharge
- Inundation Area

Overtopping
- Force water overtop Levee
- Discharge / Frequency
- Inundation Area

Breach
- Where/How Big/How Long/What Duration?
- Discharge?
- Inundation Area

CRS Manual – No guidance for Overtop or Breach, but combine for worst case = Community’s Judgment (621.c)
Stresses Along the Levee

Levee Could Breach at any of these Stages of Flow:

- Normal Low Flow
- Monitor Stage
- Project Flood Stage
- Danger Stage

Top of Levee
Levee Overtopping

Note: Splashing Waves
Triggering an EAP?

TRIGGERS:
In the Arid Southwest we watch for flash floods – need to know the weather and if water is rising along the levee.
Flood Warning Team

The ALERT Operation Center and some gages

Crown King Gage No. 5715
12/29/97

Station 4756, Salt River @ 67th Ave., 03/18/2010

Dewberry
Breach Location
For Levees: Water Wave Travel Times are in Minutes

Just Minutes to reach the first structures

Just Minutes to reach significant depths
EAP Actions:

- Triggers
- Notifications
- Evacuation

RED = Decision
GREEN = Notification
BLUE = All Clear
GRAY = Example
Emergency Action: Evacuation Rectangle identified at Major Intersections

Need maps for both Emergency Management and Engineering Support
Levee EAP Decision Path

From the start of this presentation until **NOW**

**If the Levee had breached**

Homes would have been **flooded**

**Step 1** - Know the Location and Levee in Danger

**Step 2** - Know the Triggers and Monitor with Evaluation

**Step 3** - Notifications

**Step 4** - Evacuation

- Triggers:
  - Remaining Freeboard
  - Breach or Overtopping Imminent

Did you come to the same conclusion for Levees? - Must have proactive response plan

Did you have enough **Time** to take action?
Levee EAP Table Top Exercise

- September 2013 Table Top for Levee EAP exercise with Emergency Management + City + County Floodplain + State
Project Needs and the Future

- Exercise the EAP
- Adopt EAP and make more!
- Pre-score our Levee EAPs
- Coordinate Coordinate Coordinate
- Lessons Learned Report
- Levee naming conventions resolved
- Tie to other EAP?
- Public Outreach

2014 ISO Visit and Future Updates

Dewberry
Project Credits
DISTRICT staff: Tim Murphy, Stephanie Gerlach, Tom Loomis, Steve Waters & others
DEWBERRY: Patrick Wolf, Jennifer Jia, James Czarnik, Ted Cassidy, John Moynier & others
MCDEM: Carol Anelas & Julie Syrmopoulos
City of Mesa: Brian Darling, Rob Kidder, Lance Webb & Shahir Safi
City of Phoenix: Scott Krushak, Hasan Mushtaq, Jeri Todd

Imagery Credits
USACE – Sacramento District, GoogleEarth, USBR