

Alexander County Flood Preparedness Plan Rita Lee, PE, CFM David Mick, PG



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Location of Alexander County





Unique Topography

- 870,00 square miles of watershed
- Covers 26% of the continental US
- Confluence of Mississippi and Ohio Rivers
- Located at upper end of Mississippi Embayment



Unique Topography

- Limited high ground
- Mississippi, Ohio and Cache Rivers in the area.
- Mississippi River has large meanders.
- Dominated by levees
- Cairo and Len Small Levees in Illinois



Unique Topography

- DFIRM 100-year floodplain and floodway in Illinois
- Cairo protected by ring levee with 500year protection





Silver Jackets Project

- Memphis District Corp of Engineers wanted an evacuation plan for the Cairo Levee System
- Cairo Levee System had seepage issues but withstood the May 2011 Record Flood
- Len Small Levee has overtopped or breach in 1993, 1994, 2008, and 2011
- OWR requested a Flood Preparedness Plan for both levee systems

Silver Jackets Team are State led multi-agency teams facilitated by the Corps of Engineers

Plan Preparation Team

- Corps of Engineers Memphis and St. Louis District
- IL Dept of Natural Resources/Office of Water Resources
- IL Emergency Management Agency
- Alexander County Highway Engineer and Emergency Manager
- City of Cairo Mayor, City Council member, and Fire Chief
- National Weather Service Paducah
- FEMA Region V
- American Water



Project Goals

Develop a plan which:



- Identifies critical infrastructure and evacuation routes.
- Determines warning system based on stream gage stage or time to flood from a levee breach.
- Specifies authority, flood personnel, and prioritizes tasks and actions.

2-D Hydraulic Modeling

- Corps of Engineers developed one model for the Cairo Levee System and one model for the entire Alexander County area.
- 2-D modeling allows flow in 8 horizontal directions for a time series
- Levee breach modeling was completed





Levee Breach and Backwater Model Scenarios

- Three hypothetical breach scenarios modeled for the Cairo Levee System
- One hypothetical breach scenario and a backwater scenario modeled for the Len Small Levee
- All models completed by Corps of Engineers



Cairo Levee System

- Corps' Mississippi River and Tributaries authority so Corps operates and maintains the levee
- Ring levee protects from Ohio River and Mississippi River
- Population protected is 4800 people and 16,500 acres of land
- Commercial Facilities -American Water and Bunge Oilseed Production



Cairo Floodwall Breach Scenario



Cairo Floodwall Breach Scenario

- One road for exit
- Critical infrastructure located
- 2-D hydraulic model from Memphis Corps adds time element and LiDAR adds detailed inundation depth and building location

































Len Small Levee

- Locally built and accepted in PL84-99 program
- Protects 16,600 acres with 52 structures
- Leveed area is exposed to backwater from the Cache River Diversion Channel
- Mississippi River drops
 10' over the levee length













Real Time Inundation Mapping

Potential Inundation by a Northern Breach on Len Small



Flood Preparedness Plan

- Authority
- Mutual Aid Agreements
- Personnel for Flood Organization
- Flood History and Elevations
- Tasks and Prioritized Actions
- Emergency Shelter
- Evacuation
- Critical Infrastructure Utilities, Facilities, and Hazardous Materials
- Communication



Tasks and Prioritized Actions

- Mobilization Cairo Stage of 40'
- Flood Inspection Cairo Stage of 49'
- Flood Fight Activities Cairo Stage of 52'
- Loose access to Kentucky Cairo Stage of 54.5'
- IL 3 closure Cape Girardeau Stage of 45.5 or Cairo Stage of 59.9'
- Loose access to Missouri -Cairo Stage of 61'



Evacuation

- Moderate flooding on the Ohio River will close 1 of 3 exit routes from the City of Cairo.
- A levee breach in the City of Cairo fills water to levels impassable in 6 hours.
- A levee breach in the Cairo Levee System will overtop and close Interstate 57
- Last evacuation route is the levee road.



Communication

- Having one emergency operation center with the State, Alexander County, and Communities makes disaster response more efficient.
- During the New Year's Flood of 2016, evacuation behind the Len Small Levee was completed with in person contact for every home owner.
- National Weather Service has the ability to warn cell phone alerts. This option will be included in the plan.



Alexander County Plan

- Proposed to have all the hydraulic modeling and analysis completed by April 2016
- Proposed public meeting to show the results
- Evacuation and warning system are key components of the plan

