2011 MISSOURI RIVER FLOOD EVENT

FLOOD RISK MANAGEMENT AND SILVER JACKETS WORKSHOP

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US Army Corps of Engineers
BUILDING STRONG®
Missouri River Mainstem Reservoir System

Congressionally Authorized Project Purposes
- Flood Control
- Navigation
- Hydropower
- Irrigation
- Recreation
- Water Supply
- Water Quality
- Fish and Wildlife
FORT PECK DAM; FORT PECK, MONTANA
OPERATING SINCE 1940
GARRISON DAM; GARRISON, NORTH DAKOTA
OPERATING SINCE 1955
OAHE DAM; PIERRE, SOUTH DAKOTA
OPERATING SINCE 1962
FORT RANDALL DAM; PICKSTOWN, SOUTH DAKOTA
OPERATING SINCE 1953
GAVINS POINT DAM ; YANKTON, SOUTH DAKOTA
OPERATING SINCE 1955
May 2011 Precipitation

Missouri Basin RFC Pleasant Hill, MO: May, 2011 Monthly Observed Precipitation
Valid at 6/1/2011 1200 UTC - Created 6/2/11 17:40 UTC

Inches

[Map showing precipitation levels across a region]
2011 Missouri River Flood Inundation Mapping
Why Develop Flood Inundation Mapping?

- To promote public safety and reduce the possibility of loss of life
- To assist County and State Floodplain Managers with making preparations for the flood event
- To assist in protecting critical facilities
Hydraulic Modeling Efforts Ongoing Prior to 2011 Flood Event

- The Critical Infrastructure Protection and Resilience Program
- Program of the USACE Office of Homeland Security
- Technical work by the Mapping, Modeling and Consequences Production Center (MMC) of USACE
- Developing updated dam break inundation mapping
MMC Hydraulic Modeling

Hydraulic model data

► HEC-RAS, geo-referenced hydraulic models from Fort Peck Dam to the Mississippi River
► All bridges were eliminated per MMC guidelines
► Cross sections were extended across the entire Missouri River Valley with Geo-RAS
► Utilized 10-meter Digital Elevation Models (DEM)
Missouri River Hydraulic Modeling and Mapping for the 2011 Flood Event

► The Omaha District utilized the MMC unsteady hydraulic models and converted them to steady-state hydraulic models
► The Omaha District ran HEC-RAS for various discharges
► Flood Inundation Maps were developed from Fort Peck, MT to Rulo, NE by the Omaha District
► 360 Flood Inundation Map Panels (covering ~900 river miles) were produced and distributed to the public
► Approximately 7 hydraulic engineers and 6 GIS specialists developed the Flood Inundation Maps
► Hydraulic modeling and flood inundation mapping were completed in approximately 13 days
HEC-RAS Model Geometry
Fort Peck Dam to Mississippi River

800 Cross Sections
1-3 miles between cross sections
Gavins to Sioux City, IA
150,000 cfs Projected Inundation

Estimated Flood Depths
- 0 - 2 ft
- 2 - 4 ft
- 4 - 6 ft
- 6 - 8 ft
- 8 - 10 ft
- > 10 ft

- Doted River Mile
- Airports or Helipads
- Police Stations
- Civil Defense Centers
- Communication Facilities
- Fire Stations
- Hospitals
- Schools
- Power Plants
- Electric Substations
- Water Treatment Plants
- Railroad

Projected Inundation
(includes current tributary flows)
Spring 2011 Flood
Date: June 2011 - Version 1
South Sioux City, Nebraska
Dakota City, Nebraska
Temporary WWTP Levee
Omaha, NE to Rulo, NE
150,000 cfs Projected Inundation

Near Percival, IA
Federal Levee L-575
Breach near Percival, IA
Sioux City, IA to Omaha, NE
150,000 cfs Projected Inundation

I-680 and I-29 Bridge in Iowa
Aerial Photo of I-680 Looking East
July 2011
Resources Deployed

- 2011 Missouri River Flood Fight
  - 15.1 Million sandbags
  - 66,070 - 4’ Hesco Bastion Containers
  - 8,200 – 3’ Hesco Bastion Containers
  - 2,531 – 1-Ton Sandbags
  - 2,836 Rolls of 100’ x 20’ plastic sheeting
  - 48 pumps
  - 2 sandbag filling machines
  - 400 personnel engaged