MICA High Water Mark Mapping Project ... What WE Learned

Mission Assignment 4222DR-OK-COE-SWD-01/02
Disaster DR-4222

Oklahoma Severe Storms, Tornadoes, Straight-line Winds, and Flooding

- **Major Disaster Declaration**
  declared on May 26, 2015

- **Incident period**
  May 5, 2015 to June 4, 2015
  Extended to June 19, 2015 to include TS Bill
Disaster DR-4222   May 6-25, 2015

Oklahoma Annual Exceedance Probabilities (AEPs) for 20-Day Rainfall
6-25 May 2015

Hydrometeorological Design Studies Center
National Water Center, National Weather Service
National Oceanic and Atmospheric Administration
http://www.nws.noaa.gov/oh/ohd/hdsc/
Created 16 July 2015
Precipitation frequency estimates are from NOAA Atlas 14, Volume 8, Version 2.
Rainfall values come from 24-hour multi-sensor data.
Disaster DR-4222  May 2-31, 2015
DR-4222 – Muskogee, OK
Disaster DR-4222 Rain Fall – OAEPs
Figure 1. Maximum observed rainfall amounts in relationship to corresponding rainfall frequency estimates for the US1OKCV0082 gauge.
DR-4222 – Davis, OK
Christmas Flooding Event - Cherokee Co.
Flood Insurance Rate Map Availability and Currency
High Water Marks & Event Determination
MA 4222DR-OK-COE-SWD-01/02

Statement of Work includes tasks to:

- Locate and identify high water marks for recording (water stains, debris lines, and other recordable items)
- Collect location (lat/long) and elevation of mark (X,Y, and Z coordinates)
- Supply photo documentation and field notes
- Provide real-time HWM collection website for reporting and data access to Federal and State partners
- High water mark Geo-database deliverable
- Review gage analysis and recent storm radar information to determine amount of rainfall
- Perform statistical analysis to determine recent event frequency equivalence
Short Term Outcomes

▸ Aides/Informs FEMA’s Public Assistance and Floodplain Management and Insurance team efforts

▸ Allows review of current available flood hazard information against recent event(s)

▸ Assists State of Oklahoma in assessing current flood risk
  • Identifies low water crossings
  • Vulnerable populations identified

▸ Provides community understanding of recent flood events
Long Term Outcomes

▸ Assists State of Oklahoma in assessing current flood risk and determining mitigation opportunities
  • Provides information for refinement flood risk profile, extent and vulnerability assessment within State Hazard Mitigation Plan
  • Offers data points for future prioritization of flood hazard mapping program investment
  • Identifies mitigation activity opportunities for long term risk reduction

▸ Determines event frequencies and recent rainfall amounts
  • Supports Federal and State agency review of available resources and current flood risk understanding

▸ Promotes local and public understanding of recent events

▸ Supports Regional investment in updated modeling within the Cache/Washita, Little and Deep Fork River basins.
- Fully-Digital Data Collection and Rapid Data Transfer
- **OWRB** analyzed and determined strategic locations for HWM collection field deployment
- Mobile computing reduces errors and saves hours of time by *eliminating manual data entry*.
- With cellular internet access, mobile computing applications *immediately send data from the field to the server* for review and analysis.
- Centralizes data collection from multiple remote teams
Field Crew Verified the 1% Floodplain Models
MICA Portal

Map panel displaying collection data. Click on a marker to see data or navigate using tree on left side.

Sample data:
- **EL311.31_FlowerMoundRoad**
  - Description: Debris on top of bridge, not sure if water crossed roadway.
- **EL311.31_FlowerMoundRoad_Debris**
  - Description: View field site and download file.
High Water Mark Map Book

Graph showing flow, precipitation, and stage over time.
High Water Mark Map Book
High Water Mark Map Book
HWM Project Mapping and Data Information is located on the official OWRB Web site with links to the FEMA Geoplatform:

http://www.owrb.ok.gov/

floodplain management/floodplain studies/HWM
Index of /Region6/Mitigation/OK_2015_HighWaterMarks

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Apache Server at data.femadata.com Port 443

https://data.femadata.com/Region6/Mitigation/OK_2015_HighWaterMarks/
OK-2015 High Water Marks
GIS Mapping
High Water Mark...
Locations Zoom into Additional Marks

Shows Locations of High Water Marks Gathered—when you zoom in all the 800+ marks gathered show up.
High Water Marks…
A Closer Look for Additional Locations
High Water Marks…
to Verify Mapping and Models
High Water Marks…
Inundation Mapping
Oklahoma High Water Marks - Watershed Locations

[Map of Oklahoma showing high water marks in various locations, such as Upper Washita, Lower North Canadian, Little, and others.]

FEMA
OWRB
RiskMAP
Oklahoma NFHL Participating Communities
High Water Marks / Inundation Mapping / Depth Grids – West & East Cache Creek
High Water Marks / Inundation Mapping / Depth Grids – Lower Washita
High Water Marks / Inundation Mapping / Depth Grids – Lower Canadian Walnut
Lessons Learned

- HWM data is EXTREMELY perishable
  - Suggest interagency coordination in "peace time" to allow data collection efforts to commence with event occurrence in the future
  - Begin data collection efforts during FEMA response efforts for best data availability
- Train crews prior to field activation
- Have supplies and Equipment ready
- Scope of Work elements and specificity is critical to success
- Know your areas of concern, your older mapped areas or no maps
- Local FPAs and EMs...Deploy to your critical areas, notify State of High Water Marks and Target sites
High Water Mark
Mission Readiness…

The following Informational Components to develop your State High Water Mark Mission are available at

Oklahoma Water Resources Board
Floodplain Management Section, Beth Wilhelm, EI, CFM

- Oklahoma Mission Framework
- Field Crew Practices and Procedures
- Equipment Selection and Evaluation
- Surge Funding (prior to Disaster Declaration) Estimator
Was it **The CRIMSON TIDE** that inundated OKLAHOMA’S Floodplains during DR-4222…

HWM Collection will save lives in the future

Be Prepared!
Questions?

For further Information…

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