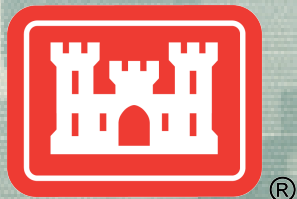


Probabilistic Flood Hazard Assessment

Panel 8 – Combined Events

Rockville, MD

31 January 2013



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US Army Corps of Engineers
BUILDING STRONG®



I want an official stochastic-action, two thousand equivalent years of record model with multiple methods in the stock and this thing which addresses aleatory and epistemic uncertainties

You'll shoot your eye out kid



Combined Events

- Panel 8 focuses on identifying and evaluating combined event scenarios within a risk informed framework. Combined events can include flooding caused by seismically induced dam or levee failure; flooding caused by combinations of snowmelt, rainfall, and ice; flooding caused by combinations of coastal and riverine events; basin or system wide performance and impacts; human and organizational factors; and other scenarios



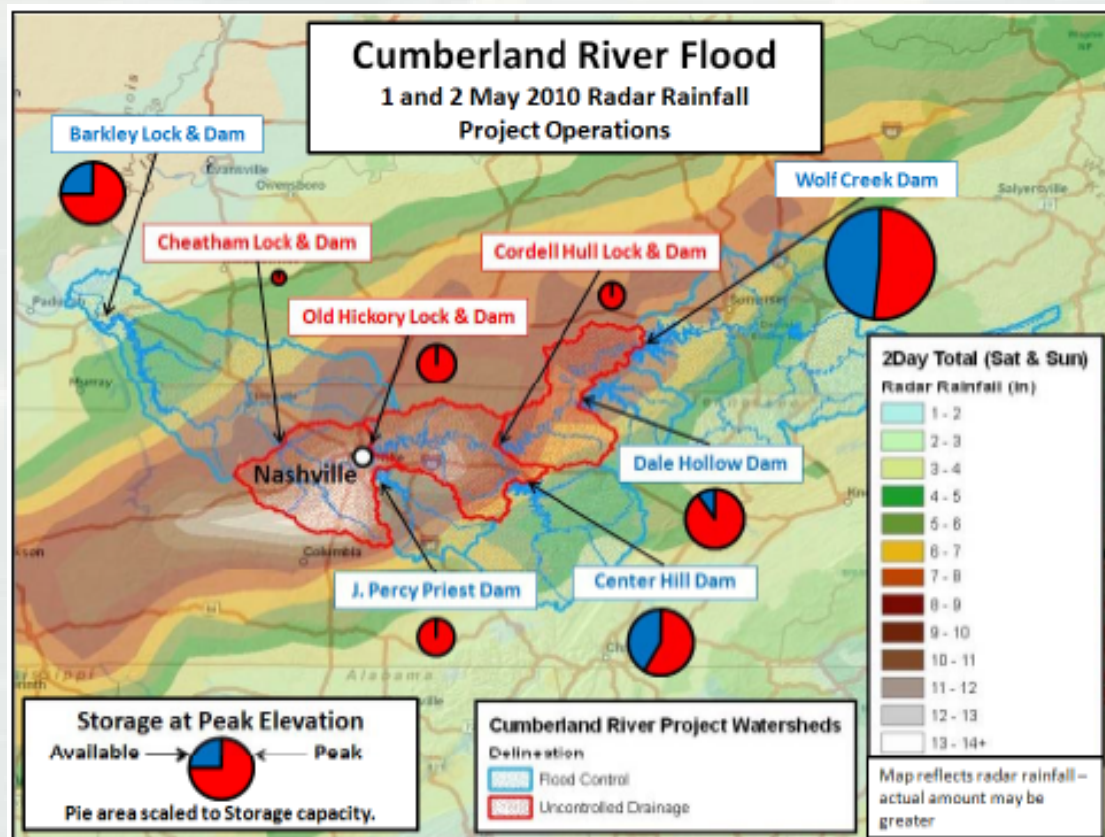
Combined Events

- The uncommon combination of not uncommon things
- Unprecedented but not extreme



Combined Events

- Unprecedented rainfall mostly over uncontrolled drainage. Several dams under operating restrictions.



Combined Events

- The 2,000-foot berm collapsed due to “onsite activities,”
- (The plant) is in the same situation it would have been in if the berm had not been added. We're still within NRC regulations.

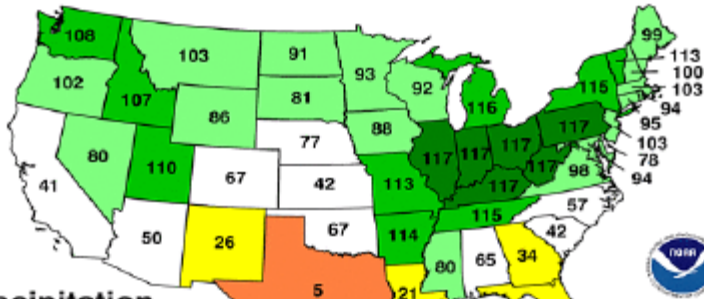


Combined Events

- Unprecedented rainfall met a significant spring snowmelt at Cairo

April 2011 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA



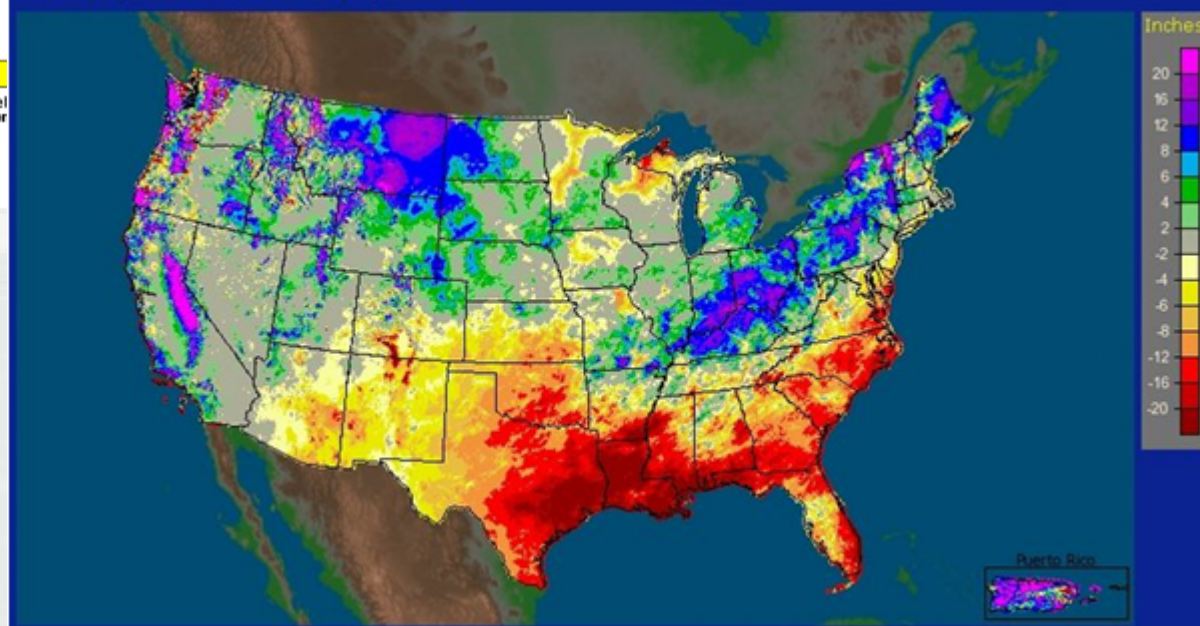
Precipitation

1 = Driest
117 = Wettest

Record
Driest

Much
Below
Normal

CONUS + Puerto Rico: Current Water-Year (Oct 1) Departure from Normal Precipitation
Valid at 6/18/2011 1200 UTC - Created 6/18/11 23:38 UTC



Presentations

- Combined Events in External Flooding Evaluation for Nuclear Plant Sites
 - ▶ Kit Y. Ng
- Assessing Levee System Performance Using Existing and Future Risk Analysis Tools
 - ▶ Christopher N. Dunn
- Seismic Risk of Co-Located Critical Infrastructure Facilities – Effects of Correlation and Uncertainty
 - ▶ Martin W. McCann



Presentations

- Storm Surge – Riverine Combined Flood Events
 - ▶ Joost Beckers
- Combining Flood Risks from Snowmelt, Rain, and Ice – The Platte River in Nebraska
 - ▶ Douglas J. Clemetson
- Human, Organizational, and Other Factors Contributing to Dam Failures
 - ▶ Patrick J. Regan



Questions

- How can a risk informed framework be utilized to identify plausible event combinations that are relevant to the flood hazard assessment?
- How can we estimate the probabilities and risks associated with event combinations?

