

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



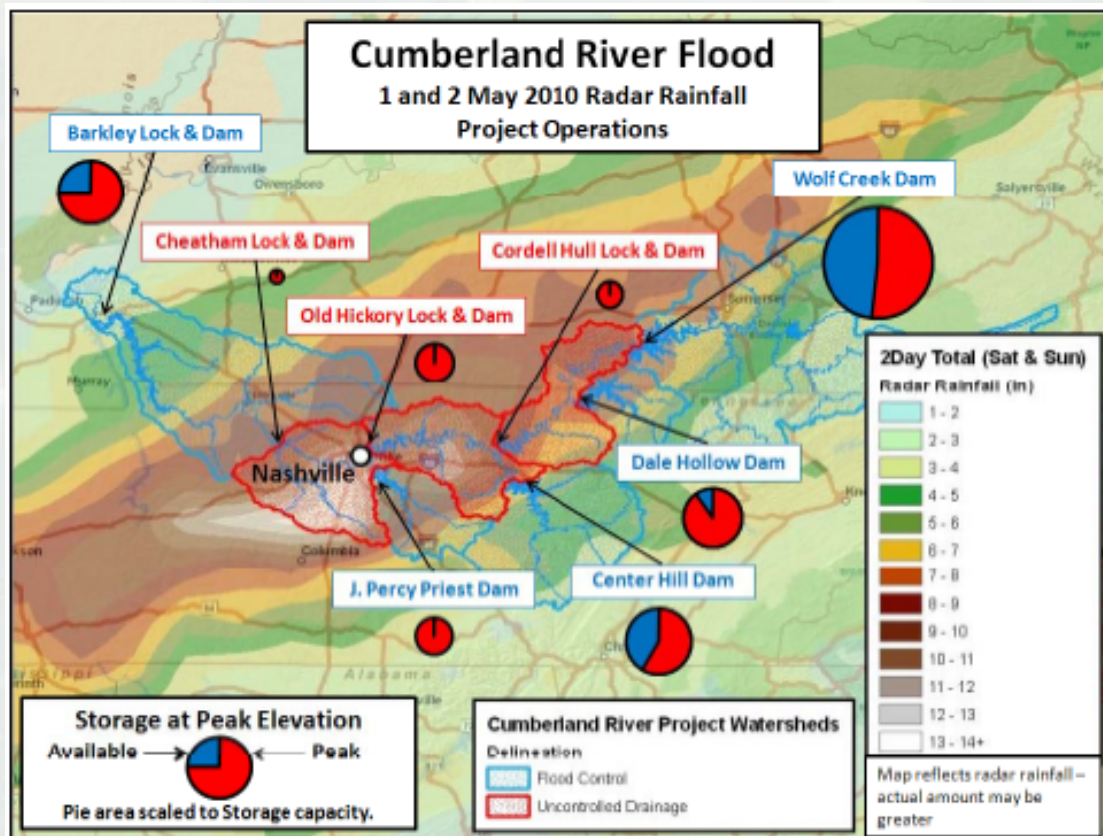
Combined Events

- 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

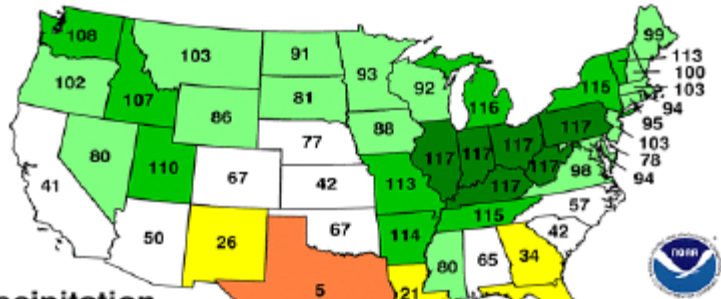
- The 2,000-foot berm collapsed due to “onsite activities,”
- (The plant) is in the same situation it would have been in if the berm had not been added. We're still within NRC regulations.



Combined Events

April 2011 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA

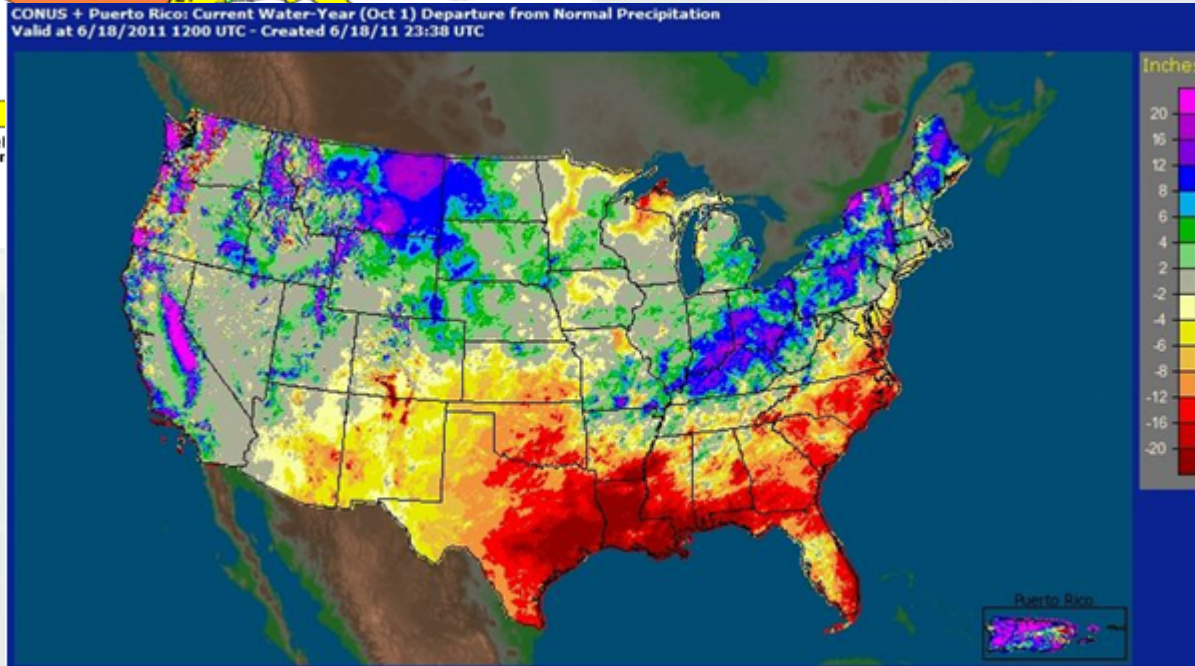


Precipitation

1 = Driest
117 = Wettest



- Unprecedented rainfall met a significant spring snowmelt at Cairo



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?

