

Panel 2: State-of-the-Practice in Identifying and Quantifying Extreme Flood Hazards



Thanks to our Rapporteurs:

- Mark McBride, NRC (NRO)
- Randy Fedors, NRC (NMSS)
- Joseph Giacinto, NRC (NRO)

Panel 2: State of the Practice

- Identifying and quantifying flood hazards
 - Extreme events (AEP 10^{-2} to 10^{-3})
 - Extremely extreme events (AEP 10^{-4} to 10^{-6})
- Acknowledging events not historically observed or anticipated (i.e., “black swans”)
- Uncertainties

Panel 2 Presentations

- Will Thomas, Michael Baker, Jr.
- Jery Stedinger, Cornell University
- Jim O'Connor, USGS
- Douglas Clemetson, USACE
- John England, BoR

Roles for Both Deterministic and Probabilistic Approaches

- Approaches dependent on
 - Site
 - Question at hand
 - Rarity of event
- Complexity of approach varies
 - Physics
 - Conceptual models
 - Stochastic approaches
 - Mixtures
- Procedures for moderate to extreme events (10^{-2}) have been applied broadly with generally satisfactory results
- Multiple approaches can be complementary

Some Issues

- Multiple possible considerations
 - Peak discharges
 - Volumes
 - Duration
- Paleoflood data, though possibly challenging to acquire, helps to define frequency of extreme events
- Paleoflood data can greatly reduce uncertainty
- Various methods for evaluating uncertainty of extreme events

Need for multidisciplinary teams

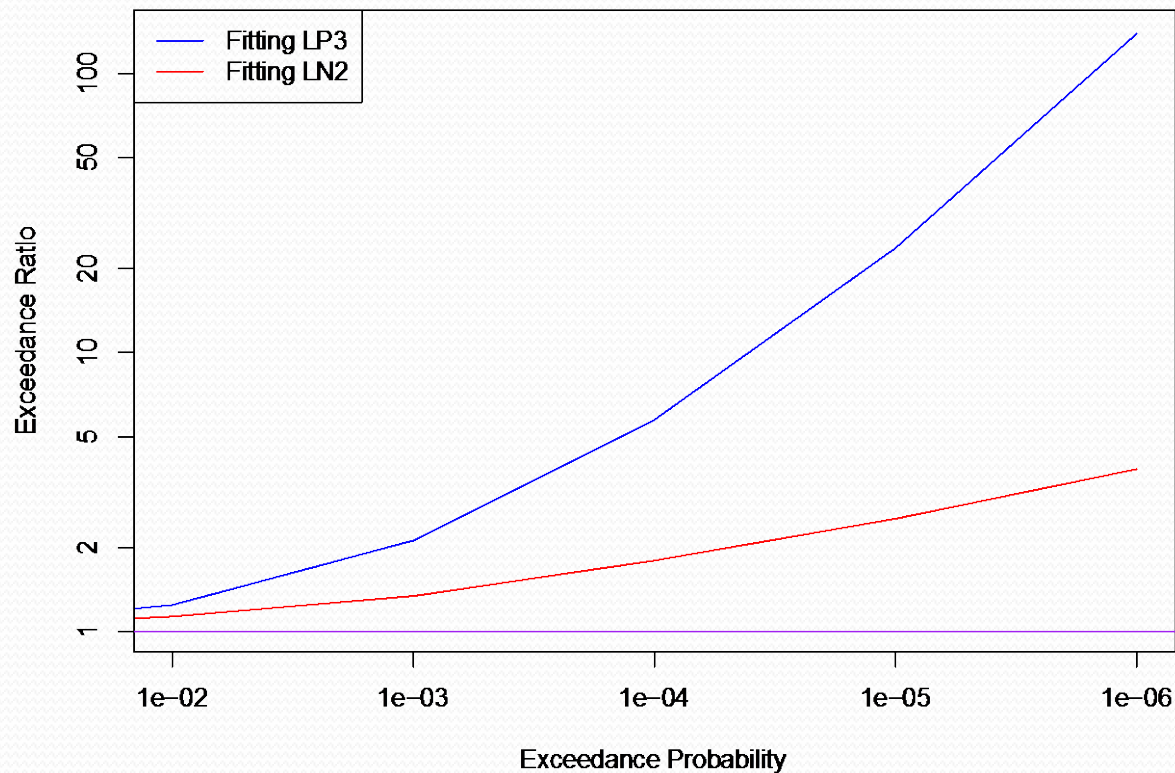
- No one person has all necessary expertise
- Effective approaches may include
 - Hydrologists
 - Paleohydrologists
 - Statisticians
 - Modelers
 - ...

Uncertainty

- For events that are frequent with respect to our data, aleatory uncertainty limits our ability to predict future events
- For rare (10^{-4} to 10^{-6}) events, epistemic uncertainty begins to be important
- One need to consider both aleatory and epistemic uncertainty
- Point estimates (PMF) are comforting but, by ignoring epistemic uncertainty, foster false sense of confidence

Does Epistemic Uncertainty Really Matter?

N=100



Some Questions

- Contributions or impacts of climate change
- Applicability of paleoflood data (changing climate, channel assumptions)
- Bulletin 17B,C (i.e., prescribed methods) may stifle innovation
- Choice of duration versus sequencing for maximum precipitation event input
- Incorporation of orographic effects

Impediments to Implementation

- Shortage of expertise
- Inadequate training/curricula
- Inconsistent definitions
- Culture (“Just try it...”)
- Lack of imagination

Concerns

- Delusional Precision
 - If we're going to present uncertainties, we had better compute them correctly
- Terminology matters (“risk,” “uncertainty,” etc.)
- Education: Training future analysts

Questions

- How can we improve our PRAs
- Can or should SSHAC-like process be followed?



Questions?