NAFE Saturday Schedule (January 16, 2027)

Chad Ballard, PE (NAFE #1363A)
Principal Engineer
High Water Mark

Time: 8 to 9 AM

Title: From Rainfall to Liability: Using Computer Modeling to Determine Flood Causation

Abstract: The “Act of God” defense frequently serves as a primary legal shield against liability in flood-related litigation under the premise that extreme precipitation events constitute unanticipated natural occurrences for which no human is responsible. This paper presents a standardized forensic engineering framework utilizing two-dimensional hydrodynamic modeling to systematically evaluate the validity of “Act of God” assertions. By establishing a baseline model alongside comparative “but-if” counterfactual simulation(s), natural meteorological forcing can be isolated from man-made impacts. The proposed methodology establishes a five-phase process to: (1) reconstruct existing (“as-Is”) conditions; (2) benchmark site-specific rainfall events against jurisdictional design requirements and prevailing regional standards; (3) create a counterfactual “but-if” simulation matrix; (4) perform hydrodynamic differential analysis; and (5) generate clear reporting to effectively quantify and communicate findings. This framework quantifies extreme weather based on mandatory civil design standards, establishing a repeatable methodology for evaluating claims of unavoidable events. Through representative case studies, this paper demonstrates how 2D physics-based hydrodynamic modeling moves beyond merely identifying human factors to quantitatively apportion flood causation between natural meteorological forcing and anthropogenic site modifications.



Chad Ballard, PE, is a civil engineer specializing in hydrology, hydraulics, flooding, and drainage. He applies advanced numerical modeling and technical analysis to investigate complex flooding events, evaluate flood and erosion damage, and assess issues involving dam operations, dam breaches, and levee failures. Chad’s expertise includes forensic engineering and expert witness services, where he uses rigorous flood modeling to evaluate causation, assess infrastructure performance, and develop clear, defensible opinions. He is a professional engineer licensed in multiple states, a Certified Floodplain Manager (CFM), and a Board-Certified Water Resources Engineer (BC.WRE). In addition to his consulting practice, Ballard has taught professional education courses in hydrology and hydraulic modeling and served as an adjunct professor, teaching undergraduate and graduate courses. His technical expertise, investigative experience, and teaching background allow him to communicate complex engineering concepts clearly to attorneys, clients, and other stakeholders. He lives in the Boise, Idaho, area with his wife and five daughters.