

## Innovations in new US guidelines for flood frequency analysis

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U.S. Federal agencies agreed on uniform flood frequency analysis procedures in 1976 with publication of Bulletin 17, update to Bulletin 17B in 1982, and to Bulletin 17C in 2018. The interagency Hydrologic Frequency Analysis Work Group (HFAWG) spent over a decade testing and developing the robust methods adopted in Bulletin 17C guidelines which use the LP3 distribution. This talk reflects on the journey, the team, and the algorithms developed and eventually adopted.

Testing found that arid areas were a particular challenge, while better use of historical information was an objective. Bulletin 17C is a significant advance over Bulletin 17B in the handling of historical information, censored data, zeros and “too-small-values”. Specific improvements are use of the Expected Moment Algorithm (EMA) with the LP3 distribution, treatment of historical and threshold data, identification of Potentially Influential Low Floods (PILFs) for special treatment, uncertainty analysis calculations, and recommended regional GLS skew estimation algorithms. Remaining concerns are flood distribution for sites with mixed populations and very flat basins with negative log-space skews. USGS regional skew studies provide dramatically improved models of log-space regional skew (annual maximum and d-day rainfall-flood maximums) and revealed interesting characteristics of flood hydrology in some mountain regions.