



## Technical Workshop

### Use of Bulletin 17C for Flow Frequency Analysis

Federal Interagency Sedimentation and Hydrologic Modeling Conference

Reno, Nevada

Monday June 24, 2019

1:00 PM to 5:00 PM, *Tuscany II*

Flood-frequency analysis of peak streamflow records provides the essential statistical interpretation of hydrologic data for estimating flood risk and for floodplain mapping. This workshop provides an overview and refresher on flood-frequency analysis of peak streamflow data, as well as introducing methods adopted in the new federal guidelines, Bulletin 17C at <https://doi.org/10.3133/tm4B5>. These new methods include a generalized method-of-moments estimator, the Expected Moments Algorithm (EMA), for dealing with zeroes, low outliers and historical data. It also employs a generalized version of the Grubbs-Beck test (MGB) for the identification of potentially influential low floods (PILFs). Participants will learn about methods implemented in Bulletin 17C, how to properly characterize flood peaks for inclusion in a Bulletin 17C analysis, and how to interpret Bulletin 17C flood frequency analyses. Software with actual examples from Bulletin 17C will be used.

#### Course Instructors:

**USACE Hydrologic Engineering Center**

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**USACE Risk Management Center**

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#### Software and Reference Materials

Bulletin 17C and pertinent references will be provided to participants. Software with actual examples from Bulletin 17C will be used.

**USACE HEC-SSP 2.2** (includes Bulletin 17C and other examples)

<https://www.hec.usace.army.mil/software/hec-ssp/>

**USGS PeakFQ version 7.2** <http://water.usgs.gov/software/PeakFQ/>

Bulletin 17C PeakFQ Examples [http://acwi.gov/hydrology/Frequency/b17c/supplementary-materials/example\\_files.html](http://acwi.gov/hydrology/Frequency/b17c/supplementary-materials/example_files.html)

***Course Attendees are encouraged to bring a Laptop with either package!***

# Use of Bulletin 17C for Flow Frequency Analysis

## Agenda

Monday June 24, 2019

Time	Duration	Topic	Key Concepts	Presenter
1:00 PM - 1:05 PM	5 min	Introductions	Instructors, Agenda, Resources (documents, websites, software, etc)	Mike Bartles
1:05 PM - 1:20 PM	15 min	Flood Frequency Overview	Introduction to at-site flood frequency (moments, quantiles, confidence intervals). What is flood frequency used for (culvert design, floodplain management, etc)?	Dave Margo
1:20 PM - 1:40 PM	20 min	Bulletin 17C Overview	What is Bulletin 17C? Overview of document – what is in it and how used? Main concepts, new things	Mike Bartles
1:40 PM - 1:55 PM	15 min	USGS Peak Flow data and Initial Data Analysis	Peak-flow data – sources, qualification codes Initial Data Analysis – Plotting and Trend test	Greg Karlovits
1:55 PM - 2:05 PM	10 min	Systematic Record Example Demo	Bulletin 17C Systematic Record Example Moose Creek (at site, then with regional skew) <i>Demonstration with HEC-SSP</i> <i>Attendees with software can follow along</i>	Mike Bartles
2:05 PM - 2:20 PM	15 min	Estimating Regional Skew	Regional Skew and its value. Sources of information, states, updates, skews for flow and volume-durations.	Greg Karlovits
2:20 PM - 3:00 PM	40 min	EMA Overview	Expected Moments – what are they? Historical Information, PILFs, Zero flows, confidence intervals.	Dave Margo
3:00 PM - 3:30 PM	30 min	Break – Tuscany A		
3:30 PM - 4:10 PM	40 min	Bulletin 17C Data – Flow Intervals and Perception Thresholds	What are flow intervals and how are they estimated? What are perception thresholds and how are the estimated? Data sources (Appendix 3) <i>Class handout and exercise</i>	Mike Bartles
4:10 PM - 4:20 PM	10 min	Historical Record Example Demo	Bulletin 17C Historical Record Example Arkansas River - Pueblo <i>Demonstration with HEC-SSP</i> <i>Attendees with software can follow along</i>	Mike Bartles
4:20 PM - 4:30 PM	10 min	Historical and PILF Example Demo	Bulletin 17C Historical and PILF Example Santa Cruz River, AZ <i>Demonstration with HEC-SSP</i> <i>Attendees with software can follow along</i>	Mike Bartles
4:30 PM - 4:45 PM	15 min	Record Extension	Extend short records < 20 years with nearby gage	Greg Karlovits
4:15 PM - 5:00 PM	15 min	Questions and Wrap-Up		All

## **Reference Materials**

Bulletin 17C

<https://doi.org/10.3133/tm4B5>

Bulletin 17C Materials

<https://acwi.gov/hydrology/Frequency/b17c/index.html>

Evaluation of Recommended Revision to Bulletin 17B

<https://pubs.er.usgs.gov/publication/ofr20171064>

References, reports, journal articles, and background to Bulletin 17C revisions

<https://sites.google.com/a/alumni.colostate.edu/jengland/bulletin-17c#Refs>