

**Hydrologic Frequency Analysis Work Group (HFAWG) Meeting**  
**September 19-20, 2012**  
**Michael Baker, Jr.**  
**3601 Eisenhower Ave., Alexandria, VA**

The Hydrologic Frequency Analysis Work Group (HFAWG) met at the office of Michael Baker, Jr., 3601 Eisenhower Ave., Alexandria, Virginia on Wednesday afternoon, September 19, and Thursday, September 20. The meeting on September 19 was primarily for the Tester Group (USGS, USBR, USGS and Cornell University) to discuss the status of work and an agenda for the September 20 meeting. Nine people attend the September 19 meeting and three people called in and participated in a Live Meeting. Twelve people attended the September 20 meeting and six people called in and participated in a Live Meeting. The attendees at the September 20 meeting are given in Attachment 1.

As recorded in the minutes of the March 19, 2012 meeting of the HFAWG that are located at (<http://acwi.gov/hydrology/Frequency/>), the issues from the March meeting included the large number of low peaks being identified by the Multiple Grubbs-Beck test and the need for user-friendly software and good documentation for establishing thresholds for historic data and intervals for missing data in applying the Expected Moments Algorithm (EMA).

Following the tone of the March 19 meeting, the two primary topics of discussion at the September 19-20 meetings were the new USGS PeakFQ computer program that implements EMA and the Multiple Grubbs-Beck Test (MGBT) for identifying Potentially Influential Low Flows (PILFs). The meeting on September 20 was the official meeting of the HFAWG and the three major presentations given at that meeting were as follows:

- Andrea Veilleux, USGS, explained the required data and capabilities of the USGS PeakFQ program version 7 that implements EMA/MGBT,
- Nancy Barth, USGS, demonstrated the capabilities of the USGS PeakFQ program version 7 using data for a couple of our 82-station sample that had low outliers and historic data, and
- Jery Stedinger and Jonathan Lamontagne, Cornell University, discussed the concept of robustness and the definition of an outlier and described an alternative way of applying the MGBT.

The presentations by Andrea Veilleux and Jery Stedinger/ Jonathan Lamontagne were provided to the entire HFAWG on September 25 along with:

- a Mini Manual describing the new version 7 of the USGS PeakFQ program and,
- a paper titled "Toward Robust Flood Frequency Procedures: Performanmce of the MGBT Outlier Tests" by Jonthan Lamontagne, Jery Stedinger, and other Cornell University students that was revised on September 24, 2012. This paper describes the testing and basis for adopting a slightly different version of MGBT. This is a revised version of the paper that Jery Stedinger provided to HFAWG members on September 17.

At the March 19, 2012 HFAWG meeting, a few members expressed concern that the MGBT as originally developed and programmed by Tim Cohn, USGS, was identifying too many low flows as being influential. This prompted the research that is described in the September 24, 2012 paper by Cornell University. The MGBT as originally programmed by Tim Cohn consisted of three steps:

- Step 1 - starting at the median and sweeping outwards towards the smallest observation testing each observation with an alpha significance level of 1 percent,
- Step 2 - starting where Step 1 ended and sweeping sequentially inward toward the median testing each observation with an alpha significance level of 10 percent, and
- Step 3 – starting at the smallest observation and sweeping inward toward the median testing each observation with an alpha significance level of 10 percent.
- The number of PILFs identified by the MGBT is the maximum of the three steps.

The recommended changes in the MGBT based on the testing and research at Cornell University is to use an alpha of 0.5 percent for Step 1, to delete Step 2 and to leave Step 3 unchanged. The powerpoint presentation given by Jerry Stedinger and Jonathan Lamontagne at the September 20 meeting illustrated that the original MGBT used in the March 8, 2012 Testing Report has a Type I error rate of 19 percent while the revised test had a Type I error rate of 15 percent. In addition, the revised test has a lesser tendency to identify a large number of PILFs for a given sample.

The HFAWG members in attendance at the September 20 meeting agreed that the revised MGBT proposed by Cornell University was an improvement over the original test and should be included in the new USGS PeakFQ program. As described by Tim Cohn, the objective of the MGB test is to identify PILFs that have high leverage (influence) with respect to the upper end of the frequency curve. This is a different objective than the original Grubbs-Beck test in Bulletin 17B which was intended to identify flows that depart significantly from the trend of the data. The plans for incorporating the revised MGBT are:

- Rerun the 82-station sample with the revised MGBT,
- Rerun the Monte Carlo simulations with the revised MGBT, and
- Update the March 8, 2012 Testing Report by December 1, 2012.

In addition, the USGS will release version 7 of their PeakFQ program to HFAWG members for testing as soon as they are sure it is working correctly. Tim Cohn will finalize the revised computational procedures for the confidence limits by December 1. The MGBT paper has been revised to incorporate the revised test and this paper will be submitted to a technical journal for review as soon as possible.

The future plans are to have another HFAWG meeting in December 2012 to discuss the status of work completed or to have a few webinars to discuss the progress.

Will Thomas  
Chair, HFAWG  
Michael Baker, Jr.  
December 4, 2012

Attachment 1. Attendees at September 20, 2012 meeting of the Hydrologic Frequency Analysis Work Group (HFAWG).

<b>Name</b>	<b>Company/Agency</b>	<b>Telephone</b>
Jerry Coffey	Public	703-944-4845
Robert Mason	USGS	703-648-5305
John England	USBR	303-445-2541
Tim Cohn	USGS	703-395-0204
Nancy Barth	USGS	916-278-3171
Will Thomas	Michael Baker	703-334-4935
Beth Faber	HEC-USACE	530-756-1104 x335
Victor Hom	NWS	301-713-0006 x173
Martin Becker	Self	404-876-3900
Jery Stedinger	Cornell University	607-257-8016
Ken Eng	USGS	703-648-5843
Sanja Perica	NWS/OHD	301-713-1669
<b>By phone/live meeting</b>		
Mike Eiffe	TVA	
Michael Anderson	CA DWR	
Mark Bandurraga	Ventura County	
Bruce Rindahl	Ventura County	
Andrea Vellieux	USGS	
Jonathan Lamontagne	Cornell University	