Nueces BBEST Instream flow subcommittee recommendations from Tuesday, July 5, 2011 conference call

- All subsistence and base flow values in HEFR outputs that are less than 1.0 cfs, would be rounded up to 1.0 cfs.
- All subsistence and base flow values in HEFR that are greater than 1.0 cfs will be rounded to two significant figures. For example, a HEFR output of 1.45 cfs would be rounded to 1.5 cfs. Suggest we round all values below 10,000 cfs to 2 significant figures (ex. round 393 to 390 and 4,750 to 4,800) and all values ≥ 10,000 cfs to 3 significant figures.
- We will continue to show all 3 tiers of base flow and the subsistence flow, regardless of how many values were less than 1.0 cfs. For example, if all the HEFR values for low and medium base flow were less than 1.0 cfs, those values would be rounded to 1.0 cfs. There would still be low base flow and medium base flow tiers but all the values in this example would equal 1.0 cfs.
- If the BBEST provides implementation suggestions to TCEQ and the stakeholders, those suggestions will discuss hydrologic condition, hydrologic triggers, and suggestions that state if the hydrologic condition is wet, diversion of water down to the high base flow would be allowed; if the hydrologic condition is moderate, diversion of water down to the medium base flow would be allowed; if the hydrologic condition is dry, diversion of water down to the dry base flow would be allowed; and if the hydrologic condition is below the dry condition, diversion of water down to subsistence flow would be allowed under extreme and unusual conditions.

Unresolved questions and suggestions:

- For values that are within ±10% of the value in an adjacent season, calculate the average of those values and use the average value in the environmental flow regime. Ex. Winter low base flow is 51 (45.9-56.1) and the spring low base flow is 44 (39.6-48.4), average the two values and round to 2 significant figures to arrive at a winter low base flow and a spring low base flow of 48.
- Should we delete seasonal pulse flows that are lower than base flow values for the same season? Ex. Frio at Derby: the winter and fall, 2/season pulses, are below the high base flows for those seasons and therefore may have questionable ecological value as pulse flows.
- Volume and duration of the 1/yr, 1/2 yr, and 1/5 yr pulses at all sites. My recommendation is to use the upper bound for the volume or the upper bound for the duration depending on which is achieved first. Sam suggested using the central tendency of the volume or the duration depending on which is achieved first.

Dan Opdyke prepared the example below at my request. The example below illustrates the natural log:natural log regression of peak flow (cfs) with volume (acre-feet) for the West Nueces River at Brackettville. The peak flows on the x-axis encompass the range of pulses in the 1 pulse per year category. A pulse from 1,020 cfs up to 4,089 cfs is in the 1 pulse per year category. A pulse of 4,090 cfs is in the 1 pulse per 2 years category. The red line represents the central tendency of the regression and the upper and lower green lines represent the upper and lower bounds that are shown on the HEFR output.

Dan's comments (July 7, 2011): "A 4,000 cfs storm could (a) immediately be diverted down to 1020 cfs, irrespective of the volume or duration passed, and (b) be diverted down to base flow once the volume or duration requirement is achieved. As you note, a typical 4,000 cfs storm event has a much larger volume and duration than a typical 1020 cfs storm event. Thus, if the BBEST requires passage of the central tendency of volume and duration for a 1020 cfs event, that is equivalent to requiring much less than the central tendency of volume and duration for a 4000 cfs event. How much less? …. The 1 per 2 year event is 4090 cfs - which is close enough to 4000 cfs. The central tendency volume of the 4090 cfs event is 25,224 ac-ft. This is approximately 4x the central tendency of the 1020 cfs event, and also approximately 2x the upper bound on the 1020 cfs event. Finally, note that the lower bound for volume of the 4090 cfs event is 12,550 ac-ft, which is essentially identical to the upper bound of the 1020 cfs event.

So…if you required passage of the upper bound for volume of the 1/yr event (i.e., 12938 ac-ft) and a 4,000 cfs storm occurred, you are effectively requiring passage of the lower bound of a typical 4000 cfs event. In the chart above, the central tendency of the 1/yr event (1020 cfs) is signified with a red x on the red line. The green lines are the bounds (3208– 12938 at a flow of 1020 cfs).

Here you can see that the lower bound at 4000 cfs is about the same as the upper bound at 1000 cfs, as I explained above."