

Low Flow\* Volumes (cfs) from streams on Libby Ranger District that have continuous stage recorders.

Water Year	Bobtail Cr.	Pipe Cr.	Quartz Cr.	Himes Cr.	West Fisher Cr.	Fisher River at Cow Cr.	Libby Cr. at US Hwy. 2
2001	2.7 – 3.7	8.5–10.4	11.5-13.1				
2002	2.6 – 3.6	10.4-14.2	10.6-14.2				
2003	2.3 – 2.4	3.9-5.8	2.8-5.3	3.7-5.0	53.1-53.5	48-57	
2004	3.0 – 3.1	10.6-11.6	16.7-20.3	1.4-4.3	19.0-21.4	56.7-64.8	6.3-7.8
2005	1.7 – 1.8	11.5-12.5	17.0-18.0	2.9-3.2	18.0-20.7	36-49	17.7-19
2006	2.3 – 2.7	15.5-16.9	15.2-17.9	7.2-8.2	5.1-6.6	64-74	4.0-5.8

\* Low flow values are from the 2 week period of lowest stage records for the water year, this generally occurs in mid August but a couple of times it was early October. EF = Equipment Failure

I took this information and looked at the range of percentage difference in low flow values for each water year for each site to get an idea of the spread of the values and the overall average of variability in low flow values.

Percent variability in low flow values per year and site

Water Year	Bobtail Cr.	Pipe Cr.	Quartz Cr.	Himes Cr.	West Fisher Cr.	Fisher River at Cow Cr.	Libby Cr. at US Hwy. 2
2001	37-27	22-18.2	13.9-12.2				
2002	38-27	36.5-26.7	33.9-25.3				
2003	4.3-4.2	48.7-32.7	89-47	35.1-26	0.7-0.7	18.7-15.7	
2004	3.3-3.2	9.4-8.6	21.6-17.7	207-67	12.6-11.2	14.2-12.5	23.8-19.2
2005	5.8-5.5	8.7-8.0	5.9-5.5	10.3-9.3	15-13	36.1-26.5	7.3-6.8
2006	17.4-14.8	9.0-8.3	17.7-15.1	13.9-12.2	29.4-22.7	15.6-13.5	45-31
ARV*	17.6-13.6	22.4-17.1	30.3-20.5	66.5-28.6	14.4-11.9	21.2-14.6	25.4-19
OA*	15.6	19.8	25.4	47.6	13.1	17.9	22.2

ARV – Average Range in Values, OA – Overall Average

I then dropped the high and low value data sets (Himes Cr. and West Fisher Cr.) and came up with the following information:

The overall average range in low flow volumes from year to year is between 15.6 to 25.4 percent. The average variability in low flow values is 20.1 percent.

I suggest we consider using 20% as the value of the cutoff for display purposes in the *Final Numerical Model Report of the Montanore Mine Area Hydrogeology*. Any value larger than 20% of modeled low flow would be considered as something outside the normal range of variability and any potential effects of the change could be discussed in the analysis.

Steve Wegner  
 Libby District Hydrologist  
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