

March 23, 2011

Ms. Celinda Adair
Risk Map Program Manager
Montana Department of Natural Resources
1424 9th Avenue
P.O. Box 201601
Helena, MT 59620

Dear Ms. Adair:

With a letter from Butte-Silver Bow County dated December 30, 2010 the County submitted an Existing Data Study on the Big Hole River in Butte-Silver Bow County, MT. To date we have received and reviewed the following information:

- “Floodplain Management Study – Big Hole River – Silver Bow County, MT,” prepared by the United States Department of Agriculture Soil Conservation Service (SCS), dated December 1986.
- Big Hole River Floodplain Management Study Supporting Documentation (189 pages), prepared by the SCS.
- Big Hole River Floodplain Management Study Flood Frequency Analysis, J407 Computer Program hardcopy input and output files (148 pages), prepared by the SCS.
- Big Hole River Floodplain Management Study Hydraulic Analysis, WSP2 Computer Program hardcopy input and output files (530 pages), prepared by the SCS

Under direction of the FEMA Region VIII office, we have completed a full review of the submitted information. The purpose of this letter is to summarize our review comments and provide corresponding documentation of our review.

Hydrologic Analysis

The above referenced study included a hydrologic analysis for the Big Hole River in Butte-Silver Bow County, MT. The hydrologic analysis was completed by conducting a flood frequency analysis at USGS gage 06025500 along with completing flood frequency analyses at 28 other regional gages and developing regression equations from the results. The study and backup data include: drainage area computations and maps, a discussion of the regional gage analysis including the recommended regression equations, a comparison with other studies, output from the regression program, comparison plots of the regression lines with the gage data, gages used in the analysis along with the results of the frequency analysis at the gages, a copy of the 1980 USACE hydrology report, a copy of gage data from USGS, and an analysis of the effects of the Pattengail Dam Breach of 1927 on the discharges of the Big Hole and Jefferson Rivers. Table 1 provides a summary of the recommended 1-percent-annual-chance discharges for the Big Hole River at various locations.

Table 1. Recommended Discharges for the Big Hole River at various locations

Flooding Source	Location	Contributing Area (sq. mi.)	100-yr (cfs)
Big Hole River	Lower end of Study below Trapper and Camp Creeks	2,365	16,820
Big Hole River	Just above Trapper and Camp Creeks	2,282	15,930
Big Hole River	Just below Moose Creek	2,250	15,800
Big Hole River	Just below Divide Creek	2,146	15,350
Big Hole River	Just above Divide Creek	2,054	14,950
Big Hole River	Just below Jerry Creek	1,999	14,710
Big Hole River	Just below the Wise River	1,942	14,450
Big Hole River	Just above the Wise River	1,682	13,250
Big Hole River	Upper end of the Study	1,609	12,900

The hydrologic analysis is well documented and meets FEMA's Guidelines and Specifications; however, the age of the study was cause for concern. Because of the age of the study, the recommended discharges were compared to the results from an analysis using the current USGS regression equations and an updated frequency analysis of USGS gage 06025500 (Big Hole River near Melrose) to determine if they are still reasonable. The comparisons yielded favorable results. The hydrologic analysis methodologies documented in the above referenced information appear appropriate and the recommended discharges appear reasonable.

Hydraulic Analysis

The above referenced study included a hydraulic analysis of approximately 35 miles of the Big Hole River from just upstream of Melrose, MT to the Southwest corner of Butte-Silver Bow County. The analysis was completed using the WSP2 computer program developed by the SCS. Hardcopies of the WSP2 input and output files, floodplain mapping, water surface profiles, and selected cross section plots were included in the documentation. Overall, we found the above referenced study and supporting materials to be well documented and the results. However there is one issue that should be addressed before the study is incorporated.

- It appears as if the Union Pacific Railroad is acting as a Non Levee Embankment in the vicinity of hydraulic model cross section AE just downstream of the confluence with Divide Creek. The low lying area to the East of the Railroad should be included in the 1-percent-annual chance floodplain unless it can be demonstrated that the ground behind the railroad embankment is above the approximate Base Flood Elevation.

The results of our review, summarized above, were discussed with representatives from the MT DNRC, Butte-Silver Bow County, FEMA Region VIII, and PBS&J via conference call and internet presentation on February 10, 2011.

We consider our review of the above referenced study complete, and recommend that it be incorporated into the Butte-Silver Bow County Preliminary Digital Flood Insurance Rate Map (DFIRM) as an Approximate Zone A. I would be happy to discuss this review in further detail with you if you are interested. If you have any questions or comments regarding this letter, please contact me at 720.514.1102.

Sincerely,

A handwritten signature in black ink that reads "Kevin P. Doyle". The signature is written in a cursive style with a large, stylized initial 'K'.

Kevin Doyle, P.E., CFM
Project Manager

Cc: Ms. Sara Brush, Mr. Dan March, Ms. Carrie Higinbotham, Mr. Steve Story