

QUARTERLY REPORT

(Fourth Quarter Federal Fiscal Year 2010: July–September, 2010 & First Quarter Federal Fiscal Year 2011: October–December, 2010)

Activities conducted by the U.S. Geological Survey for the project:

FLOOD-FREQUENCY ANALYSES FOR U.S. GEOLOGICAL GAGING STATIONS BASED ON DATA THROUGH WATER YEAR 2009

I. Introduction

This report summarizes planned activities and work conducted by the U.S. Geological Survey (USGS) during the reporting quarters for the project: Flood-Frequency Analyses for U.S. Geological Survey Gaging Stations Based on Data through Water Year 2009. This project is cooperatively funded through Montana Department of Transportation (MDT), Montana Department of Natural Resources and Conservation (DNRC), and the USGS Cooperative Water Program (<http://water.usgs.gov/coop/>).

General project information is presented in tables 1 and 2. Table 1 presents abbreviated versions of the project objectives and tasks for the quarters reviewed. The tasks presented in table 1 are the same as those presented in the Scope of Work to facilitate tracking of project activities and expenses. Table 2 presents the project budget by State and Federal fiscal year as presented in the Scope of Work.

II. Planned activities for the reporting quarters

Work was scheduled to be conducted on the following tasks (table 1) during the reporting quarter:

Fourth Quarter Fiscal Year 2010 (July–September, 2010):

1. Conduct and document standard log-Pearson III flood frequency analyses for about 650 USGS gaging stations.
 - 1a. Document regulatory structures that influence peak flows at gaging stations.
 - 1b. Construct table of regulating structures and stations influenced.
 - 1c. Retrieve and format peak-flow data.
 - 1d. Perform flood-frequency analyses.

First Quarter Federal Fiscal Year 2011 (October–December, 2010)

1. Conduct and document standard log-Pearson III flood frequency analyses for about 650 USGS gaging stations.
 - 1d. Perform flood-frequency analyses.
 - 1e. Construct figures and tables of frequency results and accompanying documentation.
2. Investigate application of record-extension methods for improving flood-frequency estimates for short-term gaging stations.
 - 2a. Identify gaging stations with less than 15 years of record or with longer periods of record but substantially influenced by unusual climatic conditions.
 - 2c. Conduct Bulletin 17b 2-station analyses and MOVE.1 analyses for record extension.
4. Investigate application of regional mixed-populations analyses for Montana.
 - 4a. Investigate occurrence of high-outlier peak flows in northwestern Montana and define mixed-population region.

Work activities conducted on these tasks during the reporting quarter are summarized in the following sections of this progress report.

Table 1. Project schedule by task.

Work tasks	Milestone dates	FY 2010			FY 2011		
		J	A	S	O	N	D
Project commencement	07/15/10	X					
1. Conduct and document standard log-Pearson III flood frequency analyses for about 650 USGS gaging stations		X	X	X	X	X	X
1a. Document regulatory structures that influence peak flows at gaging stations		X	X	X			
1b. Construct table of regulating structures and stations influenced		X	X	X			
1c. Retrieve and format peak-flow data		X	X				
1d. Perform flood-frequency analyses			X	X	X	X	X
1e. Construct figures and tables of frequency results and accompanying documentation							X
2. Investigate application of record-extension methods for improving flood-frequency estimates for short-term gaging stations						X	X
2a. Identify gaging stations with less than 15 years of record or with longer periods of record but substantially influenced by unusual climatic conditions						X	X
2b. Conduct correlation analyses to determine appropriate index stations						X	X
2c. Conduct Bulletin 17b 2-station analyses and MOVE.1 analyses for record extension							X
4. Investigate application of regional mixed-populations analyses for Montana					X	X	X
4a. Investigate occurrence of high-outlier peak flows in northwestern Montana and define mixed-population region					X	X	X

Table 2. Project budget by State and Federal fiscal years as presented in the original Scope of Work.

State fiscal year	USGS	MDT	MDNRC	TOTAL
2011	\$48,750	\$56,875	\$16,250	\$121,875
2012	\$39,800	\$55,950	\$3,750	\$99,500
2013	\$11,450	\$17,175	\$0	\$28,625
TOTAL	\$100,000	\$130,000	\$20,000	\$250,000
Federal fiscal year	USGS	MDT	MDNRC	TOTAL
2010	\$18,000	\$22,000	\$5,000	\$45,000
2011	\$41,000	\$46,500	\$15,000	\$102,500
2012	\$41,000	\$61,500	\$0	\$102,500
TOTAL	\$100,000	\$130,000	\$20,000	\$250,000

III. Project activities conducted during the reporting quarter presented by task

1a. Document regulatory structures that influence peak flows at gaging stations.

The USGS received a GIS coverage of dams from the Montana Department of Environmental Quality in November 2010. This GIS coverage is an extensive list of reservoirs and diversion dams in Montana and includes 3,667 dams. Each of these dams have several attributes including the name, owner, year built, storage capacity and drainage area which are essential attributes for completion of this task. The USGS has not previously used such an extensive list of reservoirs to determine which stream gages have upstream storage and thus may be affected by dams. A systematic approach was developed to evaluate the effect of these dams on each gaging station. This systematic approach requires a large amount of GIS work which began in late December and has been completed for approximately 94 gages as of January 10, 2011.

1b. Construct table of regulating structures and stations influenced.

The systematic approach being used in task 1a will result in a table of regulatory structures for each gage. Task 1b has been completed for 94 gages as of January 10, 2011.

1c. Retrieve and format peak flow data.

Peak flow data have been retrieved and formatted for approximately 150 gages. A majority of these gages have been identified as having little or no impact from upstream regulatory structures. The peak flow data retrieval and formatting for the remaining gages (~500) will likely be affected by impacts from upstream regulatory structures identified in tasks 1a and 1b.

1d. Perform flood frequency analyses.

Flood frequency analyses have been performed for approximately 150 gages. A majority of these gages have been identified as having limited or no impact from upstream regulatory structures.

1e. Construct figures and tables of frequency results and accompanying information

An internal document has been created to track the results and accompanying information for each gage when the flood frequency analyses are performed. This document will be used to develop presentation quality figures and tables upon completion of the analyses task.

2a. Identify gaging stations with less than 15 years of record or with longer periods of record but substantially influenced by unusual climatic conditions

This task is performed while performing the basic flood frequency analyses for each gage. None of the 150 gages for which basic flood frequency analyses have been performed have been identified as having fewer than 15 years of record or records that are influenced by unusual climatic conditions.

2b. Conduct correlation analyses to determine appropriate index stations

No correlation analyses have been evaluated.

2c. Conduct Bulletin 17b 2-station analyses and MOVE.1 analyses for record extension

No 2-station analyses or MOVE.1 analyses have been performed.

2c. Investigate occurrence of high-outlier peak flows in northwestern Montana and define mixed-population region

An investigation of high-outlier peak flows in northwestern Montana has not begun.