WASHINGTON DEPARTMENT OF ECOLOGY

ENVIRONMENTAL ASSESSMENT PROGRAM

FRESHWATER MONITORING UNIT

STREAM DISCHARGE TECHNICAL NOTES

STATION ID: 29F050

STATION NAME: Bear Creek

WATER YEAR: 2009

AUTHOR: Howard Christensen

Introduction

Watershed Description

Ecology's telemetry stream gage on Bear Creek watershed, located at river mile 1.0, is mainly on Forest Service land that is mostly forested with some logging being conducted. Bear Creek channel is made up of bedrock with medium to large boulders and small patches of gravel and cascading water.

Gage Location

Gage is about 80 feet upstream from a private bridge on the left bank. Staff gage and laser level readings were made on a biweekly basis for the duration of the period of record. Flow measurements were taken upstream 150 ft. above gage house.

Table 1.

Drainage Area (square miles)	15
Latitude (degrees, minutes, seconds)	45 45 50
Longitude (degrees, minutes, seconds)	121 49 32

Discharge

Table 2. Discharge Statistics.

Mean Annual Discharge (cfs)	40
Median Annual Discharge (cfs)	17
Maximum Daily Mean Discharge (cfs)	394
Minimum Daily Mean Discharge (cfs)	1.9
Maximum Instantaneous Discharge (cfs)	508
Minimum Instantaneous Discharge (cfs)	1.9
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	106
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	2.8
Number of Days Discharge is Greater Than Range of Ratings	5
Number of Days Discharge is Less Than Range of Ratings	0

Note: Statistics displayed in Table 2 may not include values in which the predicted discharge exceeds the range of ratings.

Narrative

Seven days were data that was estimated based on other stations; 25 days above rating are reliable extrapolations; one day is below rating but reliable extrapolation; two days were estimated; and five were unreported days due to exceeding the rating table and unreliable data.

Error Analysis

Table 3. Error Analysis Summary.

Logger Drift Error (% of discharge)	5
Weighted Rating Error (% of discharge)	14.5
Total Potential Error (% of discharge)	19.5

Rating Table(s)

Table 4. Rating Table Summary

Rating Table No.	1		
Period of Ratings	06/18/08 to 03/10/11		
Range of Ratings (cfs)	0.86 to 735		
No. of Defining Measurements	20		
Rating Error (%)	17.5		

Rating Table No.			
Period of Ratings			
Range of Ratings (cfs)			
No. of Defining Measurements			
Rating Error (%)			

Rating Table No.			
Period of Ratings			
Range of Ratings (cfs)			
No. of Defining Measurements			
Rating Error (%)			

Narrative

A total of 12 flow measurements were taken ranging from 1.71 cubic feet per second (cfs) to 176 cfs.

Stage Record

Table 5. Stage Record Summary

Minimum Recorded Stage (feet)	3.43
Maximum Recorded Stage (feet)	8.89
Range of Recorded Stage (feet)	5.46
Number of Un-Reported Days	0
Number of Days Qualified as Estimates	2
Number of Days Qualified as Unreliable Estimates	0

Narrative

Five days of missing data was caused by exceeding the rating table; and five days of data was replaced by another station due to station problems.

Modeled Discharge

Table 6. Model Summary

Model Type (Slope conveyance, other, none)	
Range of Modeled Stage (feet)	
Range of Modeled Discharge (cfs)	
Valid Period for Model	
Model Confidence	

Surveys

Table 7. Survey Type and Date (station, cross section, longitudinal)

Type	Date
RPM, Cross Sec.,Long	2009

Activities Completed

More flow measurements are needed at this station to augment both the high and low ends of the rating curve. Survey cross section and stream profile help in modeling higher flows.