

WASHINGTON DEPARTMENT OF ECOLOGY
ENVIRONMENTAL ASSESSMENT PROGRAM
FRESHWATER MONITORING UNIT
STREAM DISCHARGE TECHNICAL NOTES

STATION ID: 25F060
STATION NAME: MILL CREEK
WATER YEAR: 2005
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Introduction

Watershed Description

Mill Creek is one of three watersheds in the Lower Columbia River Intensively Monitored Watersheds project complex. Over 95% of the underlying lithology is of volcanic origin, consisting primarily of flow basalts with interbedded sandstone. The basin is rain dominated with an average annual precipitation rate of 160 centimeters. Focal species within the drainage include coho, chinook, chum, steelhead, and cutthroat. Land cover is 94% forested. Sixty-eight percent of the forested lands are managed by the Department of Natural Resources, and 32% are managed by private landowners. Road density estimates in the complex range from 4.2 to 5.8 miles per square mile.

Gage Location

The monitoring station on Mill Creek is located at the Mill Creek Road bridge approximately 0.3 miles upstream from the confluence with the Columbia River.

Table 1.

Drainage Area (square miles)	30.5
Latitude (degrees, minutes, seconds)	46 11 26 N
Longitude (degrees, minutes, seconds)	123 10 43 W

Discharge

Table 2. Discharge Statistics.

Mean Annual Discharge (cfs)	70
Median Annual Discharge (cfs)	59
Maximum Daily Mean Discharge (cfs)	614
Minimum Daily Mean Discharge (cfs)	6.0
Maximum Instantaneous Discharge (cfs)	812
Minimum Instantaneous Discharge (cfs)	5.5
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	133
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	9.5
Number of Days Discharge is Greater Than Range of Ratings	0
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

A continuous discharge record was produced for WY2005 by coupling the stage record to two separate rating curves. Error analysis of the rating curves estimates a potential error in discharge of plus or minus 9.4%

Error Analysis

Table 3. Error Analysis Summary.

Logger Drift Error (% of discharge)	d/n/a
Weighted Rating Error (% of discharge)	9.4
Total Potential Error (% of discharge)	9.4

Rating Table(s)

Table 4. Rating Table Summary

Rating Table No.	1	2	
Period of Ratings	10/01-06/08	06/09-09/30	
Range of Ratings (cfs)	6.5-994	5.5-994	
No. of Defining Measurements	6	14	
Rating Error (%)	9.5	9.3	

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

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

Narrative

Two rating curves (1 and 2) covered all of WY2005. Due to a lack of discrete discharge measurements in early WY2005, a rather long phased period between ratings 1 and 2 persisted until June 9, 2005. A discharge measurement conducted in June 2005 revealed a slight shift in the rating, marked by relatively minor scouring of the control. Discharge measurements conducted in August and September of 2005 confirmed the slight shift in the rating. The largest storm event of the water year peaked on January 18, 2005.

Stage Record

Table 5. Stage Record Summary

Minimum Recorded Stage (feet)	1.67
Maximum Recorded Stage (feet)	4.86
Range of Recorded Stage (feet)	3.19
Number of Un-Reported Days	0
Number of Days Qualified as Estimates	122
Number of Days Qualified as Unreliable Estimates	0

Narrative

Gaps in the stage record caused by power failure and firmware issues were typically filled using well-correlated stage data from either the Germany Creek or Abernathy Creek stations. Smaller gaps in the stage record were filled using linear interpolation. Backwater and tidal effects from the Columbia River can impact the stage record. These effects were manually edited from the record. A series of one-day gaps caused by the "date advance syndrome," a problem within the datalogger--operating firmware, were typically filled using linear interpolation. All records associated with these edits were considered estimates.

Modeled Discharge

Table 6. Model Summary

Model Type (Slope conveyance, other, none)	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
Station	09/28/2005

Activities Completed

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