

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

STATION ID: 25F060
STATION NAME: Mill Creek
WATER YEAR: 2006
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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)	91
Median Annual Discharge (cfs)	51
Maximum Daily Mean Discharge (cfs)	634
Minimum Daily Mean Discharge (cfs)	5.5
Maximum Instantaneous Discharge (cfs)	881
Minimum Instantaneous Discharge (cfs)	5.5
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	264
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	7.4
Number of Days Discharge is Greater Than Range of Ratings	3
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

Three of the days on which the highest predicted discharge occurred (January 10, 11, and 30) were excluded from the statistics in Table 2. Discharge was predicted by coupling two rating curves for the water year to the continuous stage record. Two storm events in January 2006 of nearly equal magnitude were the largest of the water year. After small storm events in late February and June, the discharge declined steadily to base-flow conditions near the end of the water year.

Error Analysis

Table 3. Error Analysis Summary.

Logger Drift Error (% of discharge)	d/n/a
Weighted Rating Error (% of discharge)	9.3
Total Potential Error (% of discharge)	9.3

Rating Table(s)

Table 4. Rating Table Summary

Rating Table No.	2	3	
Period of Ratings	10/01-02/13	02/13-09/30	
Range of Ratings (cfs)	5.5-994	5.5-994	
No. of Defining Measurements	14	14	
Rating Error (%)	9.3	9.3	

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

Two ratings (2 and 3) covered Water Year (WY) 2006. Rating 2 shifted slightly to Rating 3 following the storm events of January 2006. Relatively minor scour of the control resulted in the shift. Discharge measurements conducted in February, April, June and August of 2006 confirmed the low-end change in the rating.

Stage Record

Table 5. Stage Record Summary

Minimum Recorded Stage (feet)	1.25
Maximum Recorded Stage (feet)	5.24
Range of Recorded Stage (feet)	3.99
Number of Un-Reported Days	3
Number of Days Qualified as Estimates	70
Number of Days Qualified as Unreliable Estimates	0

Narrative

Discharge was not predicted for three days in WY2006 because, for brief periods during each day, the recorded stage exceeded the stage associated with twice the highest measured discharge. Gaps in the stage record caused by power-supply failure and firmware issues were filled using regressed, well-correlated stage data from the Germany and Abernathy Creek stations. Smaller gaps were filled using linear interpolation. All records associated with these edits were considered estimates. Tidal spikes were manually edited from the record.

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	10/04/2006

Activities Completed

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