

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

STATION ID: 25F060
STATION NAME: Mill Creek
WATER YEAR: 2010
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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 percent 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 63 inches. Focal species within the drainage include Coho, Chinook, chum, steelhead, and cutthroat. Land cover is 94 percent 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)	102
Median Annual Discharge (cfs)	85.3
Maximum Daily Mean Discharge (cfs)	573
Minimum Daily Mean Discharge (cfs)	6.6
Maximum Instantaneous Discharge (cfs)	638
Minimum Instantaneous Discharge (cfs)	6.6
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	230
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	14
Number of Days Discharge is Greater Than Range of Ratings	1
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

The statistics within Table 2 do not include one day in water year (WY)2010,--November 17 2009. The discharge was not predicted for that day because approximately four of the 96 recorded stage values exceeded the effective rating curve. The predicted discharge record for the remainder of the water year is continuous. Water year 2010 was a relatively dry year marked by several rather small events. The largest discharge event of the water year occurred in November 2009, peaking on the 17th. Discharge for Mill Creek began the steady decline to summer baseflow in mid-June 2010. Baseflow for WY2010 occurred in late August. A small event in early September was followed by several events during the month, refreshing discharge levels to just above baseflow. Discharge levels in September may have been high enough to allow for adult salmonid escapement to upstream reaches within the watershed.

Error Analysis

Table 3. Error Analysis Summary.

Logger Drift Error (% of discharge)	4.0
Weighted Rating Error (% of discharge)	10.5
Total Potential Error (% of discharge)	14.5

Rating Table(s)

Table 4. Rating Table Summary

Rating Table No.	6	7	
Period of Ratings	10/01-11/17	11/16--09/30	
Range of Ratings (cfs)	0.001-594	0.001-733	
No. of Defining Measurements	7	10	
Rating Error (%)	11.6	10.4	

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)			
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Rating Error (%)			

Narrative

Two rating curves used with the stage record predicted discharge for WY2010. Rating 6 covered the start of the water year and persisted until mid-November 2009. The largest storm event of the water year which peaked on November 17th scoured the control. Rating 7, which proved to be a relatively robust rating, covered the remainder of the water year. The phased period between Ratings 6 and 7 is less than a day in duration. This period captures the rising limb of the mid-November event.

Stage Record

Table 5. Stage Record Summary

Minimum Recorded Stage (feet)	1.31
Maximum Recorded Stage (feet)	3.75
Range of Recorded Stage (feet)	2.44
Number of Un-Reported Days	1
Number of Days Qualified as Estimates	12
Number of Days Qualified as Unreliable Estimates	0

Narrative

The stage record for WY2010 is continuous and complete. One day, (November 17th 2009),- recorded stage values, but they were not used to predict discharge for that day. Five days were quality coded as estimates, and seven were quality-coded as questionable estimates. Differences between the recorded stage value and the observed primary gage index (staff gage) exceeded error thresholds for those twelve days. The stage range for Mill Creek during WY2010 is relatively small compared to past years.

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

Activities Completed

Mill Creek is one of three stations comprising the Lower Columbia River complex for the Intensively Monitored Watersheds (IMW) project. A MS5 Hydrolab was installed on October 7, 2009.