

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

**STATION ID:** 46B060  
**STATION NAME:** Roaring Creek near Mouth  
**WATER YEAR:** 2012  
**AUTHOR:** Tyler W. Burks

**Introduction**

Watershed Description

Roaring Creek is a minor tributary, approximately 6% of the drainage area of the Entiat River, and enters the watershed at river mile 5.7. The watershed is bound at its headwaters by Chumstick Mountain (5820 ft) to the west, Roaring Ridge to the north, and Dinkleman Ridge to the south. Land cover above the gage consists of predominantly coniferous forest and shrub-steppe habitats, but also includes riparian woodlands and bedrock/talus slopes. Below the gage rangeland and fruit orchards predominate. Mean annual precipitation across the watershed above this gage location is 33 inches (U.S. Weather Bureau, 1965).

Gage Location

The telemetered stream gaging station on Roaring Creek was installed on September 27, 2002. The gage is located off Roaring Creek Road, approximately 0.80 miles upstream of its confluence with the Entiat River, on the left bank.

Table 1.

Drainage Area (square miles)	25 (USGS, 2015)
Latitude (degrees, minutes, seconds)	47°41'15" N
Longitude (degrees, minutes, seconds)	120°19'56" W

**Discharge**

Table 2. Discharge Statistics.

Mean Annual Discharge (cfs)	7.0
Median Annual Discharge (cfs)	2.5
Maximum Daily Mean Discharge (cfs)	54
Minimum Daily Mean Discharge (cfs)	0.20
Maximum Instantaneous Discharge (cfs)	62
Minimum Instantaneous Discharge (cfs)	0.10
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	23
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	0.35
Number of Days Discharge is Greater Than Range of Ratings	0
Number of Days Discharge is Less Than Range of Ratings	27

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

**Narrative**

Eight discharge measurements were taken, ranging from 0.29 to 54.4 cfs. Snowmelt runoff began mid-March, and reached its peak on April 26, 2012, after a period of very hot weather. The minimum discharge was recorded during baseflow conditions on September 02, 2012. Twenty-seven days in August were below half of the lowest measured discharge, resulting in a discharge that is less than the value reported.

## Error Analysis

Table 3. Error Analysis Summary.

Logger Drift Error (% of discharge)	16.5%
Weighted Rating Error (% of discharge)	17.1%
Total Potential Error (% of discharge)	33.6%

## Rating Table(s)

Table 4. Rating Table Summary

Rating Table No.	13	14	131
Period of Ratings	10/01/2011-11/08/2011	10/20/2011-04/26/2012	03/08/2012-09/30/2012
Range of Ratings (cfs)	0.03-2490	0.36-2490	0.03-2490
No. of Defining Measurements	14	9	14
Rating Error (%)	16.9%	17.4%	16.9%

Rating Table No.	141		
Period of Ratings	9/04/2012-9/30/2012		
Range of Ratings (cfs)	0.36-2490		
No. of Defining Measurements	9		
Rating Error (%)	17.4%		

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

## Narrative

The water year began with Table 13, carrying over from the previous water year. Table 13 was phased into Table 14 as gradual accumulation of silt and leaves filled the control during October. In early March, Table 14 was phased into Table 131 (a clone of Table 13) across the onset of spring runoff which scoured the control. In early September, Table 131 was phased into Table 141, as sediment and leaves gradually filled the control. The water year ended in the middle of the phased period, and Table 141 was not fully applied to the record until October 10, 2012.

## Stage Record

Table 5. Stage Record Summary

Minimum Recorded Stage (feet)	0.48
Maximum Recorded Stage (feet)	2.24
Range of Recorded Stage (feet)	1.76
Number of Un-Reported Days	11
Number of Days Qualified as Estimates	143
Number of Days Qualified as Unreliable Estimates	0

## Narrative

Eleven days were unreported due to an ice-impacted channel, in which the stage-discharge relationship was not valid. The stage record is considered an estimate for 143 days during the water year. One hundred and thirty of those days were qualified as estimates because the logger drift exceeded 20 percent, and the difference in reported discharge was greater than 0.50 cfs. The remaining 13 qualified days occurred near periods of ice-impacted data prior to the first ice-free gage observation.

## Modeled Discharge

Table 6. Model Summary

Model Type (Slope conveyance, other, none)	Slope Conveyance
Range of Modeled Stage (feet)	---
Range of Modeled Discharge (cfs)	---
Valid Period for Model	---
Model Confidence	Not Usable

## Surveys

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

Type	Date
Station/X-Section/Long.	10/20/2011

## Activities Completed

The slant pipe was reanchored on 10/11/11. Station levels and high flow model survey were conducted on 10/20/11. The high flow model was unusable because of a lack of channel control measurements.