

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

**STATION ID:** 19E060  
**STATION NAME:** Deep Creek  
**WATER YEAR:** 2012  
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**Introduction**

Watershed Description

The Deep Creek watershed contains one of three stations in the Intensively Monitored Watersheds (IMW) project Strait of Juan de Fuca complex. The stream is approximately 7.9 miles long, the basin area is 17.3 square miles. Watershed elevations range from sea level to 3,020 feet. Precipitation falls primarily as rain between October and May, averaging 86 inches annually. Crescent formation volcanic rocks in the upper watershed, and marine sedimentary rock overlain by terraces of glacial deposits in the lower watershed, coarsely define the complex geology of the watershed. The primary land use for the last century has been commercial forestry. Three vegetation zones define the basin--Sitka spruce in the valley bottoms, Western hemlock in the low to mid elevations, and Silver fir in the headwaters. The fish species present include Coho salmon, chum salmon, steelhead or rainbow trout, cutthroat trout, Pacific lamprey, western brook lamprey, torrent sculpin, and reticulate sculpin.

Gage Location

The gaging station for Deep Creek is located in Clallam County, Washington, approximately 27 miles west of Port Angeles. Deep Creek is a tributary to the Strait of Juan de Fuca. The gage, placed on the left bank, is on the downstream side of the Highway 112 bridge at approximately river mile 0.2. The stage record is tidally influenced. Tidal spikes in the stage record are removed.

Table 1.

Drainage Area (square miles)	17.3
Latitude (degrees, minutes, seconds)	48 10 21 N
Longitude (degrees, minutes, seconds)	124 01 36 W

**Discharge**

Table 2. Discharge Statistics.

Mean Annual Discharge (cfs)	80
Median Annual Discharge (cfs)	33
Maximum Daily Mean Discharge (cfs)	762
Minimum Daily Mean Discharge (cfs)	4.9
Maximum Instantaneous Discharge (cfs)	951
Minimum Instantaneous Discharge (cfs)	4.9
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	207
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	5.4
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**

Due to rating curve exceedances, the highest day of the water year(WY) in the predicted discharge record was excluded from some statistics in Table 2. The mean annual discharge, median annual discharge, maximum daily mean discharge, and maximum instantaneous discharge in Table 2 are less than the actual values. Rain events in early October lifted discharge quickly from baseflow conditions. The highest discharge of the water year occurred on November 23, 2011; however this event was relatively small. Lesser storm events persisted through the winter and spring. Smaller events in June, and even early July, delayed the decline to baseflow levels. Low flow conditions persisted until the end of the water year. September was very dry.

**Error Analysis**

Table 3. Error Analysis Summary.

Logger Drift Error (% of discharge)	2.7
Weighted Rating Error (% of discharge)	9.2
Total Potential Error (% of discharge)	11.9

**Rating Table(s)**

Table 4. Rating Table Summary

Rating Table No.	9	10	
Period of Ratings	10/01-10/28	10/10-09/30	
Range of Ratings (cfs)	0-988	5.0-988	
No. of Defining Measurements	22	22	
Rating Error (%)	9.2	9.2	

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

Rating 9 predicted discharge at the start of the water year. Somewhat surprisingly, a relatively small event in late October scoured the control slightly resulting in shift to a new rating 10. Rating 10 predicted discharge for the remainder of the water year. Ratings 9 and 10 have proven over time to be robust, well-developed rating curves.

## Stage Record

Table 5. Stage Record Summary

Minimum Recorded Stage (feet)	0.72
Maximum Recorded Stage (feet)	6.85
Range of Recorded Stage (feet)	6.13
Number of Un-Reported Days	1
Number of Days Qualified as Estimates	6
Number of Days Qualified as Unreliable Estimates	0

## Narrative

The stage record was continuous and complete for WY2012. One day was excluded from discharge record predictions because all or some of the recorded stage values for the day exceeded rating curve thresholds. Discrepancies between the logged record and the primary gage index observations were reconciled using an automated data shift procedure. Frequent tidal spikes in the stage record were manually edited. A large, 90-day gap in the stage record due to failing equipment was filled using very well-correlated, regressed stage data from the gaging station on the East Twin River.

## 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

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