

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

STATION ID: 19C060
STATION NAME: West Twin River
WATER YEAR: 2005
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Introduction

Watershed Description

The West Twin River station is a stand-alone, continuously recording gaging station that has been operating since June 2004 in Water Resource Inventory Area (WRIA) 19. Like the other two drainages within the Strait of Juan de Fuca complex (East Twin River and Deep Creek) , West Twin River is very dynamic and carries substantial loads of bed material and large woody debris during precipitation--driven storm events which typically occur from November through February. The basin geology is composed of Crescent Formation volcanic rock in the upper watershed, marine sedimentary rock in the lower watershed, and terraces of glacial deposits in the lower floodplain (ONF 2002).

Gage Location

The gaging station is located in Clallam County, Washington approximately 20 miles west of Port Angeles. The station is on the left bank approximately 0.2 miles upstream from the mouth.

Table 1. Basin Area and Legal Description

Drainage Area (square miles)	12.7
Latitude (degrees, minutes, seconds)	48 09 47
Longitude (degrees, minutes, seconds)	123 57 10

Table 2. Discharge Statistics.

Mean Annual Discharge (cfs)	30
Median Annual Discharge (cfs)	27
Maximum Daily Mean Discharge (cfs)	71
Minimum Daily Mean Discharge (cfs)	5.6
Maximum Instantaneous Discharge (cfs)	76
Minimum Instantaneous Discharge (cfs)	5.1
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	54
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	16
Number of Days Discharge is Greater Than Range of Ratings	56
Number of Days Discharge is Less Than Range of Ratings	0
Number of Un-Reported Days	240
Number of Days Qualified as Estimates	3
Number of Modeled Days	0

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

Table 2 Discussion (Discharge Statistics)

The most significant event related to predicted discharge for WY2005 at the West Twin River station was the large gap in data which began on 3/31/2005 and persisted to and through 9/30/2005. Dewatering of the sensors began on 03/31/2005 and continued through the end of the water year until the station was re-located in October 2005 approximately 100 meters downstream. Before dewatering, two significant hydrologic events occurred and were recorded at the station--one in December 2004, the other in January 2005. Both of these events appear to have scoured the channel which may have assisted in sensor dewatering. Baseflow conditions only persisted until early October 2004 when a series of small but significant events elevated stage above late-summer low flows. The large number of missing days for the Water Year renders the annual statistics displayed above almost meaningless for inclusion in future trend analysis.

Table 3. Error Analysis Summary.

Potential Logger Drift Error (% of discharge)	1.9
Potential Weighted Rating Error (% of discharge)	8.3
Total Potential Error (% of discharge)	10.2

Table 3 Discussion (Error Analysis)

Total Potential Error (TPE) is the cumulative value of the potential logger drift error and the potential weighed rating error. Error surrounding any predicted discharge value is acquired in a number of ways, ranging from variability in the quality of any particular discrete discharge measurement to the operational performance of a datalogger and the sonde measuring stage. Total Potential Error defines the expected range for any predicted discharge value. For example, if the TPE is 10.0 % and the predicted discharge value is 100 cfs, the range in which the actual predicted value lies is 90 to 110 cfs. The logger drift error component of the total potential error was relatively small for WY2005. For 68 of the recorded days, the agreement between the stage on the logger and discrete observations of the primary gage index met standards defining stable drift. Three days were quality coded as estimated due to logger drift error exceedances. The potential weighted rating error of 8.3 % was an average of the two ratings in effect during WY2005.

Table 4. Stage Record Summary

Minimum Recorded Stage (feet)	0.47
Maximum Recorded Stage (feet)	4.26
Range of Recorded Stage (feet)	3.79

Table 4 Discussion (Stage Record)

The stage record for WY2005 was incomplete due to dewatering of sensors in March 2005 that persisted through the end of the Water Year. A two week gap in the stage record possibly due to a failing battery in February was filled using regressed stage data from the Deep Creek station. During WY2005, discrepancies between the observed value of the primary gage index and the logged stage value were reconciled by manual adjustment of the continuous stage record.

Table 5. Rating Table Summary

Rating Table No.	2	3	
Period of Ratings	10/01-12/10	12/08-09/30	
Range of Ratings (cfs)	1.1-37.6	1.9-77.4	
No. of Defining Measurements	3	3	
Rating Error (%)	5.4	8.9	

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 (%)			

Table 5 Discussion (Rating Tables)

Two ratings coupled to the stage record were used to predict discharge in WY2005. A moderately large storm event in December 2004 resulted in relatively severe scour of the control at the station, resulting in the shift from rating 2 to rating 3. As mentioned earlier, this event and subsequent scour of the channel may have been primarily responsible for dewatering of the gaging station sensors.

Table 6. Model Summary

Model Type (Slope conveyance, other, none)	
Range of Modeled Stage (feet)	
Range of Modeled Discharge (cfs)	
Valid Period for Model	
Model Confidence	

Table 6 Discussion (Modeled Data)

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

Type	Date
Station	09/26/2005

Table 7 Discussion (Surveys)

This survey confirmed that channel changes during the Water Year had disconnected the gaging station sensors from the main channel. The survey was of limited usefulness for this reason and because the station was moved approximately 100 meters downstream 2 weeks after the survey was completed.

Activities Completed

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