WASHINGTON DEPARTMENT OF ECOLOGY

ENVIRONMENTAL ASSESSMENT PROGRAM

FRESHWATER MONITORING UNIT

STREAM DISCHARGE TECHNICAL NOTES

STATION ID: 01C070

STATION NAME: Hutchinson Creek near Acme

WATER YEAR: 2019

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Introduction

Watershed Description

Hutchinson Creek drains a forested basin in the North Cascades foothills that lies between Bowman Mountain on the East and its confluence with the South Fork Nooksack River on the West. The creek supports populations of steelhead, coho salmon, and cutthroat trout. Above the gage, the basin ranges in elevation from 530 ft up to 4220 ft along the mountain ridges to the East. The mean elevation is 1750 ft. About 72% of the area is covered by the forest canopy. The average annual precipitation is about 70 in.

Gage Location

This stream gage is located on the left bank at an unmarked Washington State Department of Natural Resources bridge off Mosquito Lake Road in Whatcom County, WA.

Table 1. Basin Area and Legal Description

Drainage Area (square miles)	14.0
Latitude (degrees, minutes, seconds)	48° 43' 27.84" N
Longitude (degrees, minutes, seconds)	-122° 9' 7.90" W

Table 2. Discharge Statistics.

Mean Annual Discharge (cfs)	35
Median Annual Discharge (cfs)	24
Maximum Daily Mean Discharge (cfs)	161
Minimum Daily Mean Discharge (cfs)	2.6
Maximum Instantaneous Discharge (cfs)	188
Minimum Instantaneous Discharge (cfs)	2.3
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	82
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	5.1
Number of Days Discharge is Greater Than Range of Ratings	3
Number of Days Discharge is Less Than Range of Ratings	0
Number of Un-Reported Days	3
Number of Days Qualified as Estimates	232
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)

Discharge at Hutchinson Creek near Acme gaging station reached its lowest point on October 23, 2018 and peaked January 1, 2019.

Three days were greater than the range of ratings. These rating exceedances correspond to storm events at the beginning of November and January. A total of three days were unreported in Water Year 2019.

Two hundred thirty-two days were qualified as estimates. These were qualified as estimates based on logger drift error assessment and excessive noise. A large portion of the estimated days came during a period from mid-January to early June where there was a persistent large difference between the primary gage index and the recording equipment. The issue was attributed to being a leaking gasket on the stage measurement device.

Table 3. Error Analysis Summary.

Potential Logger Drift Error (% of discharge)	39.8
Potential Weighted Rating Error (% of discharge)	10.8
Total Potential Error (% of discharge)	50.6

Table 3 Discussion (Error Analysis)

The Logger Drift Error is based on a statistical analysis comparing automated gage height readings to quality assurance gage height observations made during periodic station visits. The largest source or error is attributed to this type of error during this water year due to the issue described in the Table 2 discussion.

Similarly, the Weighted Rating Error is calculated using a composite analysis of the level of quality assigned to each discharge measurement used to define each rating table.

Table 4. Stage Record Summary

Minimum Recorded Stage (feet)	0.55
Maximum Recorded Stage (feet)	3.11
Range of Recorded Stage (feet)	2.56

Table 4 Discussion (Stage Record)

The minimum stage occurred toward the end of October 2018, during the typical end of the summer low-flow period. The maximum recorded stage occurred during a high-flow storm event on the first day of January 2019.

Table 5. Rating Table Summary

Rating Table No.	212	162	213
Period of Ratings	10/1/2018-11/07/2018	10/26/2018-04/23/2019	04/18/2019-08/27/2019
Range of Ratings (cfs)	0.39-203	0.39-203	0.39-203
No. of Defining Measurements	7	18	9
Rating Error (%)	10.6	10.5	11.6

Rating Table No.	22	221	
Period of Ratings	7/18/2019-09/30/2019	9/14/2019-09/30/2019	
Range of Ratings (cfs)	0.10-96	0.10-96	
No. of Defining Measurements	1	1	
Rating Error (%)	10.6	10.6	

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

Table 5 Discussion (Rating Tables)

Rating 212 is a holdover from the previous water year.

Filling of the gage pool over a series of high flow events resulted in Rating 162.

Scour of the gage pool over a moderate storm event resulted in Rating 213.

A small but intense summer rain event filled the gage pool and resulted in Rating 22.

Table 6. Model Summary

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

Table 6 Discussion (Modeled Data)

None.

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

Type	Date
None	

Table 7 Discussion (Surveys)

None.

Activities Completed

Replaced the failing water temperature thermistor. A new laser level pad was installed to facilitate increased accuracy during station surveys which will carry forward into primary gage index readings. The location of the original laser level pad was in a location such that it could not be surveyed as accurately as desired.

Appendix