

**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:** 2020  
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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 feet up to 4220 feet along the mountain ridges to the east. The mean elevation is 1750 feet. About 72 percent of the area is covered by forest canopy. Average annual precipitation is about 70 inches.

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)                               | 46   |
| Median Annual Discharge (cfs)                             | 39   |
| Maximum Daily Mean Discharge (cfs)                        | 197  |
| Minimum Daily Mean Discharge (cfs)                        | 4.5  |
| Maximum Instantaneous Discharge (cfs)                     | 274  |
| Minimum Instantaneous Discharge (cfs)                     | 4.5  |
| Discharge Equaled or Exceeded 10 % of Recorded Time (cfs) | 96.7 |
| Discharge Equaled or Exceeded 90 % of Recorded Time (cfs) | 7.4  |
| Number of Days Discharge is Greater Than Range of Ratings | 15   |
| Number of Days Discharge is Less Than Range of Ratings    | 0    |
| Number of Un-Reported Days                                | 15   |
| Number of Days Qualified as Estimates                     | 78   |
| 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)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Discharge at Hutchinson Creek near Acme gaging station reached its lowest point September 20, 2020 and peaked February 1, 2020.</p> <p>Fifteen days were greater than the range of ratings. These rating exceedences correspond to storm events at the beginning of November and January. A total of fifteen days were unreported in Water Year 2020.</p> <p>Seventy-eight days were qualified as estimates. These were qualified as estimates based on logger drift error assessment, excessive noise, erratic stage behavior, and unexplained drops in stage.</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 3. Error Analysis Summary.

|                                                  |      |
|--------------------------------------------------|------|
| Potential Logger Drift Error (% of discharge)    | 8.4  |
| Potential Weighted Rating Error (% of discharge) | 11.6 |
| Total Potential Error (% of discharge)           | 20.0 |

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.

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)  | 0.69 |
| Maximum Recorded Stage (feet)  | 4.21 |
| Range of Recorded Stage (feet) | 3.52 |

Table 4 Discussion (Stage Record)

|                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Minimum stage occurred toward the end of September 2020, a little ahead of the typical end of the summer low-flow period. The maximum recorded stage occurred during a high-flow storm event on February 1, 2020. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 5. Rating Table Summary

|                              |                      |                      |                     |
|------------------------------|----------------------|----------------------|---------------------|
| Rating Table No.             | 22                   | 163                  | 23                  |
| Period of Ratings            | 7/18/2019-10/07/2019 | 10/7/2019-10/28/2019 | 10/21/2019-1/7/2020 |
| Range of Ratings (cfs)       | 0.10-96              | 0.39-350             | 0.50-203            |
| No. of Defining Measurements | 1                    | 23                   | 3                   |
| Rating Error (%)             | 10.6                 | 11.0                 | 12.4                |

|                              |                      |                     |                     |
|------------------------------|----------------------|---------------------|---------------------|
| Rating Table No.             | 141                  | 231                 | 164                 |
| Period of Ratings            | 12/23/2019-2/11/2020 | 1/31/2020-7/13/2020 | 3/29/2020-9/30/2020 |
| Range of Ratings (cfs)       | 2-448                | 0.50-203            | 0.39-350            |
| No. of Defining Measurements | 7                    | 3                   | 23                  |
| Rating Error (%)             | 10.6                 | 12.4                | 11.0                |

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

Table 5 Discussion (Rating Tables)

Rating 22 is a hold over from the previous water year. Filling of the gage pool over a high flow event results in Rating 163. Filling of the gage pool over several moderate storm events and a large storm event resulted in Rating 23. Continued filling of the gage pool due to several large storm events resulted in Rating 141. Scouring of the gage pool over several small and moderate events led to Rating 231. Continued scouring of the gage pool over many small and moderate storm events led to Rating 164.

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       |
|---------|------------|
| Station | 10/29/2019 |

Table 7 Discussion (Surveys)

A survey was conducted to include the newly-placed laser level pad which functions as the primary gage index. The laser level pad was moved to facilitate more accurate surveys in the future. The old laser level pad was difficult to survey due to its placement in an area where the stadia rod was not perfectly plumb.

Activities Completed

Replaced the failing DCP with new Sutron equipment. Six flow measurements and one site visit were conducted during WY 2020. Fewer than normal flow measurements were conducted due to travel restrictions related to the COVID-19 pandemic.

## Appendix