

Salmon Creek Gaging Station near Juneau, Alaska

Station Description and Analysis 2016

LOCATION.—Lat 58°19'57", long 134°27'57" referenced to North American Datum of 1927, and Lat 58°19'56", long 134°28'04" referenced to World Geodetic System 1984. Gage is located on the left bank (when facing downstream), about 0.3 mi upstream from the mouth and 2.5 mi northwest of Juneau.

DRAINAGE AREA.—Drainage area 9.69 mi² as reported by the USGS, flows are regulated.

ESTABLISHMENT AND HISTORY.—Gage established on April 27, 2016 at the location of U.S. Geological gaging station number 15051010.

GAGE.—A Campbell Scientific CS450 vented and temperature compensated transducer is coupled to a Campbell Scientific CR6 data logger and records stage data in 15 minute intervals. The transducer is housed in 1 inch galvanized pipe and set and referenced to vertical datum established by the U.S. Geological Survey (see reference marks). Additional equipment housed in a gage house on left bank.

CONTROL.—Low flow control is a boulder/cobble riffle immediately below the orifice and staff gage. The channel is the control at medium and high stages. Shifting from the rating is possible at all stages as the gage reach can be alternately scoured and filled.

DISCHARGE MEASUREMENTS.—Measurements are made by wading in the vicinity of the gage. High flow measurements can be measured from a bridge approximately 0.25 mi downstream.

FLOODS.—U.S. Geological Survey recorded a maximum discharge of 2110 ft³/s, Nov. 22, 2005 and gage height 4.20 ft. Minimum discharge recorded by the U.S. Geological Survey was 3.5 ft³/s, March 17-20, 2006.

WINTER FLOW.—The stage-discharge relationship will be periodically affected by ice during cold periods most winters.

REGULATION AND DIVERSIONS.—Flow is regulated by Salmon Creek Reservoir located 2 miles upstream. Diversion upstream for off-stream hydropower plant; outflow from the plant goes into Gastineau Channel and is not included in the discharge records.

ACCURACY.— Accuracy of the discharge records should be fair to good with the exception of ice affected record which will be fair to poor.

REFERENCE MARKS.—The gage is referenced to several vertical reference marks (RMs) established by the U.S. Geological Survey to accurately track vertical datum for the gage. The existing gage will continue to reference these RMs to maintain accurate vertical datum.

RM 1 – Brass cap anchored in concrete 2 feet shoreward of the orifice on left bank, elevation 2.44 feet. This RM is the base RM from which to begin level surveys.

RM 4 – Lag bolt driven in 3 foot diameter spruce tree 20 feet from the left edge of water and 30 feet upstream of the orifice and outside staff gage, elevation 10.82 feet.

RP 1 – ¼ inch anchor bolt drilled in concrete block 1 foot upstream of orifice, elevation 2.44 feet.

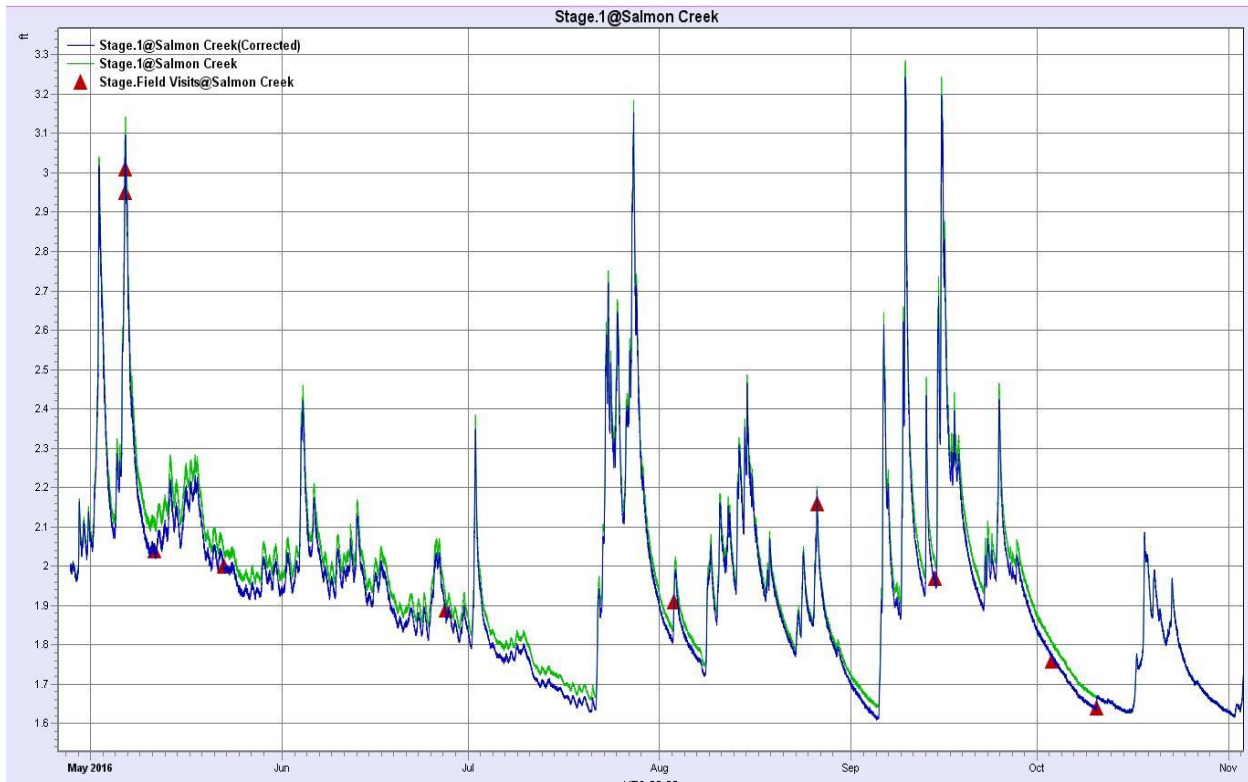
RM 5 – ¼ inch lag bolt on upstream side of two foot diameter cottonwood 25 feet from left edge of water and 12 feet downstream of the orifice, elevation 8.574 feet.

RM 6 – ¼ inch lag bolt on upstream side of 1 foot diameter spruce tree, 15 feet from the left edge of water and 15 feet upstream of the orifice, elevation 7.774 feet.

STATION ANALYSIS

GAGE HEIGHT RECORD.—The gage height record is complete from installation on April 27, 2016 with no periods of missing record.

GAGE HEIGHT CORRECTIONS.—Gage height corrections to the recorder are used to adjust for differences between the recorded values and readings of the outside reference gage during site visits. A plot of corrected gage heights and measured field values of gage height is shown below in figure 1.



Stage data from Salmon Creek gaging station showing raw and corrected recorded values and field readings from the outside reference gage.

Corrections to gage height were applied as follows:

4/27/16 to 5/11/16: correction of 0.00 ft prorated to -0.07 ft

5/11/16 to 5/22/16: correction of -0.07 ft prorated to -0.04 ft (level survey)

5/22/16 to 8/03/16: correction of -0.04 ft prorated to -0.03 ft

8/03/16 to 8/26/16: correction of -0.03 ft prorated to -0.01 ft

8/26/16 to 9/14/16: correction of -0.01 ft prorated to -0.05 ft

9/14/16 to 10/10/16: correction of -0.05 ft prorated to -0.03 ft

DATUM CORRECTIONS.— Level survey conducted on May 22, 2016. No datum corrections were needed.

RATING.— Rating 1 was developed by the USGS and continued in use for the 2016 water year. The gage reach is under section control at low to midrange discharges. The gage reach is subject to scour and fill during peak flows and during lower discharges when salmon spawn throughout the gage reach. Nine discharge measurements were used for rating analysis, including five discharge measurements conducted by the USGS. Discharge measurements ranged from 12.8 to 366 ft³/s. Rating curve and rating equation points are shown below:

Rating Curve

Salmon Creek Rating 2016 - Used to compute discharge with stage variable shift.

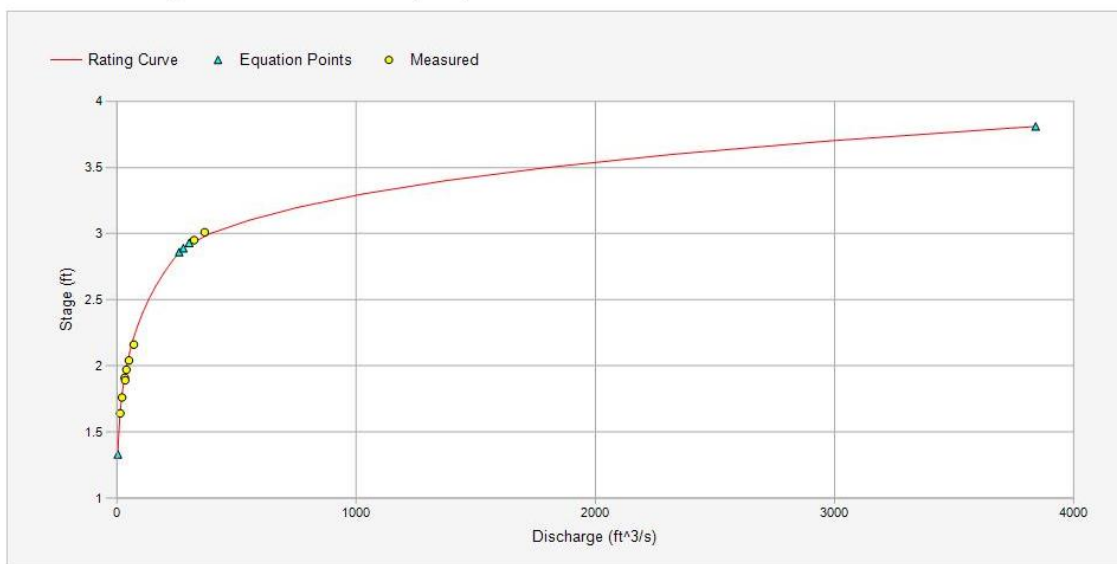
Label: Salmon Creek

Description: Site ID-Salmon Creek

Curve on: November 4, 2016

Curve Start Date: April 20, 2015

Location: Salmon Creek Juneau



Date Processed: November 4, 2016 14:47

Rating Curve

Salmon Creek Rating 2016 - Used to compute discharge with stage variable shift.

Label: Salmon Creek

Description: Site ID-Salmon Creek

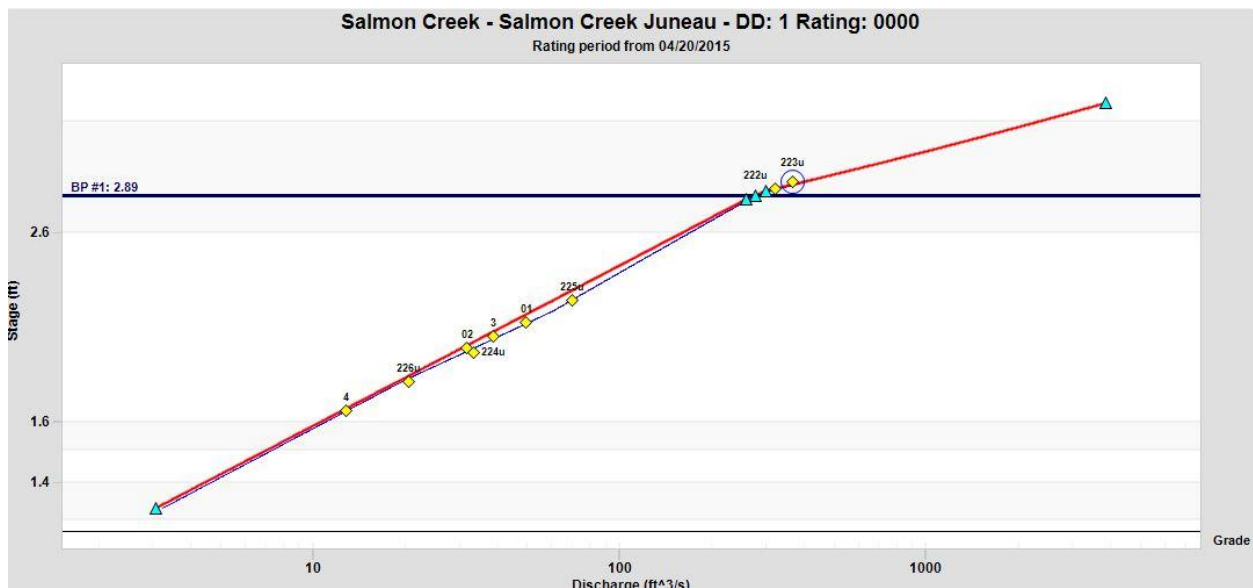
Curve on: November 4, 2016

Curve Start Date: April 20, 2015

Location: Salmon Creek Juneau

Stage	0	1	2	3	4	5	6	7	8	9
1.00	0.00	0.00	0.00	0.00	4.41	7.00	10.59	15.39	21.66	29.65
2.00	39.66	51.99	66.97	84.96	106.32	131.45	160.76	194.69	233.68	282.63
3.00	389.17	550.06	760.28	1,030.42	1,372.48	1,799.96	2,327.99	2,973.35	3,754.63	

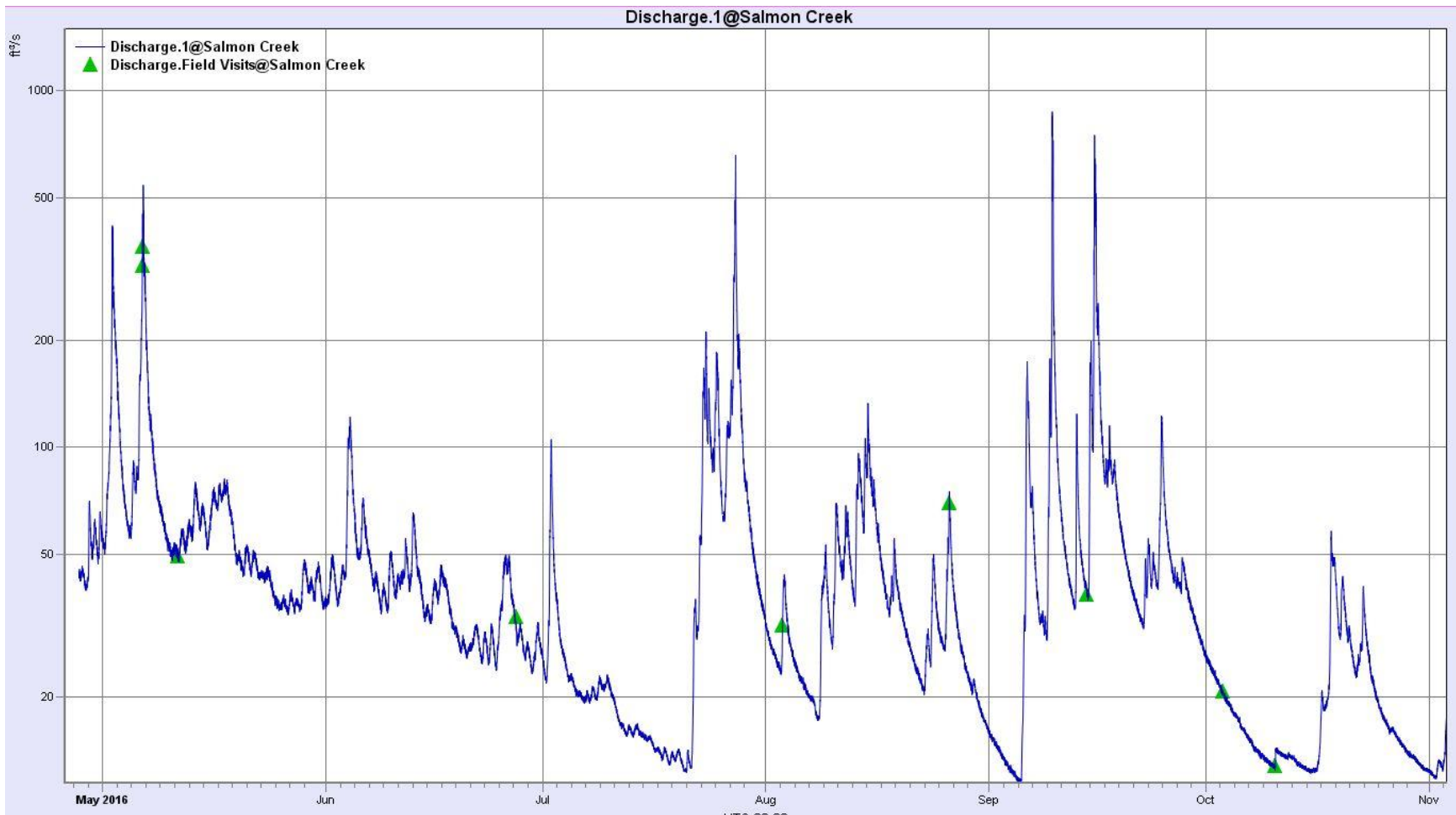
DISCHARGE RECORD.—Rating number 1 was used to compute discharge with a single stage variable shift to adjust for slight scour conditions. The shift was defined by measurements 1-4 and three measurements made by the USGS. The shifted rating is shown below. The stage variable shift is in effect below stages of 3.08 feet.



REMARKS.— Records of discharge are complete. Discharge records are fair due to drift in stage recordings and the relatively poor gage reach and lack of cross sections available to consistently make good discharge measurements. The stage variable shift used to compute discharges for the 2016 would not be needed if a slight offset adjustment was made to the existing rating. If future measurements follow similar patterns the rating will be recomputed to better fit the observed measurements. The following files are included as an attachment to this document:

Salmon Creek 15 min 2016 WY- containing discharge values in 15 min time steps.

Salmon Creek daily mean discharge- containing daily mean discharge values.



Computed stream discharge and field measurements for Salmon Creek near Juneau, Alaska from April 27 – October 9, 2016.